

OLD DOMINION  
EMERGENCY MEDICAL SERVICES  
ALLIANCE



2013 REGIONAL PREHOSPITAL  
PATIENT CARE PROTOCOLS

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# 2012 Regional Prehospital Patient Care Protocols

## For

### Basic and Advanced Life Support Providers

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# Section 1-1

**SECTION:** Introduction

**PROTOCOL TITLE:** Purpose and Use

**REVISED:** 5/2012

The purpose of these protocols is to establish guidelines between EMS administration, the EMS provider and medical direction for the management, treatment and transport of specific medical emergencies.

These guidelines are intended to assist in achieving excellent, consistent prehospital care for patients. The following guidelines are not intended to provide a solution to every problem which may arise. The guidelines set forth are not designed nor intended to limit the EMS provider in the exercise of good judgment or initiative in taking reasonable action in extraordinary circumstances. If **MC** is listed in the grid for the intervention, the provider must call **medical control** to obtain permission for the intervention.

Prehospital care is a shared responsibility between the operational medical director, online medical control physician, and the EMS provider. The services which EMS providers are authorized to perform pursuant to the Virginia Emergency Medical Services Regulations shall be performed by the EMS provider only pursuant to the written or verbal authorization of the operational medical director or online physician medical control. If **MC** is listed in the grid for the intervention, the provider must call **medical control** to obtain permission for the intervention.

Our objective is not only to serve the citizens and residents of our region, but also to give them our best possible prehospital care. We will measure up to the high standard required of emergency medical services, only by coordinating our operations, working together, and maintaining a high degree of professionalism.

The following levels of EMS certification are recognized in ODEMSA. Both the traditional levels and the new scope of practice levels are listed. EMS provider levels are referenced in the protocols based on the associated level of certification recognized by the Virginia Office of Emergency Medical Services.

Level	Designation
First Responder / EMR	A
EMT - Basic / EMT	B
EMT - Enhanced / AEMT	EN
EMT - Intermediate	I
EMT - Paramedic / Paramedic	P

# Section 1-1

Continued

## PURPOSE AND USE

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# Section 1-2

**SECTION:** Introduction

**PROTOCOL TITLE:** Acknowledgements

**REVISED:** 05/2012

ODEMSA is proud to continue our long history of providing progressive regional protocols which set the standard of care for our boundaries. As the regional council, established by law within the Code of Virginia, Section 32.1-111.11 to coordinate EMS, it is the mission of ODEMsa to assess, identify, coordinate and implement an effective regional EMS delivery system within the planning districts of 13, 14, 15 and 19.

The ODEMsa region has benefited from the resulting Standard of Care that has been maintained and frequently enhanced by the ODEMsa Medical Control Committee. The Committee is comprised of physicians that represent hospital emergency departments, EMS agency Operational Medical Directors (OMDs), trauma surgeons, and other physicians with an interest in or specialty that involves emergency medicine. While the Virginia Office of EMS, Virginia Department of Health, sets the minimum patient care standards, the ODEMsa Medical Control Committee, in concert with other standing ODEMsa Committees, establishes the region's Standard of Care and oversees its Prehospital Patient Care Protocols.

The area that encompasses the ODEMsa region; Virginia Planning Districts 13, 14, 15 and 19 services 17 acute care hospitals, 2 free standing emergency departments, 106 licensed EMS agencies, and at present time, 5,900 certified EMS providers. The vast majority of these providers have been trained within the ODEMsa service area.

The ODEMsa Board of Directors thanks each person who took the time to review and revise the existing set of protocols and to write new protocols that reflect the current, state of the art patient care. While it is impossible to list everyone, we would like to acknowledge a number of individuals. We particularly are indebted to members of the ODEMsa Protocol Workgroup which include: Holly Ann Sturdevant, CC NREMT-P, Dempsey Whitt, FP CC NREMT-P, Camela Crittenden, RN, Ray George, EMT-B, Eric Albert, NREMT-P, Wayne Harbour, NREMT-P and Tracy Thomas, CC NREMT-P. We would also like to acknowledge the individual work of Shawn Mease, CC NREMT-P.

Special thanks go to Richmond Fire and Emergency Services – ESU Division for 700<sup>+</sup> hours of editing and formatting. We would also like to thank Richmond Ambulance Authority and Chesterfield Fire and EMS for the use of their contributing resources. We also owe a debt of gratitude to Bon Secour's Hospitals, Centra Health Systems, Community Health Systems, Community Memorial Health Center, HCA Health Systems, Halifax Regional, McGuire VA, VCU Health System and the Virginia Poison Center. And, finally, a special thank you to the respective agencies that provided personnel to work on these protocols.

We would like to recognize everyone who had a role in this life-saving project. No doubt with the volume of help that was received, we may have unintentionally missed some individuals. For any such oversight, we apologize. ODEMsa's goal is to review these protocols periodically and to update individual protocols whenever necessary. We invite EMS providers, out-of-hospital and hospital, to contact ODEMsa at any time with suggestions, questions or comments.

## ACKNOWLEDGEMENTS

# Section 1-2

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## ACKNOWLEDGMENTS

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# Section 1-3

**SECTION:** Introduction

**PROTOCOL TITLE:** Academic Acknowledgements

**REVISED:** 05/2012

**ODEMSA would like to acknowledge the authors and publishers of the following sources. These reference materials were utilized in multiple locations throughout these protocols.**

## Texts:

*Paramedic Care: Principles and Practice Volumes 1 - 5: Trauma Emergencies, 3<sup>rd</sup> Edition*

- By Bryan E. Bledsoe, Robert S. Porter, Richard A. Cherry  
Published Mar 14, 2008; by Prentice Hall

*OB Stat Course Reference Manual*

- <http://www.obstat.org/>

*Critical Care Paramedic*

- By Bryan E. Bledsoe, Randall W. Benner  
Published Dec 19, 2005; by Prentice Hall

*Essentials of Prehospital Maternity Care*

- By Bonnie Urquhart-Gruenberg  
Published Sep 28, 2005; by Prentice Hall

*Advanced Medical Life Support, 3<sup>rd</sup> Edition*

- By Twink M. Dalton, Daniel J. Limmer, Joseph J. Mistovich, Howard Werman  
Published Aug 4, 2006; by Prentice Hall

*Manual of Emergency Airway Management*

- By Ron M. Walls, Robert C. Luten, Michael F. Murphy, Robert E. Schneider  
Published May 3, 2004; by Lippincott Williams & Wilkins

*Flight and Ground Transport Nursing Core Curriculum; ISBN 0-9718090-4-6*

- By Donna York Clark, Jacqueline Stocking, Jill Johnson  
Published 2010; by Air and Surface Transport Nursing Association

# Section 1-3

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## ACADEMIC ACKNOWLEDGMENTS

### *Pre-Hospital Trauma Life Support, 6th Edition*

- By the National Association of Emergency Medical Technicians  
Published 2007 by Mosby

### *Pediatric Advanced Life Support Provider Manual*

- By The American Heart Association  
Published 2010; Distributed by Channing Bete Company

### *Advanced Cardiac Life Support Provider Manual*

- By The American Heart Association  
Published 2010; Distributed by Channing Bete Company

### *Basic Life Support for Healthcare Providers, Provider Manual*

- By The American Heart Association  
Published 2010; Distributed by Channing Bete Company

### Papers and Articles:

### *Virginia Commonwealth University Ischemic Stroke and TIA Care Plan and Acute Hemorrhagic Stroke, Intracerebral Hemorrhage (ICH) and Subarachnoid Hemorrhage (SAH) Care Plan Booklet*

- Revised June 1, 2008

### *Rhabdo and Acute Injury Review Article*

- NEJM 2009

### Websites:

#### The Brain Trauma Foundation

- <http://www.braintrauma.org>

#### The American Heart Association

- <http://www.heart.org/HEARTORG>

# Section 1-3

Continued

## Protocol Sources:

REMS Council Protocols

Life EVAC Protocols

Richmond Ambulance Authority

Chesterfield Fire and EMS

Southside Virginia Emergency Crew

Idaho Protocols

Maryland Protocols

South Carolina Protocols

# ACADEMIC ACKNOWLEDGMENTS

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## ACADEMIC ACKNOWLEDGMENTS

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# Section 1-4

**SECTION:** Introduction

**PROTOCOL TITLE:** Board of Directors and Faculty

**REVISED:** 06/2013

## 2013 Old Dominion EMS Alliance Board of Directors and Council Officers

**R. D. "Rick" McClure**, Board President, ODEMSA EMS Advisory Board Representative  
**David Salot**, Board Vice President, Crater Council President PD - 19  
**Ellen Buchanan**, Board Secretary, Crater Council Healthcare Rep. PD - 19  
**David G. Norman**, Board Treasurer, South Central Council President PD - 14  
**Allen S. Bober**, Southside Council President PD - 13  
**Helen T. Compton**, Southside Council Prehospital Representative PD - 13  
**Bill Hogan**, South Central Council Prehospital Representative PD - 14  
**Kathleene "Kathi" Manis, R.N.**, South Central Council Healthcare Rep. PD - 14  
**Eddie Ferguson**, Metro Richmond Council President PD - 15  
**Bryan McRay**, Metro Richmond Council Prehospital Representative PD - 15  
**Mindy Carter, R.N.**, Metro Richmond Council Healthcare Representative PD - 15  
**Pier Ferguson, R.N.**, Crater Council Prehospital Representative PD - 19  
**Allen Yee, M.D.**, Regional Medical Director  
**Sean Moore**, Law Enforcement Officer  
**Heidi M. Hooker**, Executive Director

### Sub-Council Presidents

Southside EMS Council Planning District 13

*Allen S. Bober*, President

South Central EMS Council, Planning District 14

*David G. Norman*, President

Metro Richmond EMS Council, Planning District 15

*D. Eddie Ferguson*, President

Crater EMS Council, Planning District 19

*David Salot*, President

### ODEMSA Faculty

*Heidi M. Hooker*, EMT-P, Executive Director,

*Tracy Thomas*, CC NREMT-P, Administrative Coordinator

*Holly A. Sturdevant*, CC NREMT-P, Program Coordinator

*Lynn Barbour*, NREMT-P, Program Coordinator

*Delbert Garrett Sr.*, NREMT-P, Field Coordinator PD 13 - 14

*Max Bornstein*, NREMT-P, Field Coordinator PD 15 - 19

*Jessica Goodman*, NREMT-P, Program Coordinator

*Jane Behrend*, Office Manager

### Auxiliary Members

*Catina Downey*, CPA, Accountant

*Steven Bhatt*, NREMT-P, Clinical Coordinator

*Tracy Giddens-Jarrett*, NREMT-P, Consolidated Test Site Coordinator

## DIRECTORS AND FACULTY

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## DIRECTORS AND FACULTY

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# Section 1-5

**SECTION:** Introduction

**PROTOCOL TITLE:** Regional ALS Skills

**REVISED:** 05/2012

The following ALS skills have been approved, by the Old Dominion EMS Alliance (ODEMSA) Medical Control Committee, for ALS providers throughout the ODEMsa region. However, **the practice of any ALS skill by an individual Provider must be authorized in advance by the Provider's primary Operational Medical Director (OMD)**. If there is ANY doubt, check with your agency OMD.

**TD** – Technician Discretion per ODEMsa Protocols

**Medical Control** – Physician Order Required

**XXX** – Procedure Prohibited

**OMD Option** – Provider's Agency OMD Determines "Who" Can and Cannot Perform the Procedure

	AIRWAY	EMT - E/Adv	EMT - I	EMT - P
A.	Adult – Endotracheal Intubation	XXX	TD	TD
B.	Child < 8 - 12 – Endotracheal Intubation	XXX	XXX	TD
C.	Neonate ≤ 30 days – ET	XXX	XXX	TD
D.	Adult – Nasal Intubation	XXX	XXX	TD
E.	Multilumen or Supraglottic Airways	TD	TD	TD
F.	Neuromuscular Blockade for Intubation	XXX	XXX	OMD Option
G.	Surgical Cricothyrotomy	XXX	XXX	TD
H.	Needle Cricothyrotomy	XXX	XXX	TD
I.	Mechanical Ventilation (transport vent)	XXX	OMD Option	TD
J.	Needle Chest Decompression	XXX	TD	TD
K.	Suction Endotracheal	TD	TD	TD
L.	Meconium Aspiration Neonate w/ET	XXX	XXX	TD
M.	Gastric Decompression	OMD Option	TD	TD
N.	CPAP	OMD Option	OMD Option	OMD Option

# REGIONAL ALS SKILLS

# Section 1-5

Continued

## REGIONAL ALS SKILLS

	CIRCULATORY	EMT – E/Adv	EMT - I	EMT - P
A.	Peripheral IV	TD	TD	TD
B.	IV Fluid Bolus w/o Meds	TD	TD	TD
C.	Manual Defibrillation	XXX	TD	TD
D.	Intraosseous / IV	XXX	TD	TD
E.	IV Piggyback	XXX	TD	TD
F.	Synchronized Cardioversion	XXX	TD	TD
G.	Pacing	XXX	TD	TD
H.	External Jugular	XXX	TD	TD
I.	Access Permanent Indwelling IV	XXX	OMD Option	TD
J.	12 Lead ECG – Obtain	TD	TD	TD
K.	12 Lead ECG – Interpret	XXX	TD	TD

	MEDICATION ROUTE	EMT – E/Adv	EMT - I	EMT - P
A.	Inhaled – Nebulizer	TD	TD	TD
B.	Inhaled – MDI	TD	TD	TD
C.	Sublingual (SL)	TD	TD	TD
D.	Transdermal	TD	TD	TD
E.	Subcutaneous (SQ)	TD	TD	TD
F.	Oral (PO)	TD	TD	TD
G.	Intramuscular (IM)	TD	TD	TD
H.	Intravenous (IV)	TD	TD	TD
I.	Intranasal (IN)	OMD Option	OMD Option	OMD Option
J.	Endotracheal Tube	Medical Control	TD	TD
K.	Rectal (PR)	XXX	TD	TD

# Section 1-5

Continued

# REGIONAL ALS SKILLS

	MEDICATIONS	EMT – E/Adv	EMT - I	EMT - P
A.	Adenosine	XXX	TD	TD
B.	Albuterol	TD	TD	TD
C.	Amiodarone	XXX	TD	TD
D.	Aspirin (ASA)	TD	TD	TD
E.	Atropine Sulfate	XXX	TD	TD
F.	Atrovent	TD	TD	TD
G.	Bumetanide (Bumex)	XXX	TD	TD
H.	Calcium Chloride	XXX	TD	TD
I.	D <sub>25</sub>	XXX	TD	TD
J.	D <sub>50</sub>	TD	TD	TD
K.	Diazepam (Valium)	XXX	TD	TD
L.	Diphenhydramine (Benadryl)	TD	TD	TD
M.	Dopamine (Intropin)	XXX	Medical Control	TD
N.	Epinephrine 1 :1,000	XXX	TD	TD
O.	Epinephrine 1 :10,000	XXX	TD	TD
P.	Fentanyl (IN)	XXX	TD	TD
Q.	Furosemide (Lasix)	XXX	TD	TD
R.	Glucagon (IN)	TD	TD	TD
S.	Lorazepam (Ativan)	XXX	TD	TD
T.	Magnesium Sulfate	XXX	TD	TD
U.	Metoprolol (Lopressor)	XXX	Medical Control	Medical Control
V.	Midazolam (Versed) (IN)	XXX	TD	TD
W.	Naloxone (Narcan) (IN)	TD	TD	TD
X.	Nitroglycerin Tablets	TD	TD	TD
Y.	Nitropaste	TD	TD	TD
Z.	Odansetron (Zofran)	OMD Option	TD	TD
AA.	Prednisone	OMD Option	TD	TD
BB.	Sodium Bicarbonate	XXX	TD	TD
CC.	Ziprasidone (Geodon)	XXX	Medical Control	Medical Control

# Section 1-5

Continued

## REGIONAL ALS SKILLS

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# Section

# 2

**SECTION:** Adult Cardiovascular Emergencies

**REVISED:** 06/2013

# ADULT CARDIOVASCULAR EMERGENCIES

1.	<b><u>Non -Traumatic Chest Discomfort</u></b> <i>Medical – Chest Pain Non-Cardiac</i>	Protocol 2 - 1
2.	<b><u>ACS / AMI</u></b> <i>Medical – ST Elevation Myocardial Infarction (STEMI)</i>	Protocol 2 - 2
3.	<b><u>Heart Failure</u></b> <i>Medical – Pulmonary Edema/CHF</i>	Protocol 2 - 3
4.	<b><u>Cardiogenic Shock</u></b> <i>Medical – Hypotension/Cardiogenic Shock</i>	Protocol 2 - 4
5.	<b><u>Aortic Dissection &amp; AAA</u></b> <i>Medical – Abdominal Aortic Aneurysm/Dissection</i>	Protocol 2 - 5
6.	<b><u>BLS Pulseless Arrest</u></b>	Protocol 2 - 6
7.	<b><u>ALS Adult Cardiac Arrest</u></b> <i>General – Cardiac Arrest</i>	Protocol 2 - 7
8.	<b><u>Tachycardia with a Pulse</u></b> <i>Medical – Supraventricular Tachycardia (including atrial fibrillation)</i> <i>Medical - Ventricular Tachycardia with a Pulse</i>	Protocol 2 - 8
9.	<b><u>Bradycardia</u></b> <i>Medical - Bradycardia</i>	Protocol 2 - 9

# Section 2

Continued

**ADULT CARDIOVASCULAR EMERGENCIES**

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# Protocol

## 2-1

**SECTION:** Adult Cardiovascular Emergencies

**PROTOCOL TITLE:** Non-Traumatic Chest Discomfort  
**(Medical - Cardiac Chest Pain Non-Cardiac)**

**REVISED:** 06/2013

# NON-TRAUMATIC CHEST DISCOMFORT

### OVERVIEW:

Non-traumatic chest discomfort is a common pre-hospital patient complaint. It always should be considered life-threatening until proven otherwise. The discomfort may be caused by acute myocardial infarction (AMI) or angina pectoris, which is a sign of inadequate oxygen supply to the heart muscle. Risk factors which increase the likelihood of heart disease include > 50 years of age, history of hypertension, diabetes mellitus, hypercholesterolemia, smoking, and strong family history of coronary artery disease.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Age</li> <li>• Medications</li> <li>• PMH (MI, Angina, DM, HTN)</li> <li>• Allergies (ASA, Morphine)</li> <li>• Recent physical exertion</li> <li>• Onset</li> <li>• Quality (crushing, sharp, dull, constant, etc.)</li> <li>• Region/ Radiation / Referred</li> <li>• Severity (1 - 10)</li> <li>• Time (duration / repetition)</li> <li>• Erectile dysfunction medications such as: Viagra®, Levitra®, Cialis®</li> </ul>	<ul style="list-style-type: none"> <li>• CP (pressure, aching, and / or tightness)</li> <li>• Location (sub-sternal, epigastric, arm, jaw, neck, shoulder)</li> <li>• Radiation of pain</li> <li>• Pale, diaphoresis</li> <li>• Shortness of breath</li> <li>• Nausea, vomiting, dizziness</li> <li>• Non-specific illness</li> </ul>	<ul style="list-style-type: none"> <li>• Trauma vs. Medical</li> <li>• Angina vs. MI</li> <li>• Pericarditis</li> <li>• Mitral valve prolapse</li> <li>• Pulmonary embolism</li> <li>• Asthma / COPD</li> <li>• Pneumothorax</li> <li>• Aortic dissection or aneurysm</li> <li>• GI reflux, hiatal hernia</li> <li>• Esophageal spasm</li> <li>• Chest wall injury or pain</li> <li>• Pleural pain</li> <li>• Musculo-skeletal pain</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Treat dysrhythmias. Be prepared to initiate CPR and defibrillation, if necessary.	•	•	•	•	•
4. Administer supplemental oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
5. Obtain patient history. Reassure the patient.	•	•	•	•	•
6. Place patient on cardiac monitor.		•	•	•	•
a. Obtain a <u>12 lead ECG</u> , as soon as possible.		•	•	•	•

# Protocol 2-1

Continued

## NON-TRAUMATIC CHEST DISCOMFORT

	A	B	EN	I	P
b. Consider ALS rendezvous, especially when the 12-lead indicates the patient is experiencing a STEMI.		•	•		
c. When a 12 lead ECG indicates “***ACUTE MI***” <b>notify closest appropriate Emergency PCI center (cath hospital).</b>		•	•	•	•
7. Transport as soon as feasible.		•	•	•	•
8. Administer <u>ASPIRIN</u> 324 mg to <b>chew</b> .		•	•	•	•
9. Establish an IV of normal saline at KVO.			•	•	•
10. If history consistent with cocaine associated chest pain and 12 lead not indicative of STEMI, administer <u>MIDAZOLAM</u> 5 mg IV. Alternatively administer <u>DIAZEPAM</u> 2.5 - 5 mg IV. Skip to step 14				•	•
11. Administer <u>NITROGLYCERIN</u> .					
a. Assist patient with PRESCRIBED NITROGLYCERIN. If the pain persists and B/P > 100 mmHg systolic, repeat nitroglycerin 0.4 mg SL in 3 to 5 minutes (up to total of three SL doses).		•	•	•	•
b. Administer nitroglycerin 0.4 mg SL. If the pain persists and B/P > 100 mmHg systolic, repeat nitroglycerin 0.4 mg SL in 3 to 5 minutes (up to total of three SL doses).			•	•	•
12. If pain persists following administration of nitroglycerin SL, apply one (1) inch of nitroglycerin paste.			•	•	•
13. If pain persists following administration of a minimum of 3 SL nitroglycerin and nitroglycerin paste, consider <u>FENTANYL</u> titrated to pain relief at 1 mcg / kg IV/IM, not to exceed 50 mcg per single dose. May repeat every 10 minutes. Alternatively, administer <u>MORPHINE</u> 0.1 mg / kg IV at 1 mg / min., not to exceed 10 mg, titrated to effect.				•	•
14. Transport to appropriate hospital. Patients with ECGs consistent with STEMI should be transported ONLY to PCI CAPABLE HOSPITALS.		•	•	•	•
15. Transport and perform ongoing assessment as indicated.	•	•	•	•	•

### Acute Cocaine Toxicity

If 12-lead ECG does not indicate AMI and chest discomfort due to cocaine is suspected per HPI, administer Midazolam 5 mg slow IVP, or alternatively Valium 2.5 – 5.0 mg slow IVP.

# Protocol

## 2-1

Continued

# NON-TRAUMATIC CHEST DISCOMFORT

### Cardiac Causes of Chest Discomfort

Ischemic	Non-Ischemic
<ul style="list-style-type: none"> <li>• Angina</li> <li>• Myocardial infarction</li> <li>• Aortic stenosis</li> <li>• Hypertrophic cardiomyopathy</li> <li>• Coronary vasospasm</li> </ul>	<ul style="list-style-type: none"> <li>• Pericarditis</li> <li>• Aortic dissection</li> <li>• Mitral valve prolapse</li> </ul>

### Non-Cardiac Causes of Chest Discomfort

Gastro-esophageal	Pulmonary	Musculoskeletal	Dermatologic
<ul style="list-style-type: none"> <li>• Reflux esophagitis</li> <li>• Esophageal spasm</li> <li>• Esophageal perforation</li> <li>• Gastritis</li> <li>• Peptic ulcer disease</li> </ul>	<ul style="list-style-type: none"> <li>• Pneumothorax</li> <li>• Pulmonary embolism</li> <li>• Pleuritis</li> <li>• Neoplasm</li> <li>• Bronchitis</li> </ul>	<ul style="list-style-type: none"> <li>• Costochondritis</li> <li>• Rib fracture</li> <li>• Compression radiculopathy</li> </ul>	<ul style="list-style-type: none"> <li>• Herpes zoster</li> </ul>

Lead	Elevation	Reciprocal Depression
SEPTAL	V1, V2	NONE
ANTERIOR	V3, V4	NONE
ANTERO-SEPTAL	V1, V2, V3, V4	NONE
LATERAL	I, aVL, V5, V6	II, III, aVF
ANTERO-LATERAL	I, aVL, V3, V4, V5, V6	II, III, aVF
INFERIOR	II, III, aVF	I, aVL
INFERO-LATERAL	II, III, aVF, V5, V6	I, aVL, V1, V2
POSTERIOR	NONE	V1, V2, V3, V4

### PEARLS:

1. Many patients with an acute coronary syndrome do not have classic textbook symptoms. As age progresses, chest discomfort declines in frequency as the presenting symptom.
2. Women are more likely to have atypical presentations. Do not overlook vague complaints such as discomfort in the epigastric area, shortness of breath, back, jaw, and heartburn.
3. Ongoing chest discomfort that has been present for an extended period of time may still represent angina. Further questioning may reveal that the pain is actually intermittent since onset rather than constant.
4. Although most acute MI develop ECG changes, up to 1/3 do not develop any changes at all.
5. Do not attribute cardiac symptoms to other chronic underlying conditions, (i.e. hiatal hernia or esophageal spasm) without a thorough assessment. A new cardiac condition may have developed.

# Protocol 2-1

Continued

**NON-TRAUMATIC CHEST DISCOMFORT**

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# Protocol

## 2-2

**SECTION:** Adult Cardiovascular Emergencies

**PROTOCOL TITLE:** ACS / AMI  
**(Medical – ST Elevation Myocardial Infarction (STEMI))**

**REVISED:** 06/2013

### OVERVIEW:

Prompt diagnosis and treatment offers the greatest potential benefit for myocardial salvage in the first hours of STEMI; and early, focused management of unstable angina and NSTEMI reduces adverse events and improves outcome. Thus, it is imperative that healthcare providers recognize patients with potential ACS in order to initiate the evaluation, appropriate triage, and management as expeditiously as possible; in the case of STEMI, this recognition also allows for prompt notification of the receiving hospital and preparation for emergent reperfusion therapy. Potential delays to therapy occur during 3 intervals: from onset of symptoms to patient recognition, during prehospital transport, and during emergency department (ED) evaluation.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Age</li> <li>• Medications</li> <li>• PMH (MI, Angina, DM, HTN)</li> <li>• Allergies (ASA, Morphine)</li> <li>• Recent physical exertion</li> <li>• Onset</li> <li>• Quality (crushing, sharp, dull, constant, etc.)</li> <li>• Region / Radiation / Referred</li> <li>• Severity (1 - 10)</li> <li>• Time (duration / repetition)</li> <li>• Viagra®, Levitra®, Cialis®</li> </ul>	<ul style="list-style-type: none"> <li>• CP (pressure, aching, and / or tightness)</li> <li>• Location (sub-sternal, epigastric, arm, jaw, neck, shoulder)</li> <li>• Radiation of pain</li> <li>• Pale, diaphoresis</li> <li>• Shortness of breath</li> <li>• Nausea / vomiting, dizziness</li> <li>• Non-specific illness</li> </ul>	<ul style="list-style-type: none"> <li>• Trauma vs. Medical</li> <li>• Angina vs. MI</li> <li>• Pericarditis</li> <li>• Pulmonary embolism</li> <li>• Asthma / COPD</li> <li>• Pneumothorax</li> <li>• Aortic dissection or aneurysm</li> <li>• GI reflux, hiatal hernia</li> <li>• Esophageal spasm</li> <li>• Chest wall injury or pain</li> <li>• Pleural pain</li> </ul>

Lead	Elevation	Reciprocal Depression
SEPTAL	V1, V2	NONE
ANTERIOR	V3, V4	NONE
ANTERO-SEPTAL	V1, V2, V3, V4	NONE
LATERAL	I, aVL, V5, V6	II, III, aVF
ANTERO-LATERAL	I, aVL, V3, V4, V5, V6	II, III, aVF
INFERIOR	II, III, aVF	I, aVL
INFERO-LATERAL	II, III, aVF, V5, V6	I, aVL, V1, V2
POSTERIOR	NONE	V1, V2, V3, V4

### PEARLS:

1. Recognized PCI centers in the ODEMSA region include: (not listed in any particular order): VCU, St. Mary's, Chippenham, MRMIC, Henrico Doctor's Hospital (Forest), SRMC, St. Francis, Southside Regional Medical Center.
2. In right-sided infarctions, a prophylactic fluid bolus will assist with pre-load.

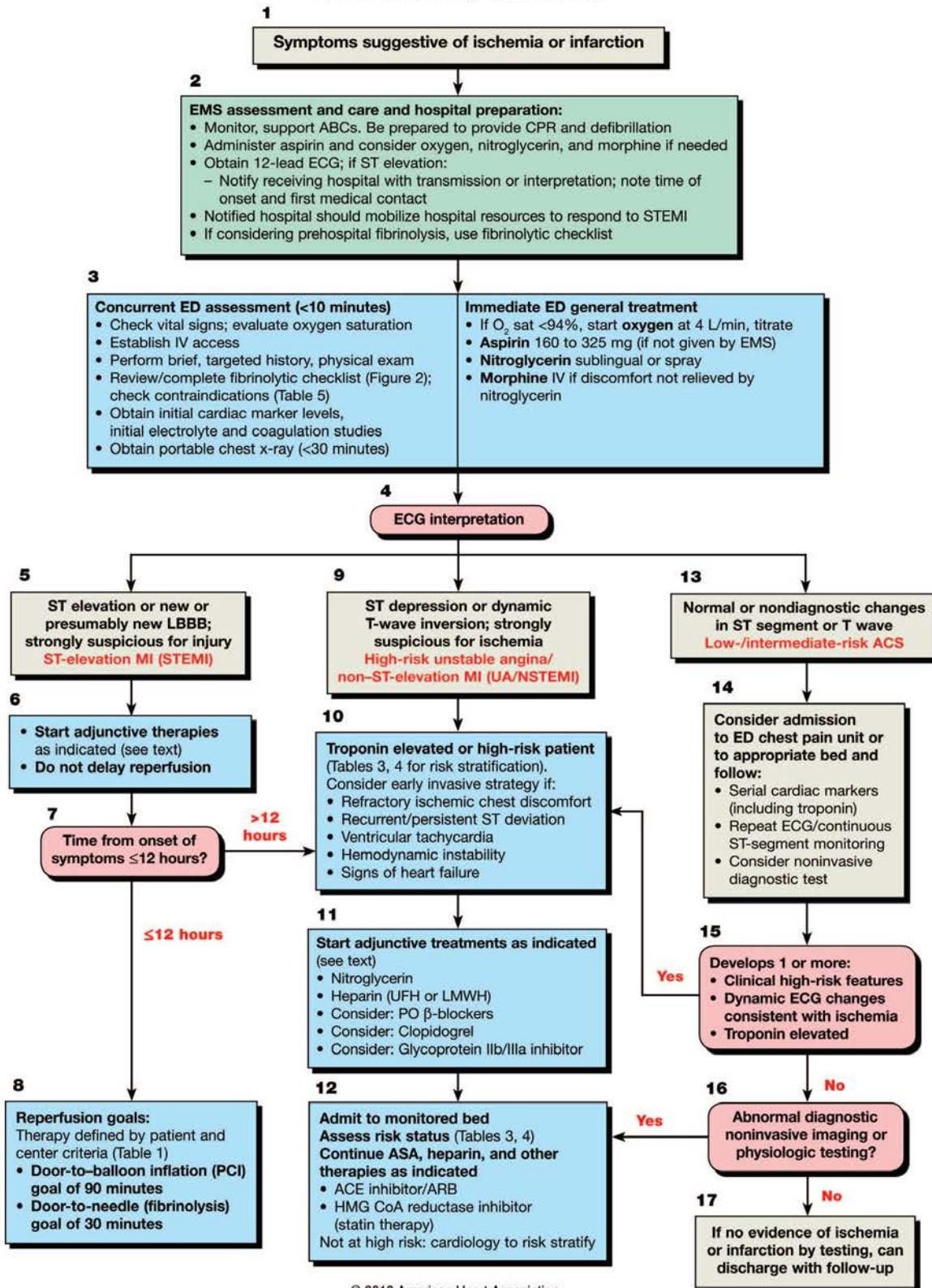
ACS / AMI

# Protocol 2-2

Continued

**ACS / AMI**

## Acute Coronary Syndromes



# Protocol 2-3

**SECTION:** Adult Cardiovascular Emergencies

**PROTOCOL TITLE:** Heart Failure  
**Medical – Pulmonary Edema/CHF**  
**REVISED:** 06/2013

## OVERVIEW:

Heart failure is generally divided into left ventricular failure and right ventricular failure. Left ventricular heart failure is the inability of the left ventricle to adequately move blood into the systemic circulation. In left ventricular failure, an imbalance in the output of the two sides of the heart occurs. The left ventricle is unable to move all the blood delivered to it from the right side of the heart. Left ventricular followed by left atrial pressure rises and is transmitted back to the pulmonary circulation. When the pressure in the pulmonary vessels becomes too high, blood serum is forced into the alveoli, resulting in pulmonary edema. In right ventricular heart failure the right side of the heart fails to function as an adequate pump, which leads to back pressure which leads to back pressure into the venous circulation. This is most commonly caused by left heart failure, which subsequently progresses to right heart failure. The patient's symptoms should assist in determining left versus right heart failure, or both. Signs of left sided heart failure include rales / crackles, tachypnea while right-sided failure will create JVD, ascites, and peripheral edema. The management goal of patients with HF involves decreasing cardiac workload by reducing both preload and afterload.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"><li>• Congestive heart failure</li><li>• Past medical history</li><li>• Medications (digoxin, lasix, Bumex)</li><li>▪ Erectile dysfunction meds: Cialis® (Tadalafil), Viagra® (Sildenafil), Levitra® (Vardenafil HCl)</li><li>• Cardiac history</li><li>• Myocardial infarction</li></ul>	<ul style="list-style-type: none"><li>• Respiratory distress, rales</li><li>• Apprehension, orthopnea</li><li>• Jugular vein distention</li><li>• Pink, frothy sputum</li><li>• Peripheral pitting edema</li><li>• Diaphoresis</li><li>• Tripod positioning</li><li>• Inability to speak in full sentences</li><li>• Accessory muscle usage with respiration</li><li>• Hypotension, shock</li><li>• Chest pain</li></ul>	<ul style="list-style-type: none"><li>• Myocardial Infarction</li><li>• Asthma</li><li>• Anaphylaxis</li><li>• Aspiration</li><li>• COPD</li><li>• Pleural effusion</li><li>• Pneumonia</li><li>• Pulmonary Embolus</li><li>• Pericardial Tamponade</li></ul>

**Pulmonary edema with SBP greater than or equal to 100 mmHg**  
If SBP less than 100 mmHg, see [Cardiogenic SHOCK protocol](#).

**HEART FAILURE**

# Protocol 2-3

Continued

## HEART FAILURE

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
4. <u>CPAP</u> is the preferred airway management over endotracheal intubation. Consider intubation for severe respiratory distress / pending respiratory failure.				•	•
5. Transport the patient immediately positioned in an upright position.		•	•	•	•
6. Monitor <u>pulse oximetry</u> .	•	•	•	•	•
7. Place patient on cardiac monitor and obtain/interpret <u>12 lead ECG</u> .				•	•
8. Establish an IV / lock of normal saline at KVO.				•	•
9. Give <u>NITROGLYCERIN</u> .					
a. SBP greater than 180: Give <u>NITROGLYCERIN</u> , 2 tablets, 0.4 mg SL and 2 inches of Nitropaste 2%. If respiratory distress persists <i>and</i> SPB greater than 180 <i>and</i> HR greater than or equal to 60 bpm, repeat nitroglycerin, 1 tablets SL every 5 minutes.				•	•
b. SBP 100 – 180: Give <u>NITROGLYCERIN</u> , 1 tablet, 0.4 mg SL and 1 inch of Nitropaste 2%. If respiratory distress persists <i>and</i> SPB greater than or equal to 100 mmHg <i>and</i> HR greater than or equal to 60 bpm, repeat nitroglycerin, 1 tablet SL every 5 minutes.				•	•
10. If available, administer <u>CPAP</u> with 5 - 10 cmH <sub>2</sub> O PEEP. If no CPAP available, continue with next step.		•	•	•	•
11. If obvious pulmonary edema noted on exam, consider <u>LASIX</u> 0.5 – 1.0 mg / kg slow IVP, if systolic BP > 90 mmHg.				•	•
12. If wheezing is present, consider bronchodilator therapy, <u>ALBUTEROL</u> 5.0 mg and <u>ATROVENT</u> 0.50 mg via nebulizer with 6 - 8 liters of Oxygen. Treatment should only be administered ONCE.				•	•
13. Consider <u>FENTANYL</u> titrated to pain relief at 1 mcg / kg IV/IM, not to exceed 50 mcg per single dose. May repeat every 10 minutes.				•	•
14. Transport and perform ongoing assessment as indicated.	•	•	•	•	•

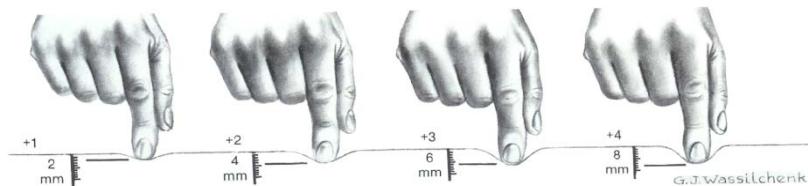
# Protocol 2-3

Continued

HEART FAILURE

## Assessment of Edema

+1	Slight pitting, disappears rapidly (2 mm)	+2	Deeper pit, disappears in 10 - 15 seconds (4 mm)
+3	Pit is noticeably deep and may last more than a minute. The extremity is fuller and swollen (6 mm)	+4	The pit is very deep, lasts 2 - 5 minutes, and the extremity is grossly distorted (8 mm)



### PEARLS:

1. The possibility of myocardial infarction should be assessed in all patients presenting with HF.
2. If the patient is currently taking daily diuretics, double the patient's normal prescribed dose.
3. In left ventricular failure, the apical pulse is usually displaced laterally and downward. There may additionally be a paradoxically split  $S_2$  /  $S_3$  gallop.
4. In right ventricular failure,  $S_3$  is often heard with a holosystolic murmur of tricuspid regurgitation.
5. Advise the receiving facility of CPAP initiation early so they can have CPAP ready on arrival.
6. Upon arrival at hospital, advocate for patient to remain on CPAP and do not remove CPAP until hospital equivalent respiratory therapy is ready to be placed on patient.

# Protocol 2-3

Continued

**HEART FAILURE**

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# Protocol

## 2-4

**SECTION:** Adult Medical Emergencies

**PROTOCOL TITLE:** Cardiogenic Shock  
**Medical – Hypotension/Cardiogenic Shock**

**REVISED:** 06/2013

### OVERVIEW:

Shock is often defined as a state of inadequate tissue perfusion. This may result in acidosis, derangements of cellular metabolism, potential end-organ damage, and death. Early in the shock process, patients are able to compensate for decreased perfusion by increased stimulation of the sympathetic nervous system, leading to tachycardia and tachypnea. Later, compensatory mechanisms fail, causing a decreased mental status, hypotension, and death. Early cellular injury may be reversible if definitive therapy is delivered promptly.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Blood loss (vaginal or gastrointestinal)</li> <li>AAA, ectopic</li> <li>Fluid loss (vomiting, diarrhea)</li> <li>Fever</li> <li>Infection</li> <li>Cardiac ischemia (MI, HF)</li> <li>Medications</li> <li>Allergic Reaction</li> <li>Pregnancy</li> </ul>	<ul style="list-style-type: none"> <li>Restlessness, confusion</li> <li>Weakness, dizziness</li> <li>Weak, rapid pulse</li> <li>Pale, cool, clammy skin</li> <li>Delayed capillary refill</li> <li>Difficulty breathing</li> <li>Hypotension</li> <li>Coffee-ground emesis</li> <li>Tarry stools</li> </ul>	<ul style="list-style-type: none"> <li>Shock</li> <li>Hypovolemic</li> <li>Cardiogenic</li> <li>Septic</li> <li>Neurogenic</li> <li>Anaphylactic</li> <li>Ectopic pregnancy</li> <li>Dysrhythmia</li> <li>Pulmonary embolus</li> <li>Tension pneumothorax</li> <li>Medication effect, overdose</li> <li>Vaso-vagal</li> <li>Physiologic (pregnancy)</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Assess mechanism of injury and / or nature of illness.	•	•	•	•	•
3. Administer Oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
4. If shock is present, without pulsating masses, refer to <u>Shock protocol</u> .	•	•	•	•	•
5. Place patient on cardiac monitor and obtain / interpret <u>12 lead ECG</u> .		•	•	•	•
6. Initiate IV of Normal Saline KVO. Establish second IV if time permits.			•	•	•
7. Administer Normal Saline 20 mL / kg bolus twice. Caution should be used in patients with a history of renal failure and HF. Reassess for overload.				•	•

# CARDIOGENIC SHOCK

# Protocol 2-4

Continued

## CARDIOGENIC SHOCK

	A	B	EN	I	P
8. If patient has not responded to boluses, contact medical control to consider the administration of <u>DOPAMINE</u> 5 - 20 mcg / kg / min for hypotension that remains after fluid bolus. Titrate to maintain adequate peripheral perfusion.				•	•
9. Transport promptly in position of comfort. Reassess as needed.		•	•	•	•

### Dopamine IV Infusion

Add 400 mg of Dopamine to 250 ml of NS (1600 mcg / ml) and attach 60 gtts IV tubing							
Mcg / min	Weight in kilograms						
	50 Kg 110 Lb	60 Kg 132 Lb	70 Kg 154 Lb	80 Kg 176 Lb	90 Kg 198 Lb	100 Kg 220 Lb	125 Kg 275 Lb
Microdrops / minute (ml / hr)							
5.0 mcg	9	11	13	15	17	19	23
10.0 mcg	19	23	26	30	34	38	47
15.0 mcg	28	34	39	45	51	56	70
20.0 mcg	38	45	53	60	68	75	94

### Classes of Shock

Hypovolemic	Distributive	Cardiogenic	Obstructive
Caused by hemorrhage, burns, or dehydration.	Maldistribution of blood, caused by poor vasomotor tone in neurogenic shock, sepsis, anaphylaxis, severe hypoxia, or metabolic shock.	Caused by necrosis of the myocardial tissue, or by arrhythmias.	Caused by impairment of cardiac filling, found in pulmonary embolism, tension pneumothorax, or cardiac Tamponade.

### PEARLS:

1. Circulatory failure is due to inadequate cardiac function.
2. Cardiogenic shock should be considered when an MI is suspected and there is no specific indication of volume related shock.
3. Pulmonary edema / HF may cause cardiogenic shock.
4. Marked, symptomatic tachycardia and bradycardia will cause cardiogenic shock.

# Protocol 2-5

**SECTION:** Adult Cardiovascular Emergencies

**PROTOCOL TITLE:** Aortic Dissection and AAA  
**Medical – Abdominal Aortic Aneurysm/Dissection**

**REVISED:** 06/2013

## OVERVIEW:

Aortic Aneurysms (AA) are a degenerative and progressively slow process where the walls of the aorta weaken and expand due to the systemic pressures of the circulatory system. The formation of aneurysms can be attributed to atherosclerosis, infection, trauma, hypertension, and inherited disorders. AAs generally form in the abdominal section of the aorta and present with weak or absent pulses in the lower extremities, cooler temperatures in the lower extremities, a central abdominal mass that can sometimes have pulsations, and abdominal and/or back pain. If the aneurysm ruptures, chance of survival is very low and requires immediate surgical intervention. Aortic Dissections usually occur in the thoracic cavity when the aortic intima is torn away, exposing the media layer. The pulse pressure from the systemic circulation then begins to dissect the two layers of the aortic wall and creates a false lumen or pouch in the wall of the aorta. Conditions associated with the formation of an aortic dissection include: hypertension, Marfan's Syndrome, aortic valve abnormalities, immune disorders, atherosclerosis, and patients in the third trimester of pregnancy. When left untreated, about 33% of patients die within the first 24 hours, and 50% die within 48 hours. The 2-week mortality rate approaches 75% in patients with undiagnosed ascending aortic dissection.<sup>1</sup>

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"><li>• Age</li><li>• Medications</li><li>• Viagra®, Levitra®, Cialis®</li><li>• PMH (MI, Angina, DM, HTN)</li><li>• Allergies (ASA, Morphine)</li><li>• Onset</li><li>• Quality (crushing, sharp, dull, constant, etc.)</li><li>• Region / Radiation / Referred</li><li>• Severity (1 - 10)</li><li>• Time (duration / repetition)</li></ul>	<ul style="list-style-type: none"><li>• Weak / absent pulses in lower extremities</li><li>• Cooler temperatures in lower extremities</li><li>• Central abdominal mass with possible pulsations</li><li>• Anterior chest / upper back pain</li><li>• “Tearing” sensation in back or chest</li><li>• Tachycardia</li><li>• Hypertension</li></ul>	<ul style="list-style-type: none"><li>• Trauma vs. Medical</li><li>• Angina vs. MI</li><li>• Pericarditis</li><li>• Pulmonary embolism</li><li>• Asthma / COPD</li><li>• Pneumothorax</li><li>• GI reflux, hiatal hernia</li><li>• Esophageal spasm</li><li>• Chest wall injury or pain</li><li>• Pleural pain</li></ul>

<sup>1</sup> Emedicine: Emergent Management of Acute Aortic Dissection

Author: John M Wiesenfarth, MD, FACEP, FAAEM; Chief Editor: Barry E Brenner, MD, PhD, FACEP

# Protocol 2-5

Continued

## AORTIC DISSECTION & AAA

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer <u>OXYGEN</u> , via non-rebreather mask, at 10 - 15 L / minute as necessary.	•	•	•	•	•
4. Obtain VS in both arms and assess distal pulses.	•	•	•	•	•
5. Place the patient on a monitor and obtain/interpret <u>12 lead ECG</u> ; Refer to appropriate <i>Cardiac Patient Care Protocol</i> as needed. <i>DO NOT administer ASA if acute MI is present in conjunction with suspected AAA or aortic dissection.</i>		•	•	•	•
6. Establish two IV of normal saline and titrate to a systolic B/P > 90 mmHg. Do not delay transport to establish second IV.			•	•	•
7. Administer <u>FENTANYL</u> 1mcg / kg or <u>MORPHINE</u> 2.5 - 5.0 mg as needed, per <i>Pain Management Patient Care Protocol</i> .				•	•
8. Administer <u>ONDANSETRON</u> (Zofran) 0.1 mg / kg slow IVP as needed per <i>Nausea and Vomiting</i> protocol.				•	•
9. Consider <u>DOPAMINE</u> Infusion 5 - 20 mcg / kg / minute for hypotension. <b>Titrate to systolic B/P &gt; 90 mmHg</b>				•	•
10. Transport and perform ongoing assessment as indicated.	•	•	•	•	•

### Dopamine IV Infusion

Add 400 mg of Dopamine to 250 ml of NS (1600 mcg / ml) and attach 60 gtt/s IV tubing

Mcg / min	Weight in kilograms						
	50 Kg 110 Lb	60 Kg 132 Lb	70 Kg 154 Lb	80 Kg 176 Lb	90 Kg 198 Lb	100 Kg 220 Lb	125 Kg 275 Lb
microdrops/minute (ml/hr)							
5.0 mcg	9	11	13	15	17	19	23
10.0 mcg	19	23	26	30	34	38	47
15.0 mcg	28	34	39	45	51	56	70
20.0 mcg	38	45	53	60	68	75	94

### PEARLS:

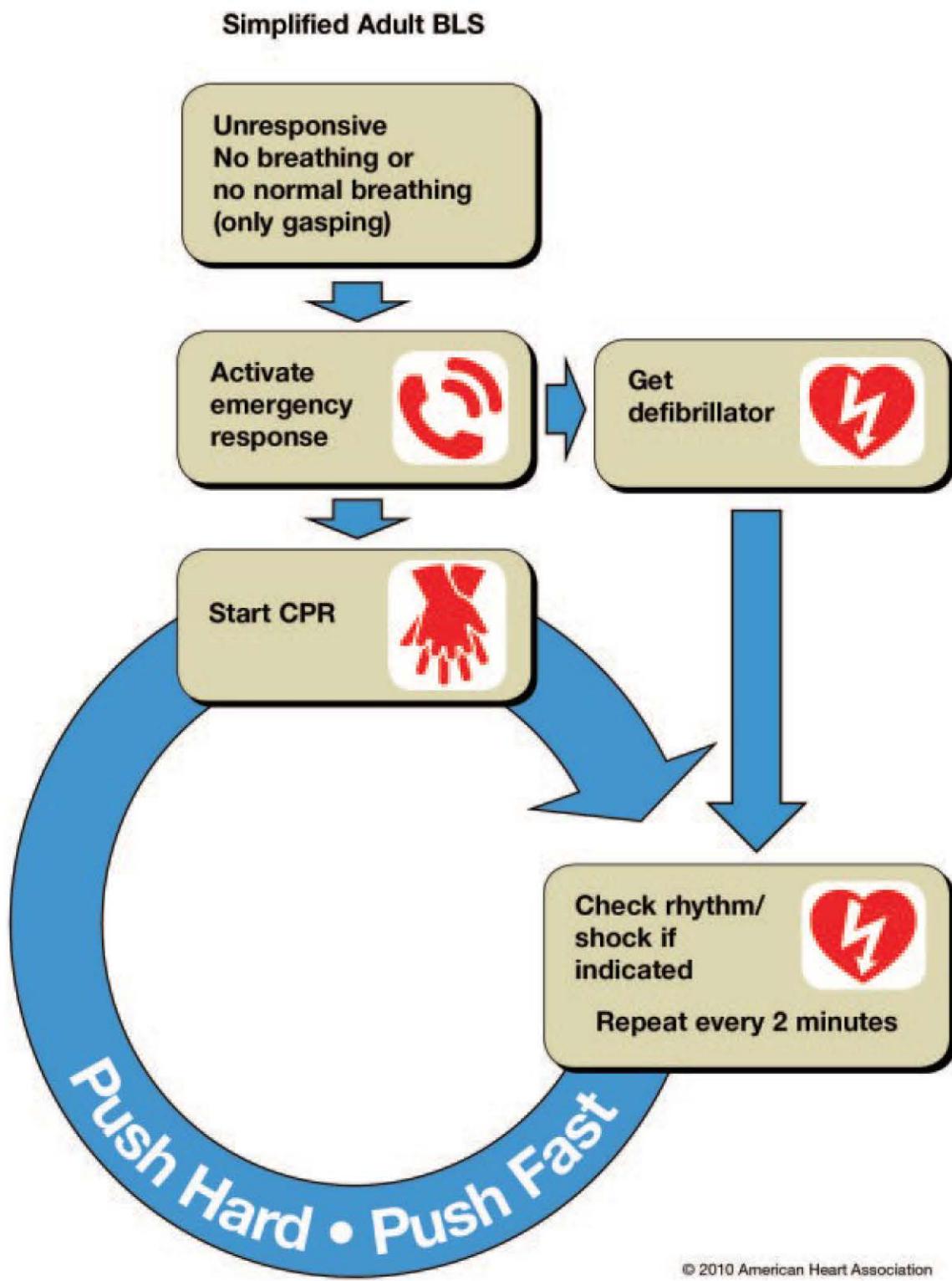
1. Treatment goals are to maintain systolic BP 90 -120 mmHg and heart rate between 50 - 80 bpm.
2. Do not delay transport for any reason if possible, interventions should be done enroute to appropriate facility.
3. Abdominal mass may not be palpable in obese patients.
4. Physical examination may reveal a murmur of aortic insufficiency.
5. Type A dissection occurs in the ascending aorta, while a Type B dissection occurs just distal to the left subclavian artery.

# Protocol 2-6

SECTION: Adult Cardiovascular Emergencies

PROTOCOL TITLE: BLS Pulseless Arrest

REVISED: 06/2013



**BLS PULSELESS ARREST**

# Protocol 2-6

Continued

## BLSS PULSELESS ARREST

### POSSIBLE CAUSES OF PULSELESS ARREST

A	Alcohol, Abuse, Acidosis	T	Toxicodromes, Trauma, Temperature, Tumor
E	Endocrine, Electrolytes, Encephalopathy	I	Infection, Intussusception
I	Insulin	P	Psychogenic, Porphyria, Pharmacological
O	Oxygenation, Overdose, Opiates	S	Space occupying lesion, Sepsis, Seizure, Shock
U	Uremia		

#### PEARLS:

1. If airway is maintainable initially with a BVM, delay rescue airway insertion until after initial defibrillation. The best airway is an effective airway with the least potential complications.
2. Continue CPR while AED is charging.
3. CPR should not be stopped for any reason, if at all avoidable, other than to check for rhythm post-defibrillation. Any stop of compressions should be kept as short as possible, preferably a maximum of 10 seconds.
4. Rescue airway placement should be performed during compressions.
5. Pay close attention to rate of manual ventilation. The rate should be maintained at 8 - 10 breaths per minute. Hyperventilation should be avoided because it decreases preload, cardiac output, coronary perfusion, and cerebral blood flow. The oxygenation goal is to maintain a  $\text{SPO}_2$  of 94 - 99% throughout resuscitation.

# Protocol 2-7

## ALS PULSELESS ARREST

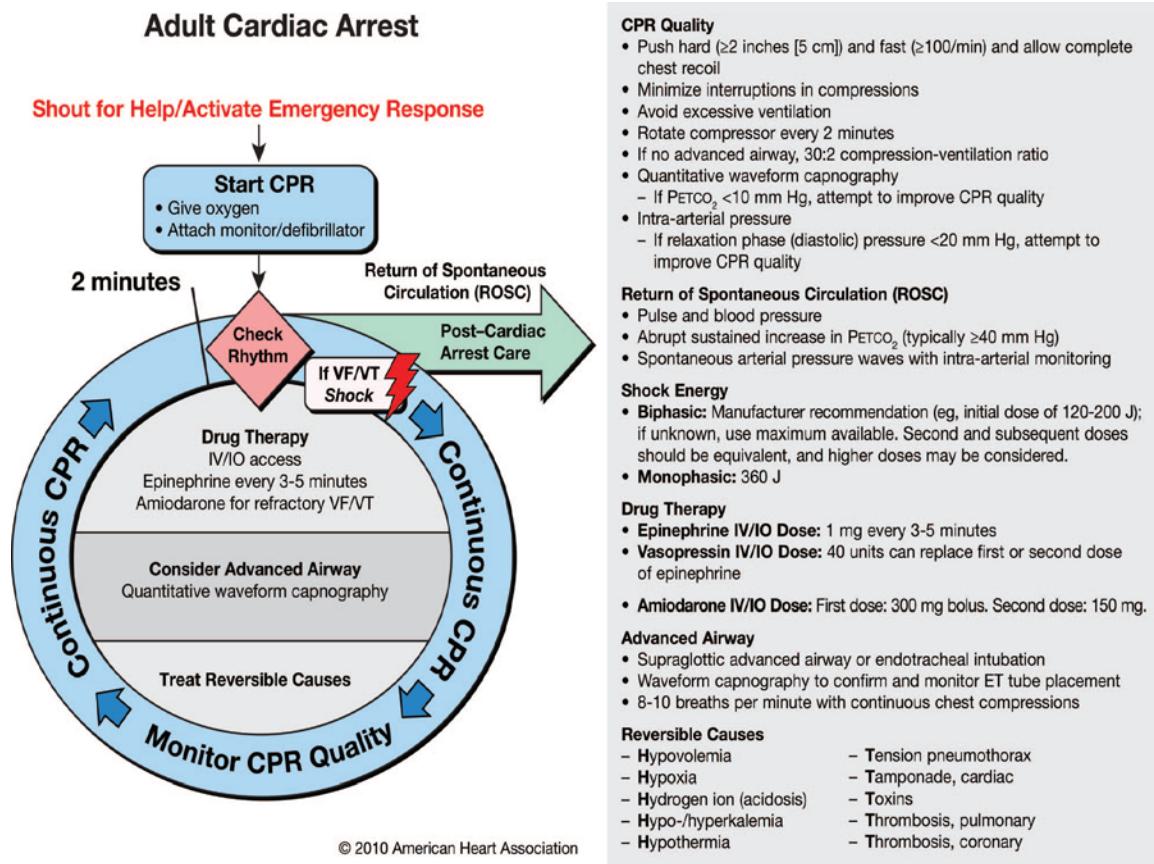
**SECTION:** Adult Cardiovascular Emergencies

**PROTOCOL TITLE:** ALS Pulseless Arrest  
**General – Cardiac Arrest**

**REVISED:** 05/2012

### OVERVIEW:

Cardiac arrest can be caused by Ventricular Fibrillation (VF), pulseless Ventricular Tachycardia (VT), Pulseless Electric Activity (PEA), and asystole. VF represents disorganized electric activity, whereas pulseless VT represents organized electric activity of the ventricular myocardium. Neither of these rhythms generates significant forward blood flow. PEA encompasses a heterogeneous group of organized electric rhythms that are associated with either absence of mechanical ventricular activity or mechanical ventricular activity that is insufficient to generate a clinically detectable pulse. Asystole (perhaps better described as ventricular asystole) represents absence of detectable ventricular electric activity with or without atrial electric activity. The foundation of successful ACLS is high quality CPR, and, for VF / pulseless VT, attempted defibrillation within minutes of collapse. For victims of witnessed VF arrest, early CPR and rapid defibrillation can significantly increase the chance for survival to hospital discharge.

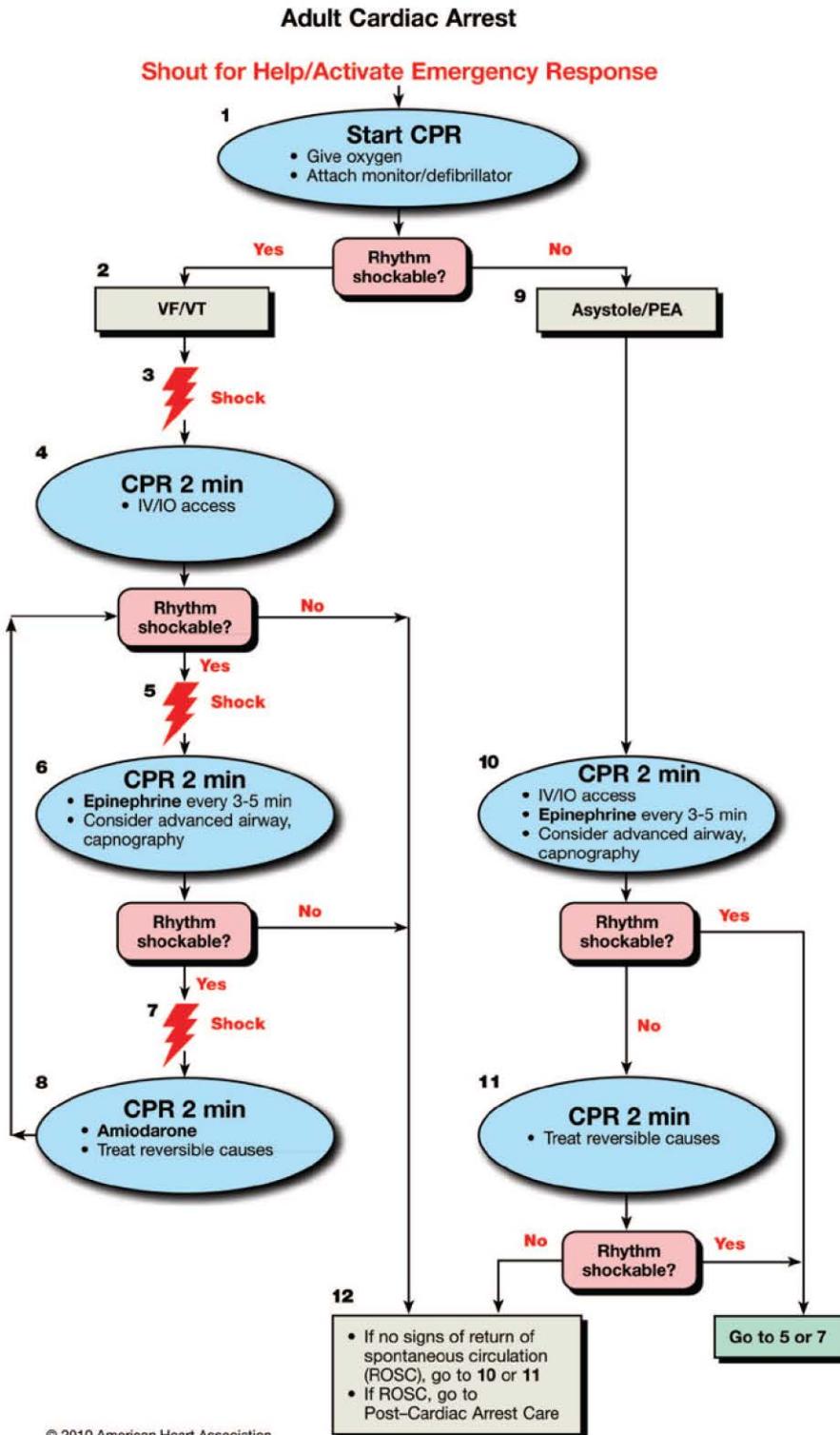


Agencies may choose to alternate between epinephrine and vasopressin.

# Protocol 2-7

Continued

## ALS PULSELESS ARREST



### CPR Quality

- Push hard ( $\geq 2$  inches [5 cm]) and fast ( $\geq 100/\text{min}$ ) and allow complete chest recoil
- Minimize interruptions in compressions
- Avoid excessive ventilation
- Rotate compressor every 2 minutes
- If no advanced airway, 30:2 compression-ventilation ratio
- Quantitative waveform capnography
  - If  $\text{PETCO}_2 < 10 \text{ mm Hg}$ , attempt to improve CPR quality
- Intra-arterial pressure
  - If relaxation phase (diastolic) pressure  $< 20 \text{ mm Hg}$ , attempt to improve CPR quality

### Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in  $\text{PETCO}_2$  (typically  $\geq 40 \text{ mm Hg}$ )
- Spontaneous arterial pressure waves with intra-arterial monitoring

### Shock Energy

- Biphasic:** Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
- Monophasic:** 360 J

### Drug Therapy

- Epinephrine IV/IO Dose:** 1 mg every 3-5 minutes
- Vasopressin IV/IO Dose:** 40 units can replace first or second dose of epinephrine
- Amiodarone IV/IO Dose:** First dose: 300 mg bolus. Second dose: 150 mg.

### Advanced Airway

- Supraglottic advanced airway or endotracheal intubation
- Waveform capnography to confirm and monitor ET tube placement
- 8-10 breaths per minute with continuous chest compressions

### Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

# Protocol 2-8

**SECTION:** Adult Cardiovascular Emergencies

**PROTOCOL TITLE:** Tachycardia with a Pulse

**Medical – Supraventricular Tachycardia (including atrial fibrillation)**

**Medical - Ventricular Tachycardia with a Pulse**

**REVISED:** 06/2013

## OVERVIEW:

Tachycardia's can be classified in several ways, based on the appearance of the QRS complex, heart rate, and regularity. ACLS professionals should be able to recognize and differentiate between sinus tachycardia, narrow-complex SupraVentricular Tachycardia (SVT), and wide-complex tachycardia. Because ACLS providers may be unable to distinguish between supraventricular and ventricular rhythms, they should be aware that most wide-complex (broad-complex) tachycardias are *ventricular* in origin.

HPI	Signs and Symptoms	Considerations
		QRS < 0.12 ms
<ul style="list-style-type: none"> <li>Past medical history</li> <li>Medications: (Aminophylline, Diet Pills, Thyroid Supplements, Decongestants, Digoxin)</li> <li>Diet (caffeine, chocolate)</li> <li>Drugs (nicotine, cocaine)</li> <li>History of palpitations / heart racing</li> <li>Syncope / near syncope</li> </ul>	<ul style="list-style-type: none"> <li>Heart rate &gt; 150 bpm</li> <li>Dizziness</li> <li>Chest Pain</li> <li>Shortness of Breath</li> <li>Potential presenting rhythm: <ul style="list-style-type: none"> <li>○ Sinus tachycardia</li> <li>○ Atrial Fibrillation / Flutter</li> <li>○ Multifocal atrial tachycardia (MAT)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Sinus tachycardia</li> <li>Atrial fibrillation</li> <li>Atrial flutter</li> <li>AV nodal reentry</li> <li>Accessory pathway – mediated tachycardia</li> <li>Atrial tachycardia (including automatic and reentry forms)</li> <li>Multifocal atrial tachycardia (MAT)</li> <li>Junctional tachycardia (rare in adults)</li> </ul>
		<ul style="list-style-type: none"> <li>Ventricular tachycardia (VT) and ventricular fibrillation(VF)</li> <li>SVT with aberrancy</li> <li>Pre-excitation tachycardia's (Wolff-Parkinson-White [WPW] syndrome)</li> <li>Ventricular paced rhythms</li> </ul>

**TACHYCARDIA WITH A PULSE**

# Protocol

## 2-8

Continued

# TACHYCARDIA WITH A PULSE

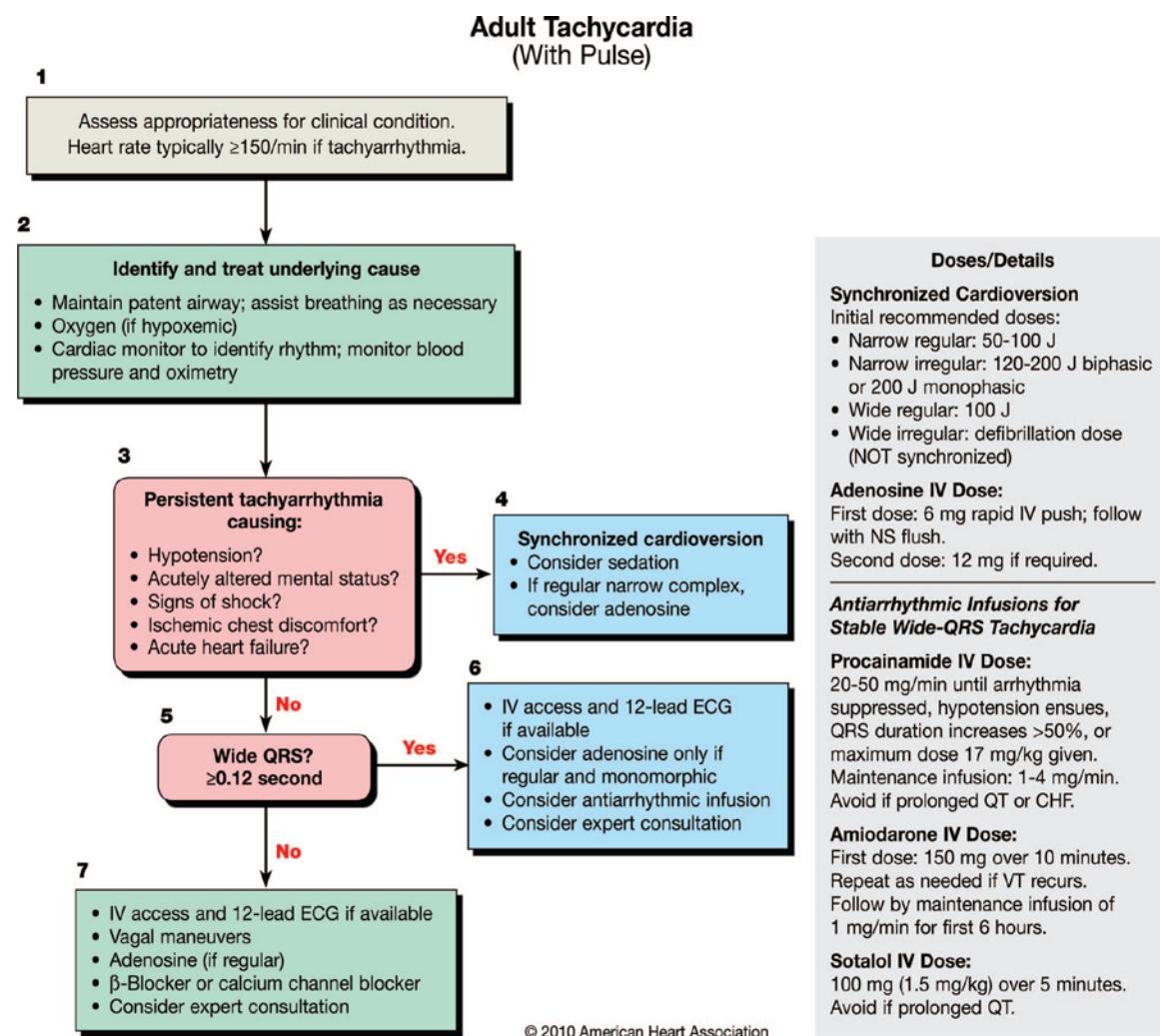
### PEARLS:

1. Approved vagal maneuvers include coughing, bearing down as if attempting a bowel movement, and attempting to blow plunger out of 10 mL syringe. **Carotid sinus massage and / or ocular massage are not approved.**
2. Irregular narrow-complex tachycardias are likely atrial fibrillation or MAT; occasionally atrial flutter is irregular.
3. Each dose of Adenosine should be drawn up completely in a 5 ml syringe. Both the Adenosine and a 10 ml syringe of NS should be inserted, together, in the port closest to the IV catheter. Adenosine should be administered rapid IVP followed immediately by the Normal Saline flush administered rapid IVP. Due to the half-life of Adenosine, this is the only way to assure its efficacy and safety. Slow administration allows for a prolonged effect on the SA and AV node, which may result in prolonged bradycardia or asystole after rhythm converts.
4. Patients with past history of SVT conversion by Adenosine alone are more likely to convert by medication alone. Those who do not convert easily are patients on aminophylline, or similar agents (including high dose caffeine ingestion). A proper history should include number of conversions in past, and whether cardioversion was necessary.

# Protocol 2-8

Continued

# TACHYCARDIA WITH A PULSE



# Protocol 2-8

Continued

**TACHYCARDIA WITH A PULSE**

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# Protocol 2-9

**SECTION:** Adult Cardiovascular Emergencies

**PROTOCOL TITLE:** Bradycardia  
**Medical - Bradycardia**

**REVISED:** 05/2012

## OVERVIEW:

Brady-arrhythmias can be caused by two mechanisms: depression of sinus nodal activity or conduction system blocks. In both situations, subsidiary pacemakers take over and pace the heart, provided the pacemaker is located above the bifurcation of the Bundle of His, and the rate is generally adequate to maintain cardiac output. The need for emergent treatment is guided by two considerations: evidence of hypoperfusion and the potential of the rhythm to degenerate into a more profound bradycardia or Asystole.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"><li>Past medical history</li><li>Medications (Beta Blockers, Calcium channel blockers, Clonidine, Digitalis)</li><li>Pacemaker</li></ul>	<ul style="list-style-type: none"><li>Heart rate &lt; 60 bpm</li><li>Chest pain</li><li>Respiratory distress</li><li>Hypotension or shock</li><li>Altered mental status</li><li>Syncope</li></ul>	<ul style="list-style-type: none"><li>Acute myocardial infarction</li><li>Hypoxia</li><li>Hypothermia</li><li>Sinus bradycardia</li><li>Athletes</li><li>Head injury (elevated ICP) or stroke</li><li>Spinal cord lesion</li><li>Sick sinus syndrome</li><li>AV blocks (1<sup>st</sup>, 2<sup>nd</sup>, or 3<sup>rd</sup> degree)</li></ul>

## PEARLS:

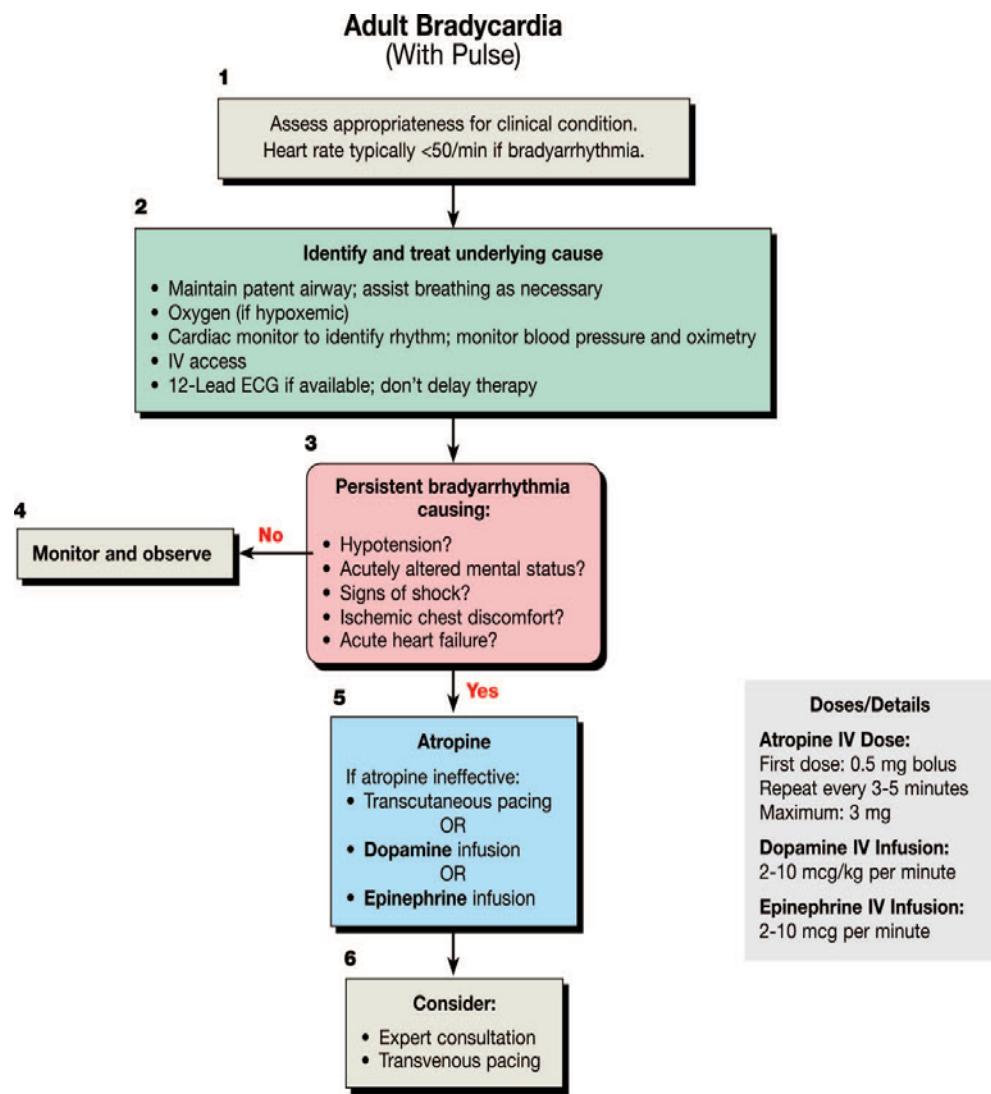
1. Symptomatic 2<sup>nd</sup> and 3<sup>rd</sup> degree heart block should be treated with transcutaneous pacing, avoid Atropine.
2. In the setting of AMI or suspected acute cardiac ischemia, transcutaneous pacing should be first, only if the patient is showing profound symptoms of poor perfusion.
3. Electrical capture during transcutaneous pacing is defined as an electrical stimulus marker followed by a wide QRS complex, with no underlying intrinsic rhythm, followed by a T - wave. This should occur for each electrical complex.
4. Mechanical capture is confirmed when the patient's pulse matches the displayed pace rate. Because pacing stimuli generally causes muscular contractions that can be mistaken for a pulse, you should never take a pulse on the left side of the body to confirm mechanical capture. Pectoral muscle contractions due to pacing also do not indicate mechanical capture. To avoid mistaking muscular response to pacing stimuli for arterial pulsations, use ONLY: (1) right femoral artery or (2) right brachial for confirming mechanical capture.
5. Acute myocardial infarcts can present with hypotension and brady-arrhythmias. Obtain 12-Lead ECG.
6. If hypotension exists with bradycardia, treat the bradycardia.
7. If blood pressure is adequate, monitor only.

**BRADYCARDIA**

# Protocol 2-9

Continued

## BRADYCARDIA



8. Treatment of bradycardia is based upon the presence or absence of significant signs and symptoms (symptomatic vs. asymptomatic).

### Dopamine IV Infusion

Add 400 mg of Dopamine to 250 ml of NS (1600 mcg / ml) and attach 60 gtt/IV tubing

Mcg / min	Weight in kilograms						
	50 Kg 110 Lb	60 Kg 132 Lb	70 Kg 154 Lb	80 Kg 176 Lb	90 Kg 198 Lb	100 Kg 220 Lb	125 Kg 275 Lb
Microdrops / minute (ml / hr)							
5.0 mcg	9	11	13	15	17	19	23
10.0 mcg	19	23	26	30	34	38	47
15.0 mcg	28	34	39	45	51	56	70
20.0 mcg	38	45	53	60	68	75	94

# Section 3

**SECTION:** Adult General Medical Emergencies

**REVISED:** 06/2013

# ADULT MEDICAL EMERGENCIES

1.	<b><u>Medical Patient Assessment</u></b> <i>General – Medical Assessment</i>	Protocol 3 - 1
2.	<b><u>Abdominal Pain</u></b> <i>Medical – Abdominal Pain</i>	Protocol 3 - 2
3.	<b><u>Allergic Reaction / Anaphylaxis</u></b> <i>Medical – Allergic Reaction/Anaphylaxis</i>	Protocol 3 - 3
4.	<b><u>Behavioral Emergencies</u></b> <i>General – Behavioral/Patient Restraint</i>	Protocol 3 - 4
5.	<b><u>Cerebrovascular Emergencies</u></b> <i>Medical – Stroke/TIA</i>	Protocol 3 - 5
6.	<b><u>Dystonic / Extra-pyramidal Reaction</u></b> <i>Medical – Dystonic/Extra-pyramidal Reaction</i>	Protocol 3 - 6
7.	<b><u>Hyperglycemia</u></b> <i>Medical - Hyperglycemia</i>	Protocol 3 - 7
8.	<b><u>Hypoglycemia</u></b> <i>Medical – Hypoglycemia/Diabetic Emergency</i>	Protocol 3 - 8
9.	<b><u>Nausea / Vomiting</u></b> <i>Medical – Nausea/Vomiting</i>	Protocol 3 - 9
10.	<b><u>Pain Management</u></b> <i>General – Pain Control</i>	Protocol 3 - 10
11.	<b><u>Respiratory Distress</u></b> <i>Medical – Respiratory Distress/Asthma/COPD/Croup/Reactive Airway</i>	Protocol 3 - 11
12.	<b><u>Seizures</u></b> <i>Medical - Seizure</i>	Protocol 3 - 12
13.	<b><u>Shock</u></b> <i>Medical – Hypotension/Shock (Non-trauma)</i>	Protocol 3 - 13
14.	<b><u>Sickle Cell Anemia Crisis</u></b> <i>Medical – Sickle Cell Crisis</i>	Protocol 3 - 14
15.	<b><u>Unconscious / Syncope / AMS</u></b> <i>Medical – Altered Mental Status</i>	Protocol 3 - 15
16.	<b><u>Difficult Airway</u></b> <i>Airway - Failed</i>	Protocol 3 - 16

# Section 3

Continued

## ADULT MEDICAL EMERGENCIES

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# Protocol 3-1

**SECTION:** Adult General Medical Emergencies

**PROTOCOL TITLE:** Medical Assessment  
**General – Medical Assessment**

**REVISED:** 06/2013

## OVERVIEW:

The ability to perform an accurate assessment is one of the most important skills in EMS. The information gained during the assessment is used to make decisions regarding emergency interventions, such as the need for immediate airway management and ventilation; to formulate a differential field diagnosis; and to provide continued and advanced pre-hospital care enroute to a receiving facility. Since this information is used in clinical decision-making, it is important that the assessment findings are interpreted correctly and efficiently.

## SCENE SURVEY:

Scene evaluation is one of the most important parts of pre-hospital EMS. Maintaining you and your crew's safety is paramount, and begins from the moment of dispatch to a call. The communications center begins obtaining information with each 911 call about possible problems and circumstances the pre-hospital provider may confront. The general rule is to never compromise the rescuers to aid the victim.

### Summary of Scene Survey and Management

- Obtain overview and evaluate situation / scene for potential safety hazards.
- Wear personal protective equipment (PPE) appropriate to hazards of the scene and / or patient.
- Gain access to the patient.
- Determine the number of patients and additional resources needed.
- Provide life-sustaining care to the patient.
- Prepare and remove the patient from the incident scene.
- Prepare the patient for transport to the hospital.
- Provide the patient with treatment enroute.
- Notify the intended receiving facility in a timely manner to prepare for patient arrival.

Upon entering a scene, a general impression should be formed, typically prior to any physical contact with the patient. Patients are usually categorized as either medical or trauma during the scene survey and general impression. At times, a patient may be both, as one may have led to the other. Until the condition is identified or the possibility of spine injury is ruled out, manual in-line spinal stabilization must be established and maintained.

## PRIMARY ASSESSMENT:

The primary assessment is based on assessment of the patient's airway, breathing, circulation, neurologic disability, and exposure. During the primary assessment, as patient problems are identified, critical interventions are initiated. The basic steps remain the same, whether at a scene or during an inter-facility transport.

## AIRWAY:

The patient's airway should be assessed to determine whether it is patent, maintainable, or not maintainable. For any patient who may have a traumatic injury, cervical spine precautions should be utilized while the airway is evaluated. Assessment of the patient's

MEDICAL ASSESSMENT

# Protocol

## 3-1

Continued

# MEDICAL ASSESSMENT

level of consciousness, in conjunction with assessment of the airway status, provides an impression of the effectiveness of the patient's current airway status. If an airway problem is identified, the appropriate intervention should be initiated. The decision to use a particular intervention depends on the nature of the patient's problem and the potential for complications during transport. The ability of patient to speak with a clear unobstructed voice is strong evidence of both airway patency and protection. However, if the patient that has lost protective airway reflexes, the assessment stops, and immediate action should be taken to establish airway patency. Supplemental oxygen, per assessment, should be given to all patients before transport. Specific equipment, such as a pulse oximeter or CO<sub>2</sub> detector, help provide continuous airway evaluation during transport.

### Summary of Primary Airway Assessment

- Airway: Patent, maintainable, un-maintainable
- Level of consciousness
- Skin appearance: Ashen, pale, gray, cyanotic, or mottled
- Preferred posture to maintain airway
- Airway clearance
- Sounds of obstruction

### BREATHING:

The assessment of ventilation begins with noting whether the patient is breathing. If the patient is either apneic or in severe respiratory distress, immediate interventions are required. If the patient has any difficulty with ventilation, the problem must be identified and the appropriate intervention initiated. Emergent interventions may include manual ventilation of the patient via bag valve mask, endotracheal intubation, and / or needle thoracentesis.

### Summary of Primary Breathing Assessment

- Rate and depth of respirations
- Cyanosis
- Position of the trachea
- Presence of obvious injury or deformity
- Work of breathing
- Use of accessory muscles
- Flaring of nostrils
- Presence of bilateral breath sounds
- Presence of adventitious breath sounds
- Asymmetric chest movements
- Palpation of crepitus
- Integrity of chest wall
- Oxygen saturation measured with pulse oximetry

# Protocol 3-1

Continued

## MEDICAL ASSESSMENT

### CIRCULATION:

Palpation of both the peripheral and the central pulse provides information about the patient's circulatory status. The quality, location, and rate of the patient's pulses should be noted along with the temperature of the patient's skin being assessed while obtaining the pulses. Observation of the patient's level of consciousness may also help evaluate the patient's perfusion status initially.

Active bleeding should be quickly controlled with direct pressure and/ or tourniquet per assessment. The patient should also be observed for indications of circulatory compromise. Skin color and temperature, diaphoresis, and capillary refill are all indicators of circulatory compromise during an assessment.

Intravenous access should be obtained for administration of fluid, blood, or medications per assessment. Depending on the patient's location and the accessibility veins, peripheral, central, or intraosseous access may be used as necessary. Regardless of type of access, fluid resuscitation must always be guided by the patient's response.

#### Summary of Primary Circulation Assessment

- Pulse rate and quality
- Skin appearance: Color
- Peripheral pulses
- Skin temperature
- Level of consciousness
- Urinary output
- Blood Pressure
- Cardiac monitor
- Invasive monitor

### DISABILITY:

The basic, primary neurological assessment includes assessment of the level of consciousness; the size, shape, and response of the pupils; and motor sensory function. The simple method if AVPU should be used to evaluate the patient's overall level of consciousness.

The Glasgow Coma Scale (GCS) provides assessment of the patient's level of consciousness and motor function and may serve as a predictor of morbidity and mortality after brain injury.

If the patient has an altered mental status, it must be determined whether the patient has ingested any toxic substances, such as alcohol or other drugs, or may be hypoxic because of illness or injury. A patient with an altered mental status may pose a safety problem during transport. Use of chemical sedation, or physical restraint, may be necessary to ensure safe transport of the patient and EMS providers.

# Protocol 3-1

Continued

## MEDICAL ASSESSMENT

### Summary of Primary Disability (Neurological) Assessment

A.V.P.U.	Glasgow Coma Scale (GCS)		
	Eye Opening:	Spontaneous	4
		To voice	3
		To pain	2
		No response	1
<b>A - Alert</b> <b>V - Responds to verbal stimuli</b> <b>P - Responds to painful stimuli</b> <b>U - Unresponsive</b>	Verbal Response:	Oriented	5
		Confused	4
		Inappropriate words	3
		Incomprehensible	2
		No response	1
	Motor Response:	Obeys commands	6
		Localizes (pain)	5
		Withdraws (pain)	4
		Flexion (pain)	3
		Extension (pain)	2
		No response	1

#### EXPOSURE:

As much of the patient's body as possible should be exposed for examination, depending on complaint. Keep in mind the effects of the environment on the patient. Discovery of hidden problems before the patient is loaded for transport may allow time to intervene and avoid disastrous complications. Although exposure for examination is emphasized most frequently in care of the trauma patient, it is equally important in the primary assessment of the patient with a medical illness.

The pre-hospital provider should always look under dressings or clothing, which may hide complications or potential problems. Clothing may hide bleeding that occurs as a result of thrombolytic therapy or rashes that may indicate potentially contagious conditions. During inter-facility transport, intravenous access can be wrongly assumed underneath a bulky cover. Once patient assessment has been completed, keep in mind that the patient must be kept warm. Hypothermia can cause cardiac arrhythmias, increased stress response, and hypoxia.

### Summary of Primary Exposure Assessment

- Identification of injury, active bleeding, or indication of a serious illness.
- Appropriate tube placement: Endotracheal tubes, chest tubes, feeding tubes, naso-gastric or oro-gastric tubes, and urinary catheters.
- Intravenous access: Peripheral, central, and Intraosseous.

# Protocol 3-1

Continued

## MEDICAL ASSESSMENT

### SECONDARY (FOCUSED) ASSESSMENT:

The secondary (focused) assessment is performed after the primary assessment is completed and involves evaluation of the patient from head to toe. Illness specific information is collected by means of inspection, palpation, and auscultation during the secondary assessment. Whether the patient has had an injury or is critically ill, the pre-hospital provider should observe, and listen to the patient.

The secondary (focused) assessment begins with an evaluation of the patient's general appearance. The pre-hospital provider should observe the surrounding environment and evaluate its effects on the patient. Is the patient aware of the environment? Is there appropriate interaction between the patient and the environment?

Determination of the amount of pain the patient has as a result of illness or injury is also an important component of the patient assessment. Baseline information should be obtained about the pain the patient has so that the effectiveness of interventions can be assessed during transport. Pain relief is one of the most important interventions for pre-hospital patient care providers.

#### Assessment Acronyms:

S.A.M.P.L.E.		O.P.Q.R.S.T.
S	Signs and Symptoms	O <b>Onset:</b> ( <i>When did the problem / pain begin?</i> )
A	Allergies	P <b>Provocation:</b> ( <i>What makes the problem / pain worse?</i> )
M	Medications	Q <b>Quality:</b> ( <i>Can you describe the problem / pain?</i> )
P	Pertinent past medical history	R <b>Radiation:</b> ( <i>Does the pain move anywhere?</i> )
L	Last oral intake	S <b>Severity:</b> ( <i>On a scale of 1-10, how bad is the pain?</i> )
E	Events leading up to the event	T <b>Time:</b> ( <i>Does the condition come and go? Duration?</i> )

# Protocol 3-1

Continued

## MEDICAL ASSESSMENT

### Summary of Secondary Assessment

	Summary of Secondary Assessment
Skin	<ul style="list-style-type: none"><li>• Presence of petechia, purpura, abrasions, bruises, scars, or birthmarks</li><li>• Bite / Sting marks</li><li>• Rashes</li><li>• Abnormal skin turgor</li><li>• Temperature</li><li>• Color: Jaundice, pallor, etc.</li></ul>
Head and Neck	<ul style="list-style-type: none"><li>• Pupillary reflex / Size of pupils</li><li>• Gross visual examination</li><li>• Abnormal extra-ocular movements</li><li>• Assessment of mental status / Short &amp; Long term memory assessment</li><li>• Neck veins</li><li>• Swallowing difficulties</li><li>• Nuchal rigidity</li><li>• Presence of lymphadenopathy or neck masses</li><li>• Scars</li></ul>
Ears, Nose, and Throat	<ul style="list-style-type: none"><li>• Hemorrhage</li><li>• Drainage</li><li>• Sunken eyes</li><li>• Gross assessment of the hearing</li><li>• Obstruction</li><li>• Foreign body</li></ul>
Mouth and Throat	<ul style="list-style-type: none"><li>• Mucous membranes</li><li>• Drooling</li><li>• Breath odor</li><li>• Drainage</li><li>• Inspection of tongue (i.e., laceration / bite marks indicate possible seizure activity)</li><li>• Airway obstruction</li><li>• Scars</li></ul>
Thorax, Lungs, and Cardiovascular System	<ul style="list-style-type: none"><li>• Breath sounds</li><li>• Heart Sounds</li><li>• Peripheral vs. Central Pulse Comparison</li><li>• Scars</li></ul>
Abdomen	<ul style="list-style-type: none"><li>• Shape and size</li><li>• Bowel sounds</li><li>• Tenderness / Rigidity / Guarding</li><li>• Masses (i.e., suprapubic masses)</li><li>• Pelvic tenderness, crepitus, or instability</li><li>• Scars</li></ul>

# Protocol 3-1

Continued

Genitourinary	<ul style="list-style-type: none"><li>• Rectal bleeding</li><li>• Color of urine</li><li>• Frequency / Urgency of urination</li><li>• Stools – Normal / Color</li></ul>
Extremities and Back	<ul style="list-style-type: none"><li>• Gross motor and sensory function</li><li>• Peripheral pulses</li><li>• Lack of use of an extremity</li><li>• Deformity, angulation</li><li>• Wounds, abrasions</li><li>• Vertebral column, flank, buttocks</li></ul>

MEDICAL ASSESSMENT

# Protocol

## 3-1

Continued

**MEDICAL ASSESSMENT**

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# Protocol 3-2

**SECTION:** Adult General Medical Emergencies

**PROTOCOL TITLE:** Abdominal Pain

**Medical – Abdominal Pain**

**REVISED:** 06/2013

## OVERVIEW:

Abdominal pain is one of the most common presenting complaints in emergency medicine. In nearly half the patients, the etiology remains obscure. Recalling the differences between generalized types of pain can be helpful diagnostically. Visceral abdominal pain results from stretching of the autonomic nerve fibers. The pain may be described as cramp like, colicky or gaseous and is often intermittent. Obstruction can be a serious cause of visceral pain. Somatic pain occurs when pain fibers located in the parietal peritoneum are irritated by chemical or bacterial inflammation. The pain is described as sharp, more constant, and more precisely located. Referred pain is any pain felt at a distance from a diseased organ. Referred pain generally follows certain classic patterns, for example, diaphragmatic irritation often radiates to the supra-clavicular area.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"><li>• Age</li><li>• Past medical, surgical history</li><li>• Medications</li><li>• Time of onset</li><li>• Palliation, provocation</li><li>• Quality (cramping, constant, sharp, dull, etc)</li><li>• Region, radiation, referred</li><li>• Severity (1 - 10)</li><li>• Duration, repetition</li><li>• Fever</li><li>• Last meal</li><li>• Last bowel movement, consistency</li><li>• Menstrual history, pregnancy</li></ul>	<ul style="list-style-type: none"><li>• Pain (location, migration)</li><li>• Distension, rigidity</li><li>• Unequal, absent femoral pulses</li><li>• Diaphoresis</li><li>• Orthostatic changes</li><li>• Tenderness</li><li>• Nausea, vomiting, diarrhea</li><li>• Dysuria</li><li>• Constipation</li><li>• Vaginal bleeding, discharge</li><li>• Pregnancy</li><li>• Associated symptoms (helpful to localize source)</li><li>• Fever, headache, weakness, malaise, myalgias, cough, mental status changes, rash</li></ul>	<ul style="list-style-type: none"><li>• Pneumonia, HF</li><li>• Pulmonary embolus</li><li>• Liver (hepatitis)</li><li>• Peptic ulcer disease, gastritis</li><li>• Gallbladder</li><li>• Myocardial infarction</li><li>• Pancreatitis</li><li>• Kidney stone</li><li>• Abdominal aneurysm</li><li>• Mesenteric Arterial Tear</li><li>• Appendicitis</li><li>• Bladder, prostate disorder</li><li>• Pelvic (PID, ectopic pregnancy, ovarian cyst)</li><li>• Spleen enlargement</li><li>• Bowel obstruction</li><li>• Gastroenteritis (infectious)</li></ul>

ABDOMINAL PAIN

# Protocol 3-2

Continued

## ABDOMINAL PAIN

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Assess mechanism of injury and / or nature of illness.	•	•	•	•	•
3. Administer Oxygen to maintain $\text{SPO}_2$ 94 - 99%	•	•	•	•	•
4. Allow the patient to lie in a comfortable position.	•	•	•	•	•
5. If shock is present, without pulsating masses, refer to <i>Shock protocol</i> .	•	•	•	•	•
6. Place patient on cardiac monitor and obtain a <i>12 lead ECG</i> if indicated.		•	•	•	•
7. Initiate IV of Normal Saline KVO.			•	•	•
8. Administer <i>ONDANSETRON</i> 0.1 mg / kg slow IVP over 2 - 5 minutes, max 4.0 mg per dose, as needed, per <i>Nausea and Vomiting Patient Care Protocol</i> .				•	•
9. Treat pain if indicated. Refer to <i>pain management</i> guideline.				•	•
10. Transport and perform ongoing assessment as indicated.		•	•	•	•

FOUR ABDOMINAL QUADRANTS			
	<b>A Right Upper Quadrant</b> Liver and gallbladder Pyloric sphincter Duodenum Head of pancreas Right adrenal gland Portion of right kidney Hepatic flexure of colon Portions of ascending and transverse colon	<b>B Left Upper Quadrant</b> Left lobe of liver Spleen Stomach Body of pancreas Left adrenal gland Portion of left kidney Splenic flexure of colon Portions of transverse and descending colon	
<b>C Midline</b> Aorta Bladder Uterus ○ = Umbilicus	<b>C Right Lower Quadrant</b> Lower pole of right kidney Cecum and appendix Portion of ascending colon Ovary and uterine tube Right spermatic cord Right ureter	<b>D Left Lower Quadrant</b> Lower pole of left kidney Sigmoid colon Portion of descending colon Ovary and uterine tube Left spermatic cord Left ureter	
NINE ABDOMINAL REGIONS			
	<b>A Right Hypochondriac</b> Right lobe of liver Gallbladder Portion of duodenum Hepatic flexure of colon Portion of right kidney Right adrenal gland	<b>B Epigastric</b> Pyloric sphincter Duodenum Pancreas Portion of liver Aorta	<b>C Left Hypochondriac</b> Stomach Spleen Tail of pancreas Splenic flexure of colon Upper pole of left kidney Left adrenal gland
<b>D Right Lumbar</b> Ascending colon Lower half of right kidney Portion of duodenum and jejunum	<b>E Umbilical</b> Lower part of duodenum Jejunum and ileum	<b>F Left Lumbar</b> Descending colon Lower half of left kidney Portions of jejunum and ileum	
<b>G Right Inguinal</b> Cecum Appendix Lower end of ileum Right ureter Right spermatic cord Right ovary and uterine tube	<b>H Hypogastric (Pubic)</b> Ileum Appendix Uterus (in pregnancy)	<b>I Left Inguinal</b> Sigmoid colon Left ureter Left spermatic cord Left ovary and uterine tube	

# Protocol 3-2

Continued

## **PEARLS:**

1. Abdominal pain may be the first sign of an impending rupture of the appendix, liver, spleen, ectopic pregnancy, or aneurysm. Monitor for signs of hypovolemic shock.
2. If a pulsating mass is felt, suspect an abdominal aneurysm and discontinue palpation.
3. Abdominal pain in women of childbearing age should be treated as an ectopic pregnancy until proven otherwise.
4. Appendicitis can present with vague, periumbilical pain that migrates to the RLQ over time.
5. Kidney stones can present with flank pain that migrates to the lower quadrants.
6. Ask the patient to point to the pain. The further from the umbilicus the patient points, the more likely the pain is to be organic in origin.
7. Simple pain management techniques include, speaking in calm, reassuring voice, and placing the patient in a position of comfort.

**ABDOMINAL PAIN**

# Protocol

## 3-2

Continued

# ABDOMINAL PAIN

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# Protocol

## 3-3

**SECTION:** Adult General Medical Emergencies

**PROTOCOL TITLE:** Allergic Reaction and Anaphylaxis  
**Medical - Allergic Reaction/Anaphylaxis**

**REVISED:** 06/2013

### OVERVIEW:

Allergic reactions and anaphylaxis are serious and potentially life-threatening medical emergencies. It is the body's adverse reaction to a foreign protein, (i.e., food medicine, pollen, insect sting or any ingested, inhaled, or injected substance). Patients with allergic reactions frequently present only with local or generalized swelling; in contrast, anaphylaxis is characterized by wheezing, significant airway compromise, and / or systolic BP < 90 mmHg. Common to both disorders are urticaria and Angioedema, which when isolated are best treated with simple antihistamine therapy. It is when respiratory symptoms, such as upper airway edema, dyspnea, and wheezing are present EMS personnel should attribute these findings to anaphylaxis, and subsequently move to more aggressive therapy. Cardiovascular collapse may occur abruptly, without the prior development of skin or respiratory symptoms. **Constant monitoring of the patient's airway and breathing is mandatory.**

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Onset and location</li> <li>Insect sting or bite</li> <li>Food allergy / exposure</li> <li>New clothing, soap, detergent</li> <li>Past history of reactions</li> <li>Medication history</li> </ul>	<ul style="list-style-type: none"> <li>Itching or hives</li> <li>Coughing, wheezing, or respiratory distress</li> <li>Chest or throat constriction</li> <li>Difficulty swallowing</li> <li>Hypotension or shock</li> <li>Edema</li> </ul>	<ul style="list-style-type: none"> <li>Urticaria (rash only)</li> <li>Anaphylaxis (systemic effect)</li> <li>Shock (vascular effect)</li> <li>Angioedema (drug induced)</li> <li>Aspiration / airway obstruction</li> <li>Vaso-vagal event</li> <li>Asthma or COPD</li> <li>Heart failure</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
4. Administer <u>DIPHENHYDRAMINE</u> 1 mg / kg up to 50 mg IM or IV. The IV route is preferred for the patient in severe shock. If an IV cannot be readily established, give diphenhydramine via the IM route.			•	•	•
5. If the patient is experiencing respiratory distress with wheezing, refer to the <u>Respiratory Distress protocol</u> .	•	•	•	•	•
6. Transport as soon as possible.		•	•	•	•
7. If signs of anaphylaxis available, administer epinephrine via an EpiPen® / EpiPen Jr.® autoinjector.		•	•	•	•

ALLERGIC REACTION

# Protocol 3-3

Continued

## ALLERGIC REACTION

	A	B	EN	I	P
8. If signs of anaphylactic shock and EpiPen® / EpiPen Jr.® have not been administered, administer <u>EPINEPHERINE 1:1,000</u> 0.01 mg / kg up to 0.3 mg IM. Use with caution in patients with coronary artery disease or over the age of 50.			•	•	•
9. Establish an IV of normal saline at KVO.			•	•	•
10. If hypoperfusion persists following the first dose of epinephrine, consider administration of 20 mL / kg normal saline IV. While administering a fluid bolus, frequently reassess perfusion for improvement. If perfusion improves, slow the IV to KVO and monitor closely. If patient develops fluid overload respiratory distress (dyspnea, crackles, rhonchi, decreasing SpO <sub>2</sub> ), slow the IV to KVO.			•	•	•
11. Administer <u>PREDNISONE</u> 60 mg PO.				•	•
12. Transport and perform ongoing assessment as indicated.	•	•	•	•	

### PEARLS:

1. A thorough assessment and a high index of suspicion are required for all potential allergic reaction patients.
2. Individuals with asthma, atopic dermatitis (eczema), prior anaphylactic history, and those who delay treatment can be at greater risk for a fatal reaction.
3. It is strongly recommended that all patients receiving anti-cholinergic medications should be transported for observation following treatment for return of symptoms.
4. Gastrointestinal symptoms occur most commonly in food-induced anaphylaxis, but can occur with other causes. Oral pruritus is often the first symptom observed in patients experiencing food-induced anaphylaxis. Abdominal cramping is also common, but nausea, vomiting, and diarrhea are frequently observed as well.
5. Contrary to common belief that all cases of anaphylaxis present with cutaneous manifestations, such as hives or mucocutaneous swelling, a significant portion of anaphylactic episodes may not involve these signs and symptoms on initial presentation. Moreover, most fatal reactions to food-induced anaphylaxis in children were not associated with cutaneous manifestations.

# Protocol 3-4

**SECTION:** Adult General Medical Emergencies

**PROTOCOL TITLE:** Behavioral Emergencies  
**General - Behavioral/Patient Restraint**

**REVISED:** 06/2013

## OVERVIEW:

Psychiatric patients may have an illness that presents with symptoms such as delusions, hallucinations, depression, or significant trauma. The patient's symptoms demand immediate response as they may appear intense, raise the anxiety levels of those around the patient to an intolerable level, or create problems in the immediate environment. The patient may perceive their life to be at immediate risk, either from suicide or their current inability to make logical decisions. Remember that **personal safety takes priority over patient intervention**. Patient care should be focused with preventing / mitigating hyperthermia, agitated delirium, positional asphyxia, hypoxia, and physical harm.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"><li>• Situational crisis</li><li>• Psychiatric illness / medications</li><li>• Injury to self or threats to others</li><li>• Plan</li><li>• History of suicide attempts</li><li>• Substance abuse / overdose</li><li>• Diabetes</li></ul>	<ul style="list-style-type: none"><li>• Anxiety, agitation, and / or confusion</li><li>• Affect change</li><li>• Auditory and / or visual hallucinations</li><li>• Delusional thoughts, bizarre behavior</li><li>• Combative and / or violent</li><li>• Expression of suicidal / homicidal thoughts</li></ul>	<ul style="list-style-type: none"><li>• See <i>Unconscious / Syncope / AMS Patient Care Protocol</i></li><li>• Diabetic</li><li>• Hypoxia</li><li>• Stroke</li><li>• Brain trauma</li><li>• Alcohol intoxication</li><li>• Toxin / substance abuse</li><li>• Medication effect / overdose</li><li>• Withdrawal Syndromes</li><li>• Depression</li><li>• Bipolar (manic-depressive), schizophrenia, anxiety disorders</li></ul>

BEHAVIORAL EMERGENCIES

# Protocol 3-4

Continued

## BEHAVIORAL EMERGENCIES

	A	B	EN	I	P
<b>For Non-violent and Non-aggressive Patients:</b>					
1. Scene safety is a priority. Maintain scene and provider safety. Request police if indicated.	•	•	•	•	•
2. Perform general patient management.	•	•	•	•	•
3. Develop rapport with the patient. Speak in a calm, non-judgmental / non-confrontational manner. Be aware of your own and the patient's posture, body language, and position.	•	•	•	•	•
4. Remove disturbing persons and / or objects from the environment.	•	•	•	•	•
5. Encourage the patient to sit, relax, and talk. Do not touch the patient without permission.	•	•	•	•	•
6. Transport and Reassess if indicated.		•	•	•	•
<b>For Violent or Aggressive Patients:</b>					
1. Assure scene safety. Request Police department if needed. Do not engage patient without police unless benefits outweigh risks to patient and providers.	•	•	•	•	•
2. Perform general patient management.	•	•	•	•	•
3. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
4. Assess for signs of trauma.	•	•	•	•	•
5. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
6. For altered mental status, perform rapid glucose determination.	•	•	•	•	•
7. Control environmental factors; attempt to move patient to a private area free of family and bystanders. MAINTAIN ESCAPE ROUTE.	•	•	•	•	•
8. Attempt de-escalation, utilize an empathetic approach. Ensure patient safety and comfort. AVOID CONFRONTATION.	•	•	•	•	•
9. Ensure patient capacity to make decisions. If patient has capacity, consent to treat is required. If patient lacks capacity, consent to treat is not required.	•	•	•	•	•
10. Physically restrain. Refer to <u>Clinical Procedures: Patient Restraint</u> .	•	•	•	•	•
11. Chemical Restraint:					
a. If chemical agitation or alcohol withdrawal is suspected, refer to the appropriate <u>Toxicology-Poisoning / Overdose protocol</u> .	•	•	•	•	•

# Protocol 3-4

Continued

	A	B	EN	I	P
b. If behavioral or alcohol related agitation is suspected, give <u>MIDAZOLAM</u> 0.1 mg / kg IV / IM (max single dose of 5 mg). If midazolam is unavailable, administer <u>DIAZEPAM</u> 0.25 mg / kg IV / IM (max single dose of 5 mg or a max dose of 10 mg). Contact Medical Control for repeat dosing.				•	•
c. In adult patients, if behavioral or alcohol related agitation continues or escalates, give <u>GEODON</u> 20 mg IM if greater than 50 kg weight (10 mg IM if weight less than 50 kg).				•	•
12. Transport as soon as possible.	•	•	•	•	•

## PEARLS:

1. Do not leave patient alone once patient contact has been made unless your safety has been compromised. Your safety is the primary concern. If necessary, leave equipment on scene.
2. Every suicide act, gesture, or verbal threat must be taken seriously. In the Commonwealth of Virginia, patients are unable to refuse care under these circumstances and shall be placed in emergency custody as needed with police assistance, VA Code 37.2-808.
3. Always have police search patient for weapons or items that could be used as weapons prior to placing patient in ambulance. Patient belongings that are secured should be transported in the front of the ambulance, or an outside compartment, for safety and given to hospital staff on arrival.
4. If a patient must be transported using handcuffs or police flexible wrist restraints, a police officer should ride in the ambulance with the patient to the receiving hospital.

# BEHAVIORAL EMERGENCIES

# Protocol

## 3-4

Continued

# BEHAVIORAL EMERGENCIES

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# Protocol 3-5

**SECTION:** Adult General Medical Emergencies

**PROTOCOL TITLE:** Cerebrovascular Accident (Stroke)  
**Medical - Stroke/TIA**

**REVISED:** 06/2013

## OVERVIEW:

Stroke is a major cause of disability and a leading cause of death in the U.S. There are two main mechanisms of stroke: (1) Blood vessel occlusion and (2) Blood vessel rupture. Ischemic strokes are most often caused by large vessel thrombosis, although embolism or hypoperfusion can cause them. Causes of thrombosis include atherosclerosis, vessel dissection, and some infectious diseases. Hemorrhagic strokes are divided into intracerebral (ICH) and subarachnoid (SAH) hemorrhages. Risk factors for ICH include heart disease, hypertension, smoking, diabetes, elevated cholesterol, older age, prior stroke, family history, and cocaine use. Stroke symptoms will present according to which area of the brain is being inadequately perfused.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Previous CVA/ TIA's</li> <li>• Previous cardiac / vascular surgery</li> <li>• Associated diseases; diabetes, hypertension, CAD, atrial fibrillation</li> <li>• Medications (blood thinners)</li> <li>• History of trauma</li> </ul>	<ul style="list-style-type: none"> <li>• Altered mental status</li> <li>• Weakness, paralysis</li> <li>• Blindness or other sensory loss</li> <li>• Aphasia, dysarthria</li> <li>• Syncope</li> <li>• Vertigo, dizziness</li> <li>• Vomiting</li> <li>• Headache</li> <li>• Seizures</li> <li>• Respiratory pattern change</li> <li>• Hypertension, hypotension</li> </ul>	<ul style="list-style-type: none"> <li>• TIA</li> <li>• Seizure</li> <li>• Hypoglycemia</li> <li>• Stroke</li> <li>• Thrombotic</li> <li>• Embolic</li> <li>• Hemorrhagic</li> <li>• Tumor</li> <li>• Trauma</li> </ul>

	A	B	EN	I	P
1. Perform general patient management. Obtain time of symptom onset.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation. <i>Be alert for aspiration, upper airway obstruction and hypoventilation.</i>	•	•	•	•	•
3. Administer oxygen to maintain $\text{SPO}_2$ 94 - 99%. Support respirations as necessary with a BVM.	•	•	•	•	•
4. Place patient in position of comfort.	•	•	•	•	•
5. Transport rapidly, but carefully. Notify the receiving hospital as early as possible. Scene time should be less than 20 minutes (See Stroke Triage Plan).		•	•	•	•

STROKE

# Protocol 3-5

Continued

STROKE

	A	B	EN	I	P
6. Perform rapid glucose determination. If glucose less than 60 mg / dL or clinical signs and symptoms indicate hypoglycemia, refer to the <i>Hypoglycemia protocol</i> .		•	•	•	•
7. Perform and document CINCINNATI PREHOSPITAL STROKE SCALE evaluation.	•	•	•	•	•
8. Establish an IV of normal saline at KVO.			•	•	•
9. Place patient on cardiac monitor and obtain/interpret <u>12 lead ECG</u> .				•	•
10. Perform ongoing assessment as indicated. IMPORTANT: Ensure that a witness accompanies the patient to the hospital or a contact telephone number for the witness is secured for the hospital.	•	•	•	•	•
11. Transport to closest appropriate hospital with capabilities to provide the appropriate level of treatment (see Stroke Triage Plan).		•	•	•	•

## Cincinnati Prehospital Stroke Scale

### Facial Droop (have patient show teeth or smile):

- Normal — both sides of face move equally
- Abnormal — one side of face does not move as well as the other side

### Arm Drift (patient closes eyes and holds both arms straight out for 10 seconds):

- Normal — both arms move the same or both arms do not move at all (other findings, such as pronator drift, may be helpful)
- Abnormal — one arm does not move or one arm drifts down compared with the other

### Abnormal Speech (have the patient say “you can’t teach an old dog new tricks”):

- Normal — patient uses correct words with no slurring
- Abnormal — patient slurs words, uses the wrong words, or is unable to speak

**Interpretation:** If any 1 of these 3 signs is abnormal, the probability of a stroke is 72%.

# Protocol 3-5

Continued

## POSSIBLE CAUSES OF UNCONSCIOUSNESS

A	Alcohol, Abuse, Acidosis	T	Toxidromes, Trauma, Temperature, Tumor
E	Endocrine, Electrolytes, Encephalopathy	I	Infection, Intussusception
I	Insulin	P	Psychogenic, Porphyria, Pharmacological
O	Oxygenation, Overdose, Opiates	S	Space occupying lesion, Sepsis, Seizure, Shock
U	Uremia		

### PEARLS:

1. With duration of symptoms of less than 2.5 hours, scene and transport times should be minimized so the patient may receive the maximum benefit of intravenous thrombolytic therapy.
2. Onset of symptoms is defined as the last **witnessed** time the patient was symptom free (i.e., a patient awakening with stroke symptoms would be defined as an onset time of the previous night when the patient was symptom free).
3. The differentials listed in the Unconscious / Syncope / AMS Patient Care Protocol should also be considered.
4. Be alert for airway problems (difficulty swallowing, vomiting, aspiration, etc).
5. Hypoglycemia can present as a localized neurological deficit in the elderly.
6. There is an increased risk of stroke after a myocardial infarction (MI). Positive predictors of stroke after MI include: advanced age; diabetes; hypertension; history of prior stroke; anterior location of index MI; prior MI, atrial fibrillation; heart failure; and nonwhite race.<sup>1</sup>

STROKE

<sup>1</sup> Am J Med. 2006 Apr;119(4):354.e1-9.

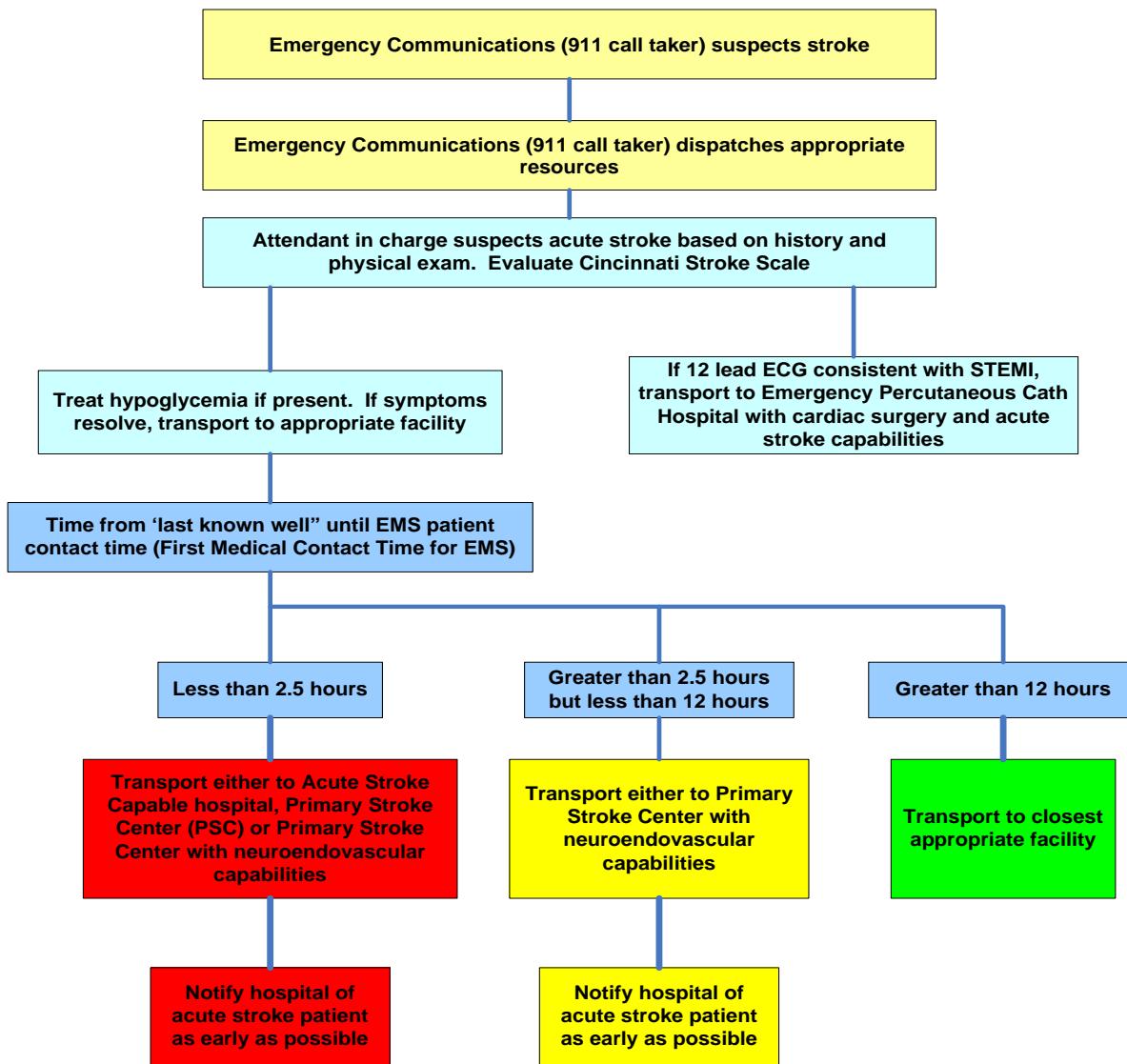
The incidence of stroke after myocardial infarction: a meta-analysis.  
Witt BJ, Ballman KV, Brown RD Jr, Meverden RA, Jacobsen SJ, Roger VL.

# Protocol 3-5

Continued

# STROKE

## ODEMSA Stroke System Onset of Symptoms to Medical First Contact Triage Scheme



*The Virginia Office of EMS State Stroke Triage Plan recommends a 3 hour time-frame from symptoms to administration of thrombolytic drug at the hospital. This ODEMsa flowchart illustrates time-frame from symptoms to EMS patient contact (first medical contact)*

# Protocol 3-6

**SECTION:** Adult General Medical Emergencies

**PROTOCOL TITLE:** Dystonic / Extrapyramidal Reaction  
**Medical - Dystonic / Extrapyramidal Reaction**

**REVISED:** 06/2013

## OVERVIEW:

Dystonic or extra-pyramidal reactions are characterized by an unusual posture, change in muscle tone, drooling, and / or uncontrolled movements. Although dystonic reactions are occasionally dose related these reactions are more often idiosyncratic and not predictable. Dystonia results from drug-induced alteration of the dopaminergic-cholinergic balance in the basal ganglia. Risk factors include, but are not limited to, family history of dystonia, recent history of cocaine or alcohol use, or treatment with a potent dopamine D<sub>2</sub> receptor antagonist such as fluphenazine and almost every anti-psychotic medication. Diphenhydramine, when administered, usually causes marked improvement, if not total resolution of symptoms.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Onset of symptoms</li> <li>Medications</li> <li>Illicit drug use</li> <li>History of past reaction</li> </ul>	<ul style="list-style-type: none"> <li>Eye deviation in all directions</li> <li>Protrusion of the tongue</li> <li>Forced jaw opening or spasms</li> <li>Facial grimacing</li> <li>Deviation of the head</li> <li>Difficulty speaking</li> </ul>	<ul style="list-style-type: none"> <li>Conversion disorder</li> <li>Mandible dislocation</li> <li>Hypocalcemia</li> <li>Hypomagnesemia</li> <li>Meningitis</li> <li>Status Epilepticus</li> <li>Stroke</li> <li>Tetanus</li> <li>Drug toxicity (Anticholinergic, Carbamazepine, Phenytoin, Valproate)</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
3. If patient is having a seizure, refer to the <u>Seizure protocol</u> .	•	•	•	•	•
4. Obtain a blood glucose sample. If < 60 mg / dl or > 300 mg / dL, refer to <u>Hypoglycemia</u> or <u>Hyperglycemia</u> protocol.		•	•	•	•
5. Place patient on cardiac monitor and obtain <u>12 lead ECG</u> if indicated.				•	•
6. Establish IV of Normal Saline, titrate to maintain systolic BP > 90 mmHg; alternatively may establish NaCl lock.			•	•	•
7. Administer <u>DIPHENHYDRAMINE</u> (Benadryl) 25 - 50 mg IV or IM.		•	•	•	•
8. Transport in position of comfort and reassess.	•	•	•	•	•

DYSTONIC REACTION

# Protocol 3-6

Continued

## DYSTONIC REACTION

### Common Types of Dystonia

**Spasmodic Torticollis** – Commonly called wry neck or cervical dystonia, is the most common form of focal dystonia. This form affects the muscles in the neck, causing the head to assume unnatural postures or turn uncontrollably. The head may turn (laterocollis), twist to one side (rotational torticollis), tilt forward (anterocollis), or tilt backward (retrocollis).

**Blepharospasm** – This is the second most common form of focal dystonia causing involuntary contraction of the eyelids, leading to uncontrollable blinking and closure of the eyes.

### Common Medications Causing Dystonia

Anti-depressants	Neuroleptic Agents	Miscellaneous Agents
<ul style="list-style-type: none"><li>• Amitriptyline</li><li>• Amoxapine (Asendis)</li><li>• Bupropion</li><li>• Clomipramide (Anafranil)</li><li>• Doxepin (Sinequan)</li><li>• Trimipramine (Surmontil)</li><li>• Trazadone (Desyrel)</li></ul>	<ul style="list-style-type: none"><li>• Chlorpromazine (Largactil)</li><li>• Clozapine (Clozaril)</li><li>• Fluphenazine (Prolixin)</li><li>• Haloperidol (Haldol)</li><li>• Perphenazine (Fentazin)</li><li>• Promazine</li><li>• Trifluoperazine (Stelazine)</li></ul>	<ul style="list-style-type: none"><li>• Lithium (Priadel)</li><li>• Midazolam</li><li>• Phenytoin (Dilantin)</li><li>• Promethazine (Phenergan)</li><li>• Verapamil (Calan)</li></ul>
Anti-anxiety Agents		Anti-nausea / vomiting agents
<ul style="list-style-type: none"><li>• Alprazolam (Xanax)</li><li>• Buspirone (Buspar)</li></ul>		<ul style="list-style-type: none"><li>• Metoclopramide (Reglan)</li><li>• Prochlorperazine (Stemetil)</li></ul>

#### PEARLS:

1. Incidence of acute dystonic reactions vary according to individual susceptibility, drug identity, dose, and duration of therapy.
2. A small population of all patients on neuroleptic medications have dystonic reactions.
3. In rare instances, although abnormal, airway management may be needed.
4. Dystonic reactions are rarely life threatening and result in no long term effects.
5. Risk of reaction typically decreases with age and tends to be most common in children, teens, and young adults (< 45 years old).

# Protocol

## 3-7

**SECTION:** Adult General Medical Emergencies

**PROTOCOL TITLE:** Hyperglycemia  
**Medical - Hyperglycemia**

**REVISED:** 06/2013

### OVERVIEW:

Symptomatic hyperglycemia can be described as an elevated blood glucose level with signs of severe dehydration, altered mental status, and / or shock. For the purpose of these protocols, the glucose level for symptomatic hyperglycemia is 300 mg / dL.

Hyperglycemia is usually the result of an inadequate supply of insulin to meet the body's needs. Most pre-hospital care should be focused around the treatment of severe dehydration and support of vital functions.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>History of diabetes</li> <li>Onset of symptoms</li> <li>Medications</li> </ul>	<ul style="list-style-type: none"> <li>Anxiety, agitation, and / or confusion</li> <li>Dry, red, and / or warm skin</li> <li>Acetone (fruity) smell on breath</li> <li>Kussmaul respirations</li> <li>Dry mouth, intensive thirst</li> <li>Abnormal / hostile behavior</li> <li>Tachycardia</li> <li>Dizziness / headache</li> </ul>	<ul style="list-style-type: none"> <li>Hypoxia</li> <li>Stroke</li> <li>Brain trauma</li> <li>Alcohol intoxication</li> <li>Toxin / substance abuse</li> <li>Medication effect / overdose</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Assess for signs of trauma. Provide spinal immobilization as necessary.	•	•	•	•	•
4. Administer oxygen to maintain $\text{SPO}_2$ 94 - 99%	•	•	•	•	•
5. For altered mental status, perform rapid glucose determination.		•	•	•	•
6. If glucose greater than 300 mg / dL, start an IV of normal saline.			•	•	•
7. For signs and symptoms of hypovolemic shock or dehydration, follow the <i>Shock protocol</i> .	•	•	•	•	•
8. Place on cardiac monitor and obtain / interpret <i>12 lead ECG</i> as indicated.				•	•
9. Transport and perform ongoing assessment as indicated.		•	•	•	•

HYPERGLYCEMIA

# Protocol 3-7

Continued

## HYPERGLYCEMIA

### POSSIBLE CAUSES OF PULSELESS ARREST

A	Alcohol, Abuse, Acidosis	T	Toxicodromes, Trauma, Temperature, Tumor
E	Endocrine, Electrolytes, Encephalopathy	I	Infection, Intussusception
I	Insulin	P	Psychogenic, Porphyria, Pharmacological
O	Oxygenation, Overdose, Opiates	S	Space occupying lesion, Sepsis, Seizure, Shock
U	Uremia		

#### PEARLS:

1. Use aseptic techniques to draw blood from finger.
2. Allow alcohol to dry completely prior to puncturing finger for blood glucose level. Alcohol may cause inaccurate readings. Do not blow on, or fan site, to dry faster.
3. After puncturing finger, use only moderate pressure to obtain blood. Excessive pressure may cause rupture of cells causing inaccurate results.
4. Know your specific agency's glucometer's parameters for a "HI" and "LO" reading.

# Protocol 3-8

**SECTION:** Adult General Medical Emergencies

**PROTOCOL TITLE:** Hypoglycemia  
**Medical - Hypoglycemia/Diabetic Emergency**

**REVISED:** 06/2013

## OVERVIEW:

Symptomatic hypoglycemia is defined as a blood glucose level < 60 mg / dL with signs of altered mental status and / or unconsciousness. The many signs and symptoms that are associated with hypoglycemia can be divided into two broad categories: adrenergic and neurologic. Adrenergic stimulation is due to the increased epinephrine levels and neurologic is due to central nervous system dysfunction from the decreased glucose levels.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>History of diabetes</li> <li>Onset of symptoms</li> <li>Medications</li> <li>Fever or recent infection</li> <li>Alcohol consumption</li> <li>Last meal</li> </ul>	<ul style="list-style-type: none"> <li>Anxiety, agitation, and / or confusion</li> <li>Cool, clammy skin</li> <li>Diaphoresis</li> <li>Seizure</li> <li>Decreased visual acuity, blindness</li> <li>Abnormal/ hostile behavior</li> <li>Tachycardia</li> <li>Hypertension</li> <li>Dizziness, headache, weakness</li> </ul>	<ul style="list-style-type: none"> <li>Hypoxia</li> <li>Seizure</li> <li>Stroke</li> <li>Brain trauma</li> <li>Alcohol intoxication</li> <li>Toxin / substance abuse</li> <li>Medication effect / overdose</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems.	•	•	•	•	•
3. Assess for signs of trauma. Provide spinal immobilization as necessary.	•	•	•	•	•
4. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
5. For altered mental status, perform rapid glucose determination.		•	•	•	•
6. If glucose less than 60 mg / dL or clinical signs and symptoms indicate hypoglycemia and the patient is awake and able to swallow:					
a. If the patient can protect airway, give Oral Glucose 15 grams. Repeat in 15 minutes if necessary.		•	•	•	•
7. If glucose less than 60 mg / dL or clinical signs and symptoms indicate hypoglycemia and oral glucose is contraindicated:					
a. Establish an IV of normal saline at KVO.			•	•	•

HYPOGLYCEMIA

# Protocol

## 3-8

Continued

# HYPOGLYCEMIA

	A	B	EN	I	P
b. Patient > 2 years old: Give <u>DEXTROSE</u> 50% 1 g / kg up to 25 g IV. Repeat once in 2 minutes if altered mental status persists.			•	•	•
c. If unable to establish an IV, alternatively administer <u>GLUCAGON</u> 1 mg IM / IN.			•	•	•
8. For signs and symptoms of hypovolemic shock or dehydration, follow the <u>Shock protocol</u> .	•	•	•	•	•
9. Place on cardiac monitor per patient assessment.				•	•
10. Transport and perform ongoing assessment as indicated.		•	•	•	•

POSSIBLE CAUSES OF PULSELESS ARREST			
<b>A</b>	Alcohol, Abuse, Acidosis	<b>T</b>	Toxidromes, Trauma, Temperature, Tumor
<b>E</b>	Endocrine, Electrolytes, Encephalopathy	<b>I</b>	Infection, Intussusception
<b>I</b>	Insulin	<b>P</b>	Psychogenic, Porphyria, Pharmacological
<b>O</b>	Oxygenation, Overdose, Opiates	<b>S</b>	Space occupying lesion, Sepsis, Seizure, Shock
<b>U</b>	Uremia		

### PEARLS:

1. Use aseptic techniques to draw blood from finger. Allow alcohol to dry completely prior to puncturing finger for blood glucose level. Alcohol may cause inaccurate readings. Do not blow on, or fan site, to dry faster.
2. Blood glucose levels should be taken from extremity opposite IV and medication administration for most accurate reading.
3. After puncturing finger, use only moderate pressure to obtain blood. Excessive pressure may cause rupture of cells causing inaccurate results. Know your specific agency's glucometer parameters for a "HI" and "LO" reading.
4. When administering IV fluids, a minimum amount should be delivered as large amounts may lower blood glucose level and impede original goal of administering Dextrose.
5. An inadequate amount of glucose for heat production, combined with profound diaphoresis, may place a hypoglycemic patient at greater risk for hypothermia. Keep patient warm as needed.
6. Patients who are consuming aspirin, acetaminophen, anti-psychotic drugs, beta-blockers, oral diabetic medications, or antibiotics such as sulfa-based, tetracycline, and amoxicillin that experience a hypoglycemic episode are at a greater risk for relapse. These patients should be strongly encouraged to seek additional medical intervention and, as such should be transported. If you (and / or Medical Control) are unable to influence the patient into accepting transport,

# Protocol 3-8

Continued

- to, the extent practical, advise the patient to stay with a responsible party who can remain with the patient for several hours.
- 7. Glucagon causes a breakdown of stored glycogen to glucose. Glucagon may not work if glycogen stores are previously depleted due to liver dysfunction, alcoholism, or malnutrition. Effects of Glucagon may take up to 30 minutes.
  - 8. Any patient that has been administered Glucagon should be transported for further evaluation.
  - 9. Any patient, who has had a hypoglycemic episode without clear reason / cause, should be transported for further evaluation.

## HYPOGLYCEMIA

# Protocol

## 3-8

Continued

### HYPOGLYCEMIA

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# Protocol 3-9

**SECTION:** Adult General Medical Emergencies

**PROTOCOL TITLE:** Nausea / Vomiting  
**Medical - Nausea / Vomiting**

**REVISED:** 06/2013

## OVERVIEW:

The pre-hospital provider should be very careful to insure that patients who present with vague complaints such as nausea and vomiting are thoroughly assessed. All patients presenting with nausea and vomiting should be screened for potential life-threats initially. Anti-emetic treatment should be considered a treatment of a symptom of an underlying illness or injury. The patient's symptoms and recent history must determine the most appropriate care. Frequently, treatment of an underlying cause and limiting movement may resolve or greatly reduce these complaints. However, persistent nausea and vomiting of unknown etiology may respond well to pharmaceutical therapy. Do not overlook the possibility of cardiac origin complaints, with atypical presentation of nausea / vomiting (i.e., diabetic and female patients)

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Age</li> <li>• Time of last meal</li> <li>• Last bowel movement, emesis</li> <li>• Improvement, worsening with food or activity</li> <li>• Duration of signs and symptoms</li> <li>• Other sick contacts</li> <li>• Past medical, surgical history</li> <li>• Medications</li> <li>• Menstrual history (pregnancy)</li> <li>• Travel history</li> <li>• Recent trauma</li> </ul>	<ul style="list-style-type: none"> <li>• Pain</li> <li>• Character of pain (constant, intermittent, sharp, dull, etc)</li> <li>• Distention</li> <li>• Constipation</li> <li>• Diarrhea</li> <li>• Anorexia</li> <li>• Radiation</li> <li>• Associated symptoms (helpful to localize source): Fever, headache, blurred vision, weakness, malaise, myalgias, cough, dysuria, mental status changes, rash</li> </ul>	<ul style="list-style-type: none"> <li>• CNS (increased pressure, headache, stroke, lesions, trauma, hemorrhage, vestibular)</li> <li>• Myocardial infarction</li> <li>• Drugs (NSAID's, antibiotics, narcotics, chemotherapy)</li> <li>• GI or renal disorders</li> <li>• Gynecological disease (ovarian cyst, PID)</li> <li>• Infections (pneumonia, influenza)</li> <li>• Electrolyte abnormalities</li> <li>• Food or toxin induced</li> <li>• Medications, substance abuse</li> <li>• Pregnancy</li> <li>• Psychologic</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
4. Allow the patient to lie in a comfortable position.	•	•	•	•	•
5. Establish an IV of normal saline per patient assessment.			•	•	•

NAUSEA / VOMITING

# Protocol 3-9

Continued

## NAUSEA / VOMITING

	A	B	EN	I	P
6. Assess for signs of shock. If shock is suspected, follow the <u>Shock protocol</u> .	•	•	•	•	•
7. Place the patient on the cardiac monitor and obtain / interpret <u>12 lead ECG</u> .		•	•	•	•
8. For severe nausea or vomiting, if available, give <u>ODANSETRON (ZOFRAN)</u> administer 0.1 mg / kg IV / IM up to 4 mg over 2 to 5 minutes. *				•	•
9. May repeat <u>ODANSETRON</u> IV dosing in adult after 10 minutes if needed				•	•
10. Transport and perform ongoing assessment as indicated.	•	•	•	•	•

### PEARLS:

1. Nausea and vomiting has many subtle, sometimes life threatening causes. Do not minimize its importance as a symptom of a serious life threatening illness or injury.
2. Atypical CVAs and vertebrobasilar artery compromise may present as benign vertigo or labyrinthitis. Therefore, it is recommended that all cases of vertigo should be transported for physician evaluation whenever possible.
3. Odansetron (Zofran) may not be as effective for vertigo and labyrinthitis related nausea and vomiting.
4. For nausea and vomiting associated with dehydration, fluid replenishment may be sufficient in improving patient comfort and reduce the need for medication administration.
5. Performing an appropriate history and physical will identify life-threats and concerns that should receive priority over anti-emetic treatment.
6. In cases of toxic ingestion, including alcohol, poisons, and drug overdoses, vomiting is an internal protective mechanism and should not be prevented with pharmacological therapy in the pre-hospital environment. Care should be given to prevent aspiration.
7. Odansetron (Zofran) is also safe and effective for nausea and vomiting in trauma patients and can be used in conjunction with pain management.
8. Proper documentation should include the mental status and vital signs before and after medication administration.

# Protocol 3-10

**SECTION:** Adult General Medical Emergencies

**PROTOCOL TITLE:** Pain Management  
**General - Pain Control**

**REVISED:** 06/2013

## OVERVIEW:

The practice of pre-hospital emergency medicine requires expertise in a wide variety of pharmacological and non-pharmacological techniques to treat acute pain resulting from a myriad of injuries and illness. One of the most essential missions for all healthcare providers should be the relief and / or prevention of pain and suffering. Approaches to pain relief must be designed to be safe and effective in the organized chaos of the pre-hospital environment. The degree of pain and the hemodynamic status of the patient will determine the rapidity of care.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Age</li> <li>• Location</li> <li>• Duration</li> <li>• Severity (1 - 10)</li> <li>• Past medical history</li> <li>• Medications</li> <li>• Drug allergies</li> </ul>	<ul style="list-style-type: none"> <li>• Severity (pain scale)</li> <li>• Quality (sharp, dull, etc)</li> <li>• Radiation</li> <li>• Relation to movement, respiration</li> <li>• Increased with palpation of area</li> </ul>	<ul style="list-style-type: none"> <li>• Musculoskeletal</li> <li>• Visceral (abdominal)</li> <li>• Cardiac</li> <li>• Pleural, respiratory</li> <li>• Neurogenic</li> <li>• Renal (colic)</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
3. Determine patient's pain score assessment.	•	•	•	•	•
4. Place patient on cardiac monitor per patient assessment.			•	•	•
5. Establish IV of normal saline per patient assessment.			•	•	•
6. If significant pain, administer FENTANYL 2 mcg / kg INTRANASAL (max first dose of 50 mcg) half dose in each nostril. May consider additional dose of up to 100mcg after 5 minutes if pain persists –OR– FENTANYL 1 mcg / kg IV, or IM (max single dose of 50 mcg). Sickle cell patients may be given higher doses up to 100 mcg IV, or IM. *** There are no documented cases of chest rigidity with the administration of Fentanyl INTRANASALLY ***				•	•
7. If Fentanyl unavailable, administer MORPHINE SULPHATE 0.1 mg / kg IV or IM (max single dose of 5.0 mg). Sickle cell patients may be given higher doses up to 10 mg IV or IM.				•	•
8. Repeat the patient's pain score assessment.	•	•	•	•	•

PAIN MANAGEMENT

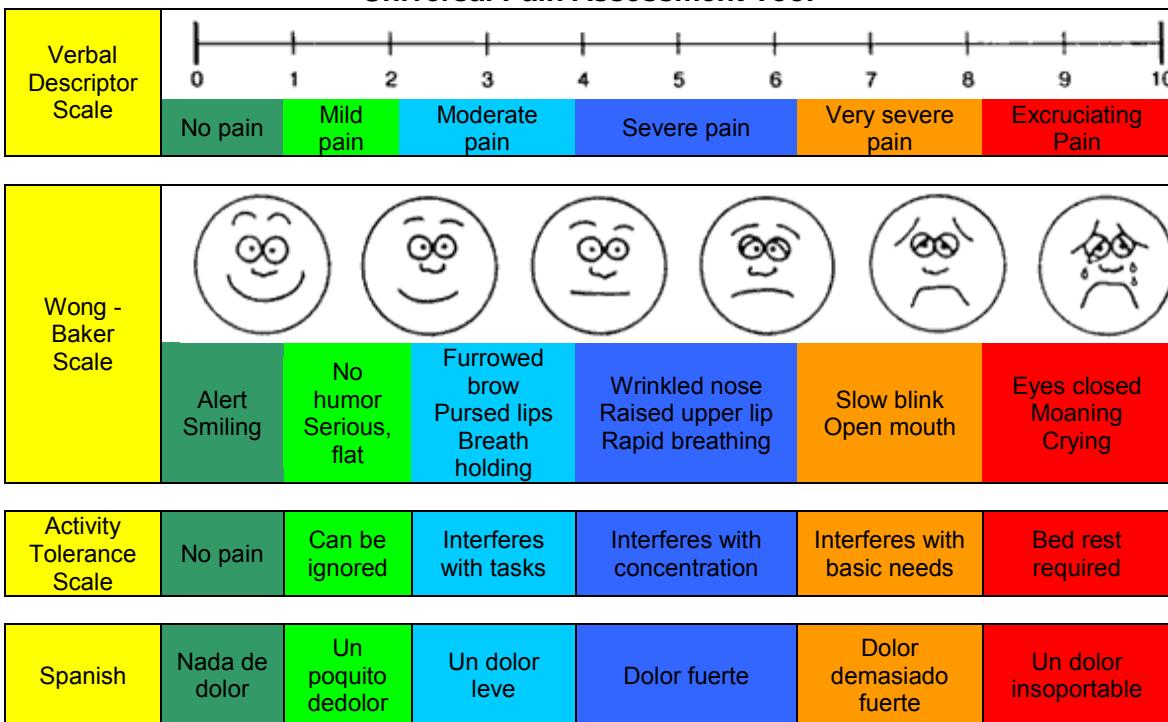
# Protocol 3-10

Continued

## PAIN MANAGEMENT

	A	B	EN	I	P
9. If indicated based on pain assessment, repeat pain medication administration after 10 minutes of the previous dose. Maximum total dose of Fentanyl is 200 mcg and Morphine Sulphate is 20 mg for non sickle cell patients. Sickle cell patients may have up to a total of 400 mcg of Fentanyl or 40 mg of Morphine Sulphate.				•	•
10. Transport in position of comfort and reassess as indicated.		•	•	•	•

Universal Pain Assessment Tool



### PEARLS:

1. Pain severity (0 - 10) is a vital sign that should be recorded before and after IV or IM medication administration and upon arrival at destination.
2. Contraindications to narcotic medication administration include hypotension, head injury, respiratory depression, and severe COPD.
3. All patients should have drug allergies ascertained prior to administration of pain medication.
4. Patients receiving narcotic analgesics should be administered oxygen.
5. Narcotic analgesia was historically contraindicated in the pre-hospital setting for abdominal pain of unknown etiology. It was thought that analgesia would hinder the ER physician or surgeon's evaluation. Recent studies have demonstrated

# Protocol 3-10

Continued

- Opiate administration may alter the physical examination findings, but these changes result in no significant increase in management errors.<sup>1</sup>
6. Fentanyl is contraindicated for patients who have taken MAOIs within past 14 days, and used with caution in patients with head injuries, increased ICP, COPD, and liver or kidney dysfunction.

PAIN MANAGEMENT

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<sup>1</sup>Do opiates affect the clinical evaluation of patients with acute abdominal pain?  
JAMA. 2006; 296(14):1764-74 (ISSN: 1538-3598)  
Ranji SR; Goldman LE; Simel DL; Shojania KG

# Protocol 3-10

Continued

PAIN MANAGEMENT

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# Protocol 3-11

**SECTION:** Adult General Medical Emergencies

**PROTOCOL TITLE:** Respiratory Distress – Asthma / COPD  
**Medical - Respiratory Distress/Asthma/COPD/Croup/  
 Reactive Airway**

**REVISED:** 06/2013

## OVERVIEW:

Respiratory distress, or dyspnea, is one of the most common medical complaints witnessed in pre-hospital medicine. Most patients describe it as a sensation of shortness of breath or a feeling of “air hunger” accompanied by labored breathing. Dyspnea may be caused by pulmonary or cardiac disease or by any mechanism that causes hypoxia. It may be mild, manifesting only on exertion, or severe, occurring at rest. The most common causes of non-cardiac dyspnea in the pre-hospital environment involve asthma, chronic obstructive pulmonary disease (COPD), pneumonia, and bronchitis. The wheezing patient may present in different ways, some may not even complain of wheezing, but rather just of shortness of breath, cough, or chest tightness. Wheezing patients are often apprehensive and distressed, at times, so severe that they may not be able to speak in complete sentences. Oxygenation may be compromised to the point that there is a decrease in the patient’s level of consciousness. These signs are clues that the patient needs immediate and aggressive therapy. Treatment is aimed at maintaining the patient’s SpO<sub>2</sub> to > 90%. Remember, **not all wheezing is from asthma.**

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Asthma, COPD, chronic bronchitis, emphysema, heart failure</li> <li>Home treatment (oxygen, inhaler, nebulizer)</li> <li>Medications (Theophylline, steroids, bronchodilators)</li> <li>Toxic exposure, smoke inhalation</li> </ul>	<ul style="list-style-type: none"> <li>Shortness of breath</li> <li>Purse lip respirations</li> <li>Decreased ability to speak</li> <li>Increased respiratory rate and effort</li> <li>Use of accessory muscles</li> <li>Tripoding</li> <li>Wheezing, rhonchi, rales</li> <li>Fever, cough</li> <li>Tachycardia</li> </ul>	<ul style="list-style-type: none"> <li>Asthma</li> <li>Anaphylaxis</li> <li>Aspiration</li> <li>COPD (emphysema, bronchitis)</li> <li>Pleural effusion</li> <li>Pulmonary embolism</li> <li>Pneumothorax</li> <li>Cardiac (MI, HF)</li> <li>Pericardial Tamponade</li> <li>Upper respiratory infection</li> <li>Hyperventilation, anxiety</li> <li>Inhaled toxins</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen to maintain $\text{SpO}_2$ 94 - 99%. Support respirations as necessary with a BVM.	•	•	•	•	•

# Protocol 3-11

Continued

## RESPIRATORY DISTRESS - Asthma / COPD

	A	B	EN	I	P
4. Place patient in a position of comfort, typically sitting upright.	•	•	•	•	•
5. Monitor <u>Capnography</u> , if available.			•	•	•
6. Assist patient with prescribed BRONCHODILATOR METERED DOSE INHALER (MDI). If no dosing schedule is prescribed, repeat in 5 to 10 minutes as needed.		•	•	•	•
7. If in critical respiratory distress, provide BVM ventilation with patient's spontaneous efforts. If patient becomes unresponsive, perform BVM ventilation with an airway adjunct. If BVM ventilation is inadequate, secure airway with a definitive airway (Supraglottic / dual lumen) or ENDOTRACHEAL TUBE [Level I and P only].	•	•	•	•	•
<b>For patients in respiratory distress:</b>					
8. Give <u>ALBUTEROL</u> 2.5 to 5.0 mg and <u>IPRATOPRIUM</u> 0.5 mg via small volume nebulizer.			•	•	•
a. Nebulizer with mouthpiece or facemask.	OMD	•	•	•	•
b. Repeat Albuterol every 10 minutes up to 4 treatments if respiratory distress persists and no contraindications develop. Note: Ipratropium bromide is only administered with the first treatment.	OMD	•	•	•	•
9. Establish venous access as needed.		•	•	•	•
10. Administer <u>PREDNISONE</u> 60 mg PO.		•	•	•	•
11. Administer <u>CPAP</u> with 5 – 10 cm H <sub>2</sub> O PEEP for moderate to severe dyspnea. For levels I and P, if the CPAP device allows, begin at 5.0 mmHg and titrate to effect.	•	•	•	•	•
12. In the asthmatic patient, for severe respiratory distress that is non-responsive to standard medications, consider administration of <u>MAGNESIUM SULFATE</u> 40 mg / kg IV over 20 minutes (max dose of 2 grams).			•	•	•
13. In the asthmatic patient, for severe respiratory distress that is non-responsive to standard medications, contact Medical Control to consider administration of <u>EPINEPHRINE 1:1,000</u> 0.01 mg / kg up to 0.3 mg IM.			MC	MC	
14. Place on cardiac monitor and obtain <u>12 lead ECG</u> per assessment.			•	•	
15. Transport and perform ongoing assessment as indicated.	•	•	•	•	•

# Protocol 3-11

Continued

## **PEARLS:**

1. Status asthmaticus is defined as a severe prolonged asthma attack, non-responsive to therapy.
  2. A silent chest in respiratory distress is a pre-respiratory arrest sign.
  3. Magnesium Sulfate and Epinephrine should only be used for patients in severe, non-responsive distress that is refractory to initial treatments.
  4. Patients with COPD, emphysema, and chronic bronchitis usually have a lowered baseline level of pulmonary function. These patients often have a history of chronic cough, sputum production, and dyspnea on exertion.
  5. The classic presentation of a patient with emphysema is the appearance of the “pink puffer,” with rapid, shallow breathing through pursed lips, with a thin body habitus, a barrel chest, and the use of accessory muscles with respirations.
- The classic presentation of a patient with bronchitis is the appearance of the “blue bloater”, with slow, deep, and labored breathing, a overweight body
6. habitus, and, at times, cyanotic.

# RESPIRATORY DISTRESS

# Protocol 3-11

Continued

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# Protocol 3-12

**SECTION:** Adult General Medical Emergencies

**PROTOCOL TITLE:** Seizures  
**Medical - Seizure**

**REVISED:** 06/2013

## OVERVIEW:

A seizure is a period of altered neurologic function caused by abnormal neuronal electrical discharges. Generalized seizures begin with an abrupt loss of consciousness. If motor activity is present, it symmetrically involves all four extremities. Episodes that develop over minutes to hours are less likely to be seizures; generally seizures only last one to two minutes. Patients with seizure disorders tend to have stereotype, or similar, seizures with each episode and are less likely to have inconsistent or highly variable attacks. True seizures are usually not provoked by emotional stress. Most seizures are followed by a postictal state of lethargy and confusion.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Reported, witnessed</li> <li>Seizure activity description</li> <li>Previous seizure history</li> <li>Medic alert tag information</li> <li>Seizure medications</li> <li>History of trauma</li> <li>History of diabetes mellitus</li> <li>History of pregnancy</li> </ul>	<ul style="list-style-type: none"> <li>Decreased mental status</li> <li>Sleepiness</li> <li>Incontinence</li> <li>Observed seizure activity</li> <li>Evidence of trauma</li> </ul>	<ul style="list-style-type: none"> <li>CNS (head) trauma</li> <li>Brain tumor</li> <li>Metabolic, hepatic, renal failure</li> <li>Diabetic</li> <li>Hypoxia</li> <li>Electrolyte abnormality</li> <li>Drugs, medications, non-compliance</li> <li>Infection, fever, meningitis</li> <li>Alcohol withdrawal</li> <li>Eclampsia</li> <li>Stroke</li> <li>Hyperthermia</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
a. Suction the oro / nasopharynx as necessary.	•	•	•	•	•
b. Place a nasopharyngeal airway as necessary (avoid in head trauma).	•	•	•	•	•
3. Administer oxygen to maintain $\text{SPO}_2$ 94 - 99%. Support respirations as necessary with a BVM.	•	•	•	•	•
4. Do not restrain the patient. Let the seizure take its course but protect patient from injury.	•	•	•	•	•
5. Perform rapid glucose determination. If glucose less than 60 mg / dL or clinical signs and symptoms indicate hypoglycemia, refer to the <u>Hypoglycemia protocol</u> .		•	•	•	•
6. Establish an IV of normal saline at KVO.			•	•	•

SEIZURES

# Protocol 3-12

Continued

## SEIZURES

	A	B	EN	I	P
7. If the seizure persists and the rapid glucose determination is greater than 60 mg / dL, give <u>MIDAZOLAM</u> 0.2 mg / kg INTRANASAL (max single dose 5 mg) –OR- give <u>MIDAZOLAM</u> 0.1 mg / kg IV / IM (max single dose 5 mg)				•	•
a. Repeat dose in 5 minutes if seizure persists.				•	•
b. If midazolam is unavailable, administer, <u>DIAZEPAM</u> 0.25 mg / kg up to 5 mg slow IV push. Repeat once as necessary.				•	•
8. Place patient on cardiac monitor (life-threatening dysrhythmias may cause seizure-like activity).				•	•
9. Consider placing the patient in the recovery position during the postictal period.	•	•	•	•	•
10. Transport and perform ongoing assessment as indicated.		•	•	•	•

TYPES OF SEIZURES		
<u>Generalized</u>	<u>Simple Partial</u>	<u>Complex Partial</u>
<ul style="list-style-type: none"> <li>• Absence (Petit-Mal)</li> <li>• Atonic (Drop Attack)</li> <li>• Myoclonic (Brief bilateral jerking)</li> <li>• Tonic-Clonic (Grand-Mal)</li> </ul>	<ul style="list-style-type: none"> <li>• Focal/ Local: Localized twitching of hand, arm, leg, face, or eyes. Patient may be conscious or unconscious</li> </ul>	<ul style="list-style-type: none"> <li>• Temporal Lobe</li> <li>• Psychomotor</li> </ul>

### PEARLS:

1. Status epilepticus is defined as two or more consecutive seizures without a period of consciousness or recovery. This is a true emergency requiring rapid airway control, treatment, and transport.
2. Grand Mal seizures are generalized in nature and associated with loss of consciousness, incontinence, and tongue trauma.
3. Focal seizures affect only a specific part of the body and are not usually associated with loss of consciousness.
4. Jacksonian seizures are seizures that start as focal in nature and become generalized.
5. Petit Mal seizures may be localized to a single muscle group or may not involve visible seizure activity at all. Always examine pupils for nystagmus, which would alert provider to continued seizure activity.
6. Respirations during an active seizure should be considered ineffective and airway maintenance should occur per assessment.
7. Be prepared for airway problems and continued seizures.
8. Investigate possibility of trauma and substance abuse.
9. Be prepared to assist ventilations as dosage Midazolam or Valium is repeated and / or increased.

# Protocol 3-13

**SECTION:** Adult General Medical Emergencies

**PROTOCOL TITLE:** Shock  
**Medical - Hypotension/Shock (Non-trauma)**

**REVISED:** 06/2013

## OVERVIEW:

Shock is defined as a state of inadequate tissue perfusion. This may result in acidosis, derangements of cellular metabolism, potential end-organ damage, and death. Early in the shock process, patients are able to compensate for decreased perfusion by increased stimulation of the sympathetic nervous system, leading to tachycardia and tachypnea. Later, compensatory mechanisms fail, causing a decreased mental status, hypotension, and death. Early cellular injury may be reversible if definitive therapy is delivered promptly.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Blood loss (vaginal or gastrointestinal)</li> <li>AAA, ectopic</li> <li>Fluid loss (vomiting, diarrhea)</li> <li>Fever</li> <li>Infection</li> <li>Cardiac ischemia (MI, HF)</li> <li>Medications</li> <li>Allergic Reaction</li> <li>Pregnancy</li> </ul>	<ul style="list-style-type: none"> <li>Restlessness, confusion</li> <li>Weakness, dizziness</li> <li>Weak, rapid pulse</li> <li>Pale, cool, clammy skin</li> <li>Delayed capillary refill</li> <li>Hypotension</li> <li>Coffee-ground emesis</li> <li>Tarry stools</li> </ul>	<ul style="list-style-type: none"> <li>Shock <ul style="list-style-type: none"> <li>Hypovolemic</li> <li>Cardiogenic</li> <li>Septic</li> <li>Neurogenic</li> <li>Anaphylactic</li> </ul> </li> <li>Ectopic pregnancy</li> <li>Dysrhythmia</li> <li>Pulmonary embolus</li> <li>Tension pneumothorax</li> <li>Medication effect, overdose</li> <li>Vaso-vagal</li> <li>Physiologic (pregnancy)</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Assess for signs of shock including, but not limited to: <ul style="list-style-type: none"> <li>Restlessness, altered mental status, hypoperfusion (cool, pale, moist skin), tachypnea (rapid breathing), rapid, weak pulse, orthostatic hypotension (blood pressure suddenly drops on standing up), nausea and thirst.</li> </ul>	•	•	•	•	•
4. Administer oxygen per patient assessment to maintain $\text{SpO}_2$ between 94 - 99%. Support respirations as necessary with a BVM.	•	•	•	•	•
5. Transport as soon as possible.		•	•	•	•
6. Control external bleeding with direct pressure, then <i>tourniquet</i> if direct pressure is inadequate.	•	•	•	•	•

SHOCK

# Protocol 3-13

Continued

## SHOCK

	A	B	EN	I	P
7. If pregnant (uterine fundus above umbilicus), place the patient on her left side.	•	•	•	•	•
8. Maintain body temperature by protecting the patient from the environment, removing wet clothing and covering the patient with a blanket.	•	•	•	•	•
9. Establish a large bore IV or IO of Normal Saline. If time permits, establish second access. <ul style="list-style-type: none"> <li>• Do not delay transport to establish vascular access.</li> </ul>			•	•	•
10. Give a 20 mL / kg bolus. If no improvement after the first 20 mL / kg bolus, may repeat once. While administering a fluid bolus, frequently reassess perfusion for improvement. If perfusion improves, slow the IV to KVO and monitor closely. If patient develops fluid overload respiratory distress (dyspnea, crackles, rhonchi, decreasing SpO <sub>2</sub> ), slow the IV to KVO.			•	•	•
11. Transport and perform ongoing assessment as indicated.		•	•	•	•

### Dopamine IV Infusion

Add 400 mg of Dopamine to 250 ml of NS (1600 mcg / ml) and attach 60 gtts IV tubing.							
Mcg / min	Weight in kilograms						
	50 Kg 110 Lb	60 Kg 132 Lb	70 Kg 154 Lb	80 Kg 176 Lb	90 Kg 198 Lb	100 Kg 220 Lb	125 Kg 275 Lb
Microdrops / minute (ml / hr)							
5.0 mcg	9	11	13	15	17	19	23
10.0 mcg	19	23	26	30	34	38	47
15.0 mcg	28	34	39	45	51	56	70
20.0 mcg	38	45	53	60	68	75	94

### Classes of Shock

Hypovolemic	Distributive	Cardiogenic	Obstructive
Caused by hemorrhage, burns, or dehydration.	Maldistribution of blood, caused by poor vasomotor tone in neurogenic shock, sepsis, anaphylaxis, severe hypoxia, or metabolic shock.	Caused by necrosis of the myocardial tissue, or by arrhythmias.	Caused by impairment of cardiac filling, found in pulmonary embolism, tension pneumothorax, or cardiac Tamponade.

# Protocol 3-13

Continued

## **PEARLS:**

1. Trendelenburg is no longer believed to increase BP and / or cardiac output in most patients, does not improve tissue oxygenation, results in displacement of only a very small amount of total blood volume, and actually decreases cardiac output in the hypotensive patient. It has also been proven to produce right ventricular stress and deterioration of pulmonary function.
2. GI bleeding may be a less obvious cause of hypovolemic shock if it has been gradual. Ask patient about possible melena, hematemesis, and hematochezia.
3. Ectopic pregnancy may be a less obvious cause of hypovolemic shock. Consider this diagnosis in all women of child bearing age if there is a complaint of abdominal, back or pelvic pain.
4. Abdominal aneurysm may be a less obvious cause of hypovolemic shock. Consider this diagnosis in patient's whose age is  $\geq 50$ , and who have a cardiac / hypertensive history if there is a complaint of abdominal or back pain.

**SHOCK**

# Protocol 3-13

Continued

**SHOCK**

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# Protocol 3-14

**SECTION:** Adult General Medical Emergencies

**PROTOCOL TITLE:** Sickle Cell Anemia / Crisis  
**Medical - Sickle Cell Anemia / Crisis**

**REVISED:** 06/2013

## OVERVIEW:

Sickle cell anemia is a recessive genetic illness that primarily affects African-Americans, but also people with African, Arab, India, Greek, Italian, and Latin American heritage. Although rare, Caucasians can also have sickle cell disease or sickle cell trait. In patients with sickle cell anemia, the beta hemoglobin chain of red blood cells are produced abnormally, *hemoglobin S*, which has an inferior oxygen-carrying ability. These mutated molecules do not have the smooth motion needed for oxygenation and de-oxygenation. When these hemoglobin S cells are exposed to low-oxygen states, they crystallize, distorting the RBC into a fragile, stiff and rigid crescent (sickle) shape, stopping the smooth passage of the cell through the narrow blood vessels. As a result, blood vessels can sometimes become clogged causing occlusions within the vessels. As fewer RBCs pass through congested vessels, tissues and joints receive less oxygen, causing excruciating pain from the buildup of waste products in the hypoxic areas. Pain may range from mild transient attacks with duration of minutes to severe pain lasting days to weeks and requiring hospitalization.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Duration of current crisis</li> <li>Last crisis</li> <li>Normal crisis symptoms</li> <li>Medications (out of meds vs. meds no longer working)</li> <li>Allergies</li> </ul>	<ul style="list-style-type: none"> <li>Increased weakness</li> <li>Body aches</li> <li>Pain</li> <li>Shortness of breath</li> <li>Abdominal pain</li> <li>Chest pain</li> <li>Back pain</li> <li>Extremity pain</li> </ul>	<ul style="list-style-type: none"> <li>Angina</li> <li>Gout</li> <li>Drug abuse</li> <li>Fibromyalgia</li> <li>Lupus</li> <li>Electrolyte imbalance</li> <li>Dehydration</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
3. Determine patient's pain score assessment.	•	•	•	•	•
4. Consider differential diagnoses for patient's pain.	•	•	•	•	•
5. Establish IV of Normal Saline per patient assessment. Administer bolus if needed.			•	•	•
6. If significant pain, refer to <u>Pain Management</u> protocol. Sickle cell patients may be given higher doses of <u>FENTANYL</u> and <u>MORPHINE SULFATE</u> .				•	•
7. Repeat the patient's pain score assessment.				•	•
8. Transport in position of comfort and reassess as indicated.		•	•	•	•

SICKLE CELL CRISIS

# Protocol 3-14

Continued

## SICKLE CELL CRISIS

### PEARLS:

1. Oxygen should be administered if necessary to maintain an O<sub>2</sub> saturation above 94% to sickle cell patients to fully oxygenate all normal RBCs and to decrease the sickling of RBCs that occurs during hypoxic states.
2. Several factors causing sickle cell crises include an infection such as a cold or the flu, cold weather, fatigue, over exercising, and dehydration.
3. Symptoms of sickle cell disease may start in children as young as six months old. Babies suffering from sickle cell symptoms may be irritable or cranky and cry even when their parents do everything they can to comfort them. A thorough assessment may include determining the parent's history when dispatched to a patient complaining of these vague symptoms.
4. Sickle cell disease is inherited. A patient must inherit two sickle cell genes, one from each parent, to develop sickle cell disease. When only one gene is present, the condition is known as a sickle cell trait. Patients with sickle cell trait often do not have crises.

# Protocol 3-15

**SECTION:** Adult General Medical Emergencies

**PROTOCOL TITLE:** Unconscious / Syncope / AMS  
**Medical - Altered Mental Status**

**REVISED:** 06/2013

## OVERVIEW:

The unconscious patient can be a difficult patient to manage. There are many potential causes for a change in mentation or syncope. These causes range from benign problems to potentially life-threatening cardiopulmonary or central nervous system disorders. When approaching the patient that has experienced a change in mental status, or syncope, be alert for clues that may indicate the potential cause – diligently obtain a thorough patient history and perform a complete physical exam. Obtaining an adequate physical assessment and assessing for the presence of common causes of the episode can quickly aid you in determining the proper sequence of care to provide to the patient. Focus on managing any life-threatening conditions that may have led to the episode and correcting any found.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Cardiac history, stroke, seizures</li> <li>Occult blood loss (GI, ectopic)</li> <li>Females (LMP, vaginal bleeding)</li> <li>Fluid loss (nausea, vomiting, diarrhea)</li> <li>Past medical history</li> <li>Recent trauma</li> <li>Complaint prior to event</li> </ul>	<ul style="list-style-type: none"> <li>Loss of consciousness with recovery</li> <li>Lightheadedness, dizziness</li> <li>Palpitations, slow or rapid pulse</li> <li>Pulse irregularity</li> <li>Decreased blood pressure</li> </ul>	<ul style="list-style-type: none"> <li>Vasovagal</li> <li>Orthostatic hypotension</li> <li>Cardiac syncope / dysrhythmia</li> <li>Micturition / defecation syncope</li> <li>Psychiatric</li> <li>Stroke</li> <li>Hypoglycemia</li> <li>Seizure</li> <li>Shock</li> <li>GI Bleed</li> <li>Ectopic Pregnancy</li> <li>Toxicological (ETOH)</li> <li>Medication effect</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Maintain patient in a supine position.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99% and glucose check.	•	•	•	•	•
4. If the patient has altered mental status, refer to the appropriate protocol per assessment. If no obvious etiology is identified, refer to <u>Cerebrovascular Accident (Stroke) protocol</u> .	•	•	•	•	•

UNCONSCIOUS / SYNCOPES / AMS

# Protocol 3-15

Continued

## UNCONSCIOUS / SYNCOPES / AMS

	A	B	EN	I	P
5. If the patient age is $\geq$ 25 years of age or has a cardiac history, place on cardiac monitor and obtain / interpret <u>12 lead ECG</u> . If interpretation is consistent with STEMI, notify and transport to the closest appropriate Emergency PCI hospital.		•	•	•	•
6. Establish IV of Normal Saline. Keep at KVO rate unless hypotensive. If hypotensive, please refer to <u>Shock protocol</u> .			•	•	•
7. Transport and reassess as needed.	•	•	•	•	•

POSSIBLE CAUSES OF UNCONSCIOUSNESS/SYSCOPE/AMS			
A	Alcohol, Abuse, Acidosis	T	Toxidromes, Trauma, Temperature, Tumor
E	Endocrine, Electrolytes, Encephalopathy	I	Infection, Intussusception
I	Insulin	P	Psychogenic, Porphyria, Pharmacological
O	Oxygenation, Overdose, Opiates	S	Space occupying lesion, Sepsis, Seizure, Shock
U	Uremia		

### PEARLS:

1. In patient that has experienced a syncopal episode, assess for signs or symptoms of injury and take appropriate precautions if there is reason to suspect trauma, or traumatic injury that cannot be ruled out.
2. In patients with a cardiac history, or in the elderly, be suspicious of cardiac arrhythmia as the cause of syncope.

# Protocol 3-16

**SECTION:** Adult General Medical Emergencies

**PROTOCOL TITLE:** Difficult Airway  
**Airway – Failed**

**REVISED:** 06/2013

## OVERVIEW:

The purpose of these guidelines is to facilitate the management of the difficult airway and to reduce the likelihood of adverse outcomes. The principal adverse outcomes associated with the difficult airway include, but are not limited to, death, brain injury, myocardial injury, and airway trauma.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"><li>• Age</li><li>• Past medical, surgical history</li><li>• Medications</li><li>• Reason for airway failure</li><li>• Duration of symptoms</li><li>• Last meal</li><li>• Menstrual history, pregnancy</li></ul>	<ul style="list-style-type: none"><li>• Hypercarbia</li><li>• Stridor</li><li>• Trismus</li><li>• Pooling of secretions</li><li>• Hypoxia</li></ul>	<ul style="list-style-type: none"><li>• Congenital abnormalities</li><li>• Previous Tracheostomy</li><li>• Previous neck surgeries</li><li>• Previous mouth / throat surgeries</li><li>• Known head / neck cancers and masses</li><li>Trauma</li></ul>

### ***\*Medication Facilitated Intubation and Surgical Airway***

***are skills that are only approved when:***

- Proper medications and equipment are available for procedures; AND*
- The ALS Provider has been trained in those procedures; AND*
- The provider's OMD has authorized the performance of the procedures for the provider.*

DIFFICULT AIRWAY

# Protocol 3-16

Continued

## DIFFICULT AIRWAY

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Assess mechanism of injury and / or nature of illness. Protect C-spine if necessary.	•	•	•	•	•
3. Administer Oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
4. Assess patient ability to control airway and adequacy of ventilations. Do not hypo or hyperventilate.	•	•	•	•	•
5. Use head-tilt-chin-lift or jaw thrust as appropriate to open airway. Use oral or nasal airway adjuncts to support as appropriate.	•	•	•	•	•
6. Support ventilations with two man bag-valve-mask ventilations if personnel is available.	•	•	•	•	•
7. If unable to maintain airway, consider oral ( <i>I</i> or <i>P</i> ) or nasal ( <i>P</i> only) intubation.				•	•
8. If unable to successfully intubate, attempt to use an <u>alternative airway</u> to secure airway.		•	•	•	•
9. If still unable to maintain airway, consider medication facilitated intubation* or use alternative airway as a rescue device.					•
10. If still unable to maintain airway, consider <u>surgical airway</u> .*					•
11. Transport promptly.		•	•	•	•
12. Continuously monitor patient's airway.	•	•	•	•	•

# Section

4

SECTION: Adult Trauma Emergencies

REVISED: 06/2013

# ADULT TRAUMA EMERGENCIES

1.	<b>Trauma Patient Assessment</b> <i>General - Trauma</i>	Protocol 4 - 1
2.	<b>Abdominal Trauma</b> <i>Injury – Abdominal Trauma</i>	Protocol 4 - 2
3.	<b>Burns</b> <i>Injury – Burns - Thermal</i>	Protocol 4 - 3
4.	<b>Crush Injuries</b> <i>Injury – Crush Syndrome</i>	Protocol 4 - 4
5.	<b>Electrical Injuries</b> <i>Injury – Electrical Injuries</i>	Protocol 4 - 5
6.	<b>Head Injury</b> <i>Injury- Head</i>	Protocol 4 - 6
7.	<b>Inhalation Injury</b> <i>Exposure - Airway/Inhalation Irritants</i>	Protocol 4 - 7
8.	<b>Sexual Assault</b> <i>Injury - Sexual Assault</i>	Protocol 4 - 8
9.	<b>Elder Abuse</b>	Protocol 4 - 9
10.	<b>Conductive Energy Device Injuries</b> <i>Conductive Energy Device Injuries</i>	Protocol 4 - 10
11.	<b>Thoracic Trauma</b> <i>Injury - Thoracic</i>	Protocol 4 - 11
12.	<b>Field Trauma Triage Scheme</b>	Protocol 4 - 12

## Section

4

Continued

# ADULT TRAUMA EMERGENCIES

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# Protocol 4-1

**SECTION:** Adult Trauma Emergencies

**PROTOCOL TITLE:** Trauma Patient Assessment  
**General - Trauma**

**REVISED:** 06/2013

## OVERVIEW

Each year, one out of three Americans sustains a traumatic injury. Trauma is a major cause of disability in the United States. According to the Centers for Disease Control (CDC) in 2008, 118,021 deaths occurred due to trauma. Trauma is the leading cause of death in people under 44 years of age, accounting for half the deaths of children under the age of 4 years, and 80% of deaths in persons 15 to 24 years of age.

As a responder, your actions within the first few moments of arriving on the scene of a traumatic injury are crucial to the success of managing the situation. Within these moments, you must size up the situation, mitigate as many hazards as possible, establish incident command, rapidly triage patients and ultimately assess, treat and extricate patients from the scene. In doing so, you must decide when to extricate a patient and what treatment is essential to improve the patient's chances of survival, based on your knowledge, previous experience and a problem-based assessment algorithm.

***Rapid transport of the trauma patient is essential to improving patient outcome.***

The trauma patient varies in presentation based on the type and mechanism of injury. Primarily, the pre-hospital EMS provider is concerned with five areas in the field; securing the scene to protect both rescuers and patients, conducting a primary assessment and managing any life threats, performing a rapid trauma assessment, extricating the victim rapidly while protecting the cervical spine, and immobilizing and transporting the victim to an appropriate facility while conducting a secondary and ongoing surveys.

## SCENE SURVEY:

### Summary of Scene Survey

Evaluate situation / scene for potential safety hazards.

Obtain an overview of the scene to determine Mechanism of Injury (MOI) include damage to vehicle, structures, furniture, etc.

Wear personal protective equipment (PPE) appropriate to hazards of the scene and / or patient.

Gain access to the patient.

Determine the number of patients and additional resources needed.

As with all scene responses, assessment of the situation begins from the moment of first dispatch. You must not only consider the information received, but take into account the time of day, traffic, weather, safety issues and potential resources that may be required. As you arrive, the first concern should be to assess the scene for safety of responding pre-hospital EMS providers and to develop an index of suspicion for potential injuries based upon the scene and mechanism of injury. Your safety always comes first, followed by your team, then your patient. Once it is determined that the scene is manageable, begin patient triage. There has been some controversy as to which triage

# Protocol 4-1

Continued

## TRAUMA PATIENT ASSESSMENT

method or methods should be used, as there are at least, nine different triage tools available worldwide, including two pediatric versions, but there is little evidence supporting one method over the other. The most common methods found in literature are Simple Triage and Rapid Treatment (START) and JumpSTART (the pediatric version of START), which are both used in North America.

### PRIMARY ASSESSMENT:

Once all hazards have been mitigated and you can safely function, you should continue on to the primary assessment to look for any life-threatening injuries. These are injuries and instability of the respiratory and cardiovascular systems that would most likely be fatal within minutes if they are not immediately found and corrected. The approach to the trauma patient is based on the same primary assessment of the patient's airway, breathing, circulation, neurologic disability, and exposure used for all patients. Unlike a medical patient, the mechanism of injury should also be quickly determined and considered.

#### A. AIRWAY / C-SPINE STABILIZATION / LEVEL OF RESPONSIVENESS:

##### Summary of Primary Airway, C-spine, and LOC Assessment

Airway: Patent, maintainable, un-maintainable  
Level of consciousness, altered mental status  
Skin appearance: Ashen, pale, gray, cyanotic, or mottled  
Facial fractures, head fractures, C-spine step-off  
Airway clearance  
Sounds of obstruction  
Glasgow coma scale, AVPU

##### Summary of Primary Disability (Neurological) Assessment

A.V.P.U.	Glasgow Coma Scale (GCS)		
A - Alert	Eye Opening:	Spontaneous	4
V - Responds to verbal stimuli	To voice	3	
P - Responds to painful stimuli	To pain	2	
U - Unresponsive	No response	1	
	Verbal Response:	Oriented	5
		Confused	4
		Inappropriate words	3
		Incomprehensible	2
		No response	1
	Motor Response:	Obeys commands	6
		Localizes (pain)	5
		Withdraws (pain)	4
		Flexion (pain)	3
		Extension (pain)	2
		No response	1

**Summary of Primary -- Breathing Assessment**

Rate and depth of respirations  
Cyanosis  
Position of the trachea  
Presence of obvious injury or deformity  
Work of breathing  
Use of accessory muscles  
Flaring of nostrils  
Presence of bilateral breath sounds  
Asymmetric chest movements  
Palpation of crepitus  
Integrity of chest wall

**B. BREATHING:**

Once the airway is assessed and managed, a quick assessment of the patient's breathing should be performed. If weather permits, and a chest injury is suspected, exposing the chest is prudent. With a stethoscope in one hand, wrap both hands around the patient's chest high along the mid-axillary line, then repeat on the other side. This allows you to assess for the presence or absence of breath sounds and to feel for equal expansion, crepitus and / or flail segments while visualizing for any injuries. Treatments that may be initiated here include high-flow oxygen, manual ventilations, stabilizing flail segments, sealing penetrating chest wounds and decompressing a suspected tension pneumothorax.

**C. CIRCULATION:****Summary of Primary Circulation Assessment**

Pulse rate and quality  
Skin appearance: Color  
Peripheral pulses  
Skin temperature  
Level of consciousness  
Open wounds  
Arterial and/ or venous hemorrhage

**RAPID TRAUMA ASSESSMENT:**

A rapid trauma assessment ,is indicated for any patient, whose MOI involves environmental factors (burns, drowning, toxic inhalation, etc), motion, or the transfer of a significant amount of energy to that patient (motor vehicle collisions, projectile penetrations, rapid deceleration, etc). As the primary assessment is meant to look for injuries and conditions that may be fatal in minutes, the rapid trauma assessment looks for injuries or conditions that are more subtle or may not be evident for a longer period (15 - 30 minutes).

# Protocol 4-1

Continued

## TRAUMA PATIENT ASSESSMENT

As others are preparing for the extrication, do a very rapid trauma assessment looking for gross injuries that may pose a problem during extrication, such as multiple long bone or pelvic fractures that may cause pain, further injury and hemorrhage if care is not taken when moving the patient from the vehicle to a backboard. Although this maneuver is "rapid" it does not allow for compromise of the cervical spine. Cervical spine injuries should be considered in all trauma patients until they can be ruled out by appropriate medical personnel. A stiff cervical collar, backboard, spider straps, head blocks, and tape, or an appropriate substitution as the need or situation arises, should be used to protect the cervical spine during transport. Neurological assessments of all extremities should be performed and documented before and after all immobilization.

To properly perform the rapid trauma assessment, the patient must be fully exposed. Do not feel guilty about cutting away obtrusive clothing if there is a high index of suspicion for injuries based upon the mechanism; however, take into account when and where you expose the patient. If there is a large crowd, maintain the patient's modesty by exposing only what is vital to the assessment and treatment and / or shielding the patient from the crowd with sheets or tarps. Also consider body temperature during exposure, as patients rapidly lose body heat through convection and radiation to the surrounding environment. No matter the temperature outside, always cover the patient with sheets or blankets and consider turning the air-conditioning down, or off, in the ambulance, as cold blood is less likely to clot and trauma patients are more prone to hypothermia.

If any serious conditions are found during the rapid trauma assessment, stabilize the patient as soon as possible, but determine to what extent. Look at the patient's overall condition and perform a risk-benefit analysis to determine if the proposed treatment would make a difference in the outcome versus how long it would take to accomplish that treatment considering the patient's other injuries. Also consider whether the desired treatment could be done safely enroute to the intended receiving facility.

Always be aware of the time you are spending on scene or on a particular task and be ready to transport if the patient's condition changes. Transport to the closest hospital is always warranted if you are unable to obtain or maintain an airway. Notify the hospital of the airway problem so they can have the appropriate equipment, medications, and personnel in place prior to the patient's arrival.

### **SECONDARY ASSESSMENT:**

Typically, the secondary assessment begins once any life threats to the patient's airway, breathing, and circulation have been managed and any major injuries are stabilized. In a trauma situation, parts of the secondary assessment may occur simultaneously with other assessments, but should never interfere with them. The ability to do this is directly dependent upon the number of people available and the space within which providers have to work.

**VITAL SIGNS:**

When and where you obtain vital signs is directly related to the severity of the patient's condition, the number of responders on the scene, and available access to the patient. Vital signs are commonly left until the patient is in the ambulance and all critical and essential treatment has been established. Occasionally, when there are enough responders, one person may be delegated to obtain vital signs, but remember that this should not delay transport.

Vital sign trending is the practice of continually retaking vital signs to identify changes in patient condition. In the trauma patient, this occurs minimally every five minutes, or whenever the patient's condition changes. Trending will help to determine patient stability and alert providers to impending problems.

**ONGOING ASSESSMENT:**

The ongoing assessment involves continual reassessment of the patient any time his or her condition changes; an intervention is performed; or after any movement. Regularly reassess the patient's ABCs. Assessing mental status, performing baseline and repeat Glasgow Coma Scale scoring, and checking / rechecking the pupils will help determine any changes in the patient's neurologic status. Constant assessment of neurovascular status will alert you to developing paralysis, shock or a splint that is improperly applied. Subjective information such as asking the patient if s/he is feeling better or worse should be included. And finally, reassessing after interventions is important and may include effectiveness and tightness of splints, patency and flow rates of intravenous lines, and confirmation of endotracheal tube placement.

# Protocol 4-1

Continued

## TRAUMA PATIENT ASSESSMENT

### Summary of Secondary Assessment

Skin	<ul style="list-style-type: none"><li>• Presence of petechia, purpura, abrasions, bruises, scars, or birthmarks</li><li>• Lacerations, uncontrolled hemorrhage</li><li>• Rashes</li><li>• Abnormal skin turgor</li><li>• Signs of abuse or neglect</li></ul>
Head and Neck	<ul style="list-style-type: none"><li>• Presence of lacerations, contusions, raccoon eyes,</li><li>• Battle's sign, or drainage from the nose, mouth, and / or ears</li><li>• Gross visual examination</li><li>• Abnormal extra-ocular movements</li><li>• Position of the trachea</li><li>• Neck veins</li><li>• Swallowing difficulties</li><li>• Nuchal rigidity</li><li>• Presence of lymphadenopathy or neck masses</li><li>• Vertebral step-off</li></ul>
Ears, Nose, and Throat	<ul style="list-style-type: none"><li>• Hemorrhage</li><li>• Drainage</li><li>• Sunken eyes</li><li>• Gross assessment of the hearing</li><li>• Obstruction</li><li>• Foreign body</li></ul>
Mouth and Throat	<ul style="list-style-type: none"><li>• Mucous membranes</li><li>• Drooling</li><li>• Breath odor</li><li>• Drainage</li><li>• Injuries to teeth</li><li>• Airway obstruction</li></ul>
Thorax, Lungs, and Cardiovascular System	<ul style="list-style-type: none"><li>• Breath sounds</li><li>• Open Pneumothorax</li><li>• Crepitus</li><li>• Paradoxical motion</li><li>• Heart Sounds</li></ul>
Abdomen	<ul style="list-style-type: none"><li>• Shape and size</li><li>• Bowel sounds</li><li>• Tenderness</li><li>• Rigidity</li><li>• Evisceration</li><li>• Masses (i.e. suprapubic masses)</li><li>• Pelvic tenderness, crepitus, or instability</li></ul>

Genitourinary	<ul style="list-style-type: none"> <li>Rectal bleeding</li> <li>Color of urine</li> </ul>
Extremities and Back	<ul style="list-style-type: none"> <li>Gross motor and sensory function</li> <li>Peripheral pulses</li> <li>Lack of use of an extremity</li> <li>Deformity, angulation</li> <li>Wounds, abrasions</li> <li>Vertebral column, flank, buttocks</li> <li>Equipment is appropriately applied (i.e. traction splints, extremity splints, cervical collar)</li> </ul>

Assessment Acronyms	
S.A.M.P.L.E.	O.P.Q.R.S.T.
<b>S</b> Signs and Symptoms	<b>O</b> Onset (When did the problem / pain begin?)
<b>A</b> Allergies	<b>P</b> Provocation (What makes the problem / pain worse?)
<b>M</b> Medications	<b>Q</b> Quality (Can you describe the problem / pain?)
<b>P</b> Pertinent past medical history	<b>R</b> Radiation (Does the pain move anywhere?)
<b>L</b> Last oral intake	<b>S</b> Severity (On a scale of 1 - 10, how bad is the pain?)
<b>E</b> Events leading up to the event	<b>T</b> Time (Does the condition come and go? Duration?)
T.I.C.S.	D.C.A.P. / B.T.L.S.
<b>T</b> Tracks, tags, tattoos	<b>D</b> Deformities
<b>I</b> Instability	<b>C</b> Contusions
<b>C</b> Crepitus	<b>A</b> Abrasions
<b>S</b> Scars	<b>P</b> Punctures
	<b>B</b> Burns
	<b>T</b> Tenderness
	<b>L</b> Lacerations
	<b>S</b> Swelling

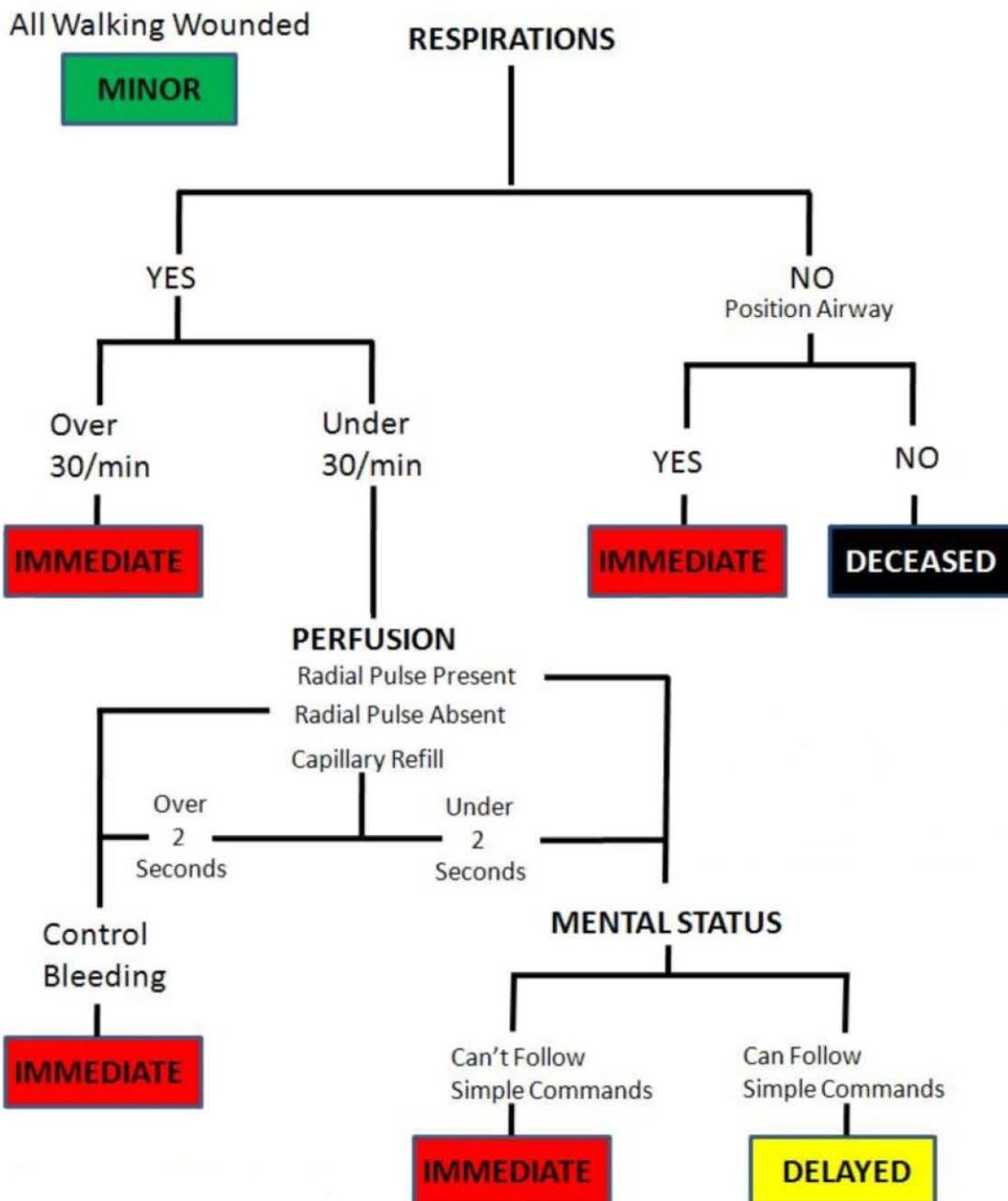
# Protocol 4-1

Continued

## TRAUMA PATIENT ASSESSMENT

### START TRIAGE

(Simple Triage and Rapid Treatment)



# Protocol

## 4-2

**SECTION:** Adult Trauma Emergencies

**PROTOCOL TITLE:** Abdominal Trauma  
**Injury – Abdominal Trauma**

**REVISED:** 06/2013

### OVERVIEW:

Blunt and penetrating traumas are major causes of morbidity and mortality in the United States. In blunt force abdominal trauma, the spleen and liver are typically the most commonly injured organs, and in penetrating trauma, there is a slightly higher mortality, depending on the mechanism of injury. Gunshot and stab wounds combine to make up the largest percentage of penetrating abdominal injuries. When performing a focused abdominal assessment, be organized, efficient, and thorough. Initial abdominal examinations only identify injury about half the time; secondary exams are needed when there is a high index of suspicion for abdominal trauma. A proper abdominal examination involves exposing the entire abdomen from the nipple line to the groin and using a standard examination sequence of inspection, auscultation, percussion, and palpation.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Time of injury</li> <li>• Mechanism: blunt/penetrating</li> <li>• Loss of consciousness</li> <li>• Damage to structure, vehicle</li> <li>• Location in structure or vehicle</li> <li>• Speed details of MVC</li> <li>• Restraints, protective devices</li> <li>• Medical history</li> <li>• Medications</li> <li>• Evidence of multi-system trauma</li> </ul>	<ul style="list-style-type: none"> <li>• Pain, swelling, bleeding</li> <li>• Deformity, lesions</li> <li>• Altered mental status, unconsciousness</li> <li>• Respiratory distress, failure</li> <li>• Hypotension, shock</li> <li>• Arrest</li> <li>• Significant mechanism of injury</li> </ul>	<ul style="list-style-type: none"> <li>• Intra-abdominal bleeding</li> <li>• Pelvis fracture</li> <li>• Abuse</li> </ul>

	A	B	EN	I	P
1. Maintain scene and provider safety.	•	•	•	•	•
2. Perform general patient management.	•	•	•	•	•
3. Administer supplemental oxygen to maintain a $\text{SPO}_2$ 94 - 99%. If needed assist ventilations with BVM but avoid hyperventilation, maintain C-spine precautions.	•	•	•	•	•
4. Identify mechanism of injury.	•	•	•	•	•
5. Establish large bore IV's of normal saline. Titrate to systolic blood pressure of 90 to 100 mmHg.			•	•	•

# ABDOMINAL TRAUMA

# Protocol 4-2

Continued

## ABDOMINAL TRAUMA

	A	B	EN	I	P
6. Treat pain if indicated. Refer to <u>pain management</u> protocol.				•	•
7. Consider <u>ONDANSETRON (ZOFTRAN)</u> 0.1 mg / kg slow IVP over 2 - 5 minutes, max 4.0 mg per dose as needed per <u>Nausea and vomiting protocol</u> . <b>Do not give PO meds.</b>				•	•
8. Transport to the appropriate hospital per <u>Trauma Triage Scheme</u> .		•	•	•	•
9. Reassess patient as indicated.	•	•	•	•	•

### Impaled objects

Stabilize impaled objects in place with bulky dressings.

### Severe hemorrhage from open penetrating injury

Control bleeding with well-aimed direct pressure directly on the bleeding source.  
Once controlled, apply dry, sterile dressing.

### Evisceration with protruding abdominal contents

Loosely wrap any protruding abdominal contents with a sterile dressing moistened with warm (if available) Normal Saline and cover in entirety with an occlusive dressing.

### PEARLS

1. The amount of external bleeding is not an indicator of the potential severity of internal bleeding associated with an underlying trauma.
2. Avoid overly aggressive fluid administration; provide fluid boluses to maintain systolic BP between 90 – 100 mmHg; alternatively, a mean arterial pressure of 65 mmHg is equally desirable. MAP is approximately equal to:

$$\text{Diastolic BP} + \frac{1}{3} (\text{Systolic BP} - \text{Diastolic BP})$$

3. Abdominal eviscerations are a surgical emergency. The protruding organ requires careful cleaning and evaluation prior to reinsertion. Do not attempt to reinsert the organs in the pre-hospital setting.
4. Impaled objects in the abdomen often tamponade internal hemorrhage, and removing them may trigger significant internal bleeding. Remember that any bump against the object moves the distal end in the organ and may worsen damage.
5. Pain management is an essential component to good trauma care. Simple pain management techniques include oxygen administration, splinting, speaking in calm, reassuring voice, and placing the patient in his or her position of comfort. When spinal immobilization is required, flexing the patient's knees toward the chest helps relax the abdominal muscles.

# Protocol

## 4-3

**SECTION:** Adult Trauma Emergencies

**PROTOCOL TITLE:** Burns  
**Injury – Burns – Thermal**

**REVISED:** 06/2013

### OVERVIEW:

Burns are a devastating form of trauma associated with high mortality rates, lengthy rehabilitation, cosmetic disfigurement, and permanent physical disabilities. Thermal, chemical, electrical, nuclear radiation or solar sources may cause burns. Burns can affect more than just the skin. They can affect the body's fluid and chemical balance, temperature regulation, and musculoskeletal, circulatory, and respiratory functions.

Burns are classified by degree, 1° (superficial) some reddening to skin, 2° (partial thickness) has blistering and deep reddening to the skin, and 3° (full thickness) causes damage to all skin layers and is either charred/ black or white/ leathery with little or no pain at the site. The patient's palm equals 1% of body surface area when determining the area affected. This is sometimes more helpful than using the "rule of nines" especially with pediatric patients.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Type of exposure (heat, gas, chemical)</li> <li>Inhalation injury</li> <li>Time of injury</li> <li>Past medical history</li> <li>Medications</li> <li>Other trauma</li> </ul>	<ul style="list-style-type: none"> <li>Burns, pain, swelling</li> <li>Dizziness</li> <li>Loss of consciousness</li> <li>Hypotension/ shock</li> <li>Airway compromise, distress</li> <li>Singed facial or nasal hair</li> <li>Hoarseness, wheezing</li> </ul>	<ul style="list-style-type: none"> <li>Chemical</li> <li>Thermal</li> <li>Radiation</li> <li>Electrical</li> </ul>

	A	B	EN	I	P
1. Stop the burning process.	•	•	•	•	•
a. Thermal burns: Irrigate the burned area with sterile water or saline to cool skin. Do not attempt to wipe off semisolids (grease, tar, wax, etc.). Do not apply ice. Dry the body when the burn area is greater than or equal to 10% TBSA to prevent hypothermia.	•	•	•	•	•
b. Dry chemical burns: Brush off dry powder, then lavage with copious amounts of tepid water (sterile, if possible) for 20 minutes. Continue en route to the hospital.	•	•	•	•	•
c. Liquid chemical burns: Irrigate the burned area with copious amounts of tepid water (sterile, if possible) for 20 minutes. Continue en route to the hospital.	•	•	•	•	•

**BURNS**

# Protocol

## 4-3

Continued

# BURNS

	A	B	EN	I	P
2. Perform general patient management.	•	•	•	•	•
3. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
4. Administer oxygen via non-rebreather mask at 10 - 15 L / min. as necessary.	•	•	•	•	•
5. If the patient is in critical respiratory distress or impending respiratory failure, consider placement of <i>orotracheal intubation</i> .				•	•
6. Remove clothing from around burned area, but do not remove / peel off skin or tissue. Remove and secure all jewelry and tight fitting clothing.		•	•	•	•
7. Assess the extent of the burn using the palm surface area or the rule of nines and the degree of burn severity.		•	•	•	•
8. Cover the burned area with a clean, dry dressing. Wet dressing may be used if the burned TBSA is less than 10%.		•	•	•	•
9. For pain control, provided SBP greater than 100, no systemic injuries, and no altered mental status, refer to <i>Medical Patient Care: Pain Management Protocol</i> .				•	•
10. Maintain body temperature.	•	•	•	•	•
11. Transport and perform ongoing assessment as indicated.	•	•	•	•	•

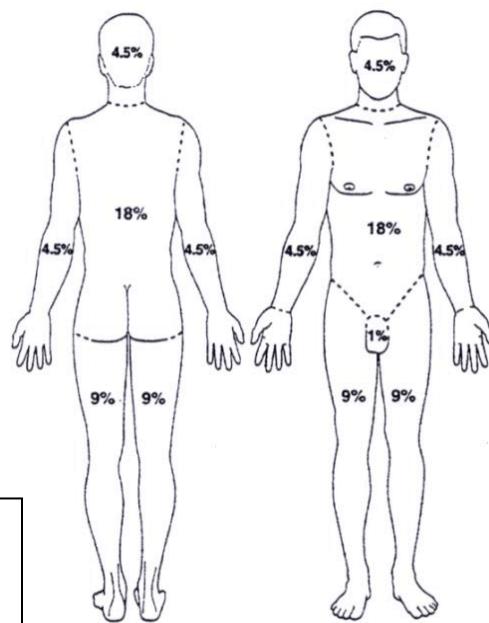
### Parkland Formula for Fluid Resuscitation

$$(2 - 4 \text{ ml} \times \text{Patient weight in KG}) \times \text{TBSA} = \\ 24 \text{ hour fluid requirement}$$

Administer  $\frac{1}{2}$  of 24 hour requirement over **first 8 hours**.

\*\*Normal Saline or Lactated Ringers are fluids of choice in burn patients. \*\*

Do not administer the entire first 8 hours IV fluid bolus during the initial resuscitation. Excessive fluid resuscitation can lead to compartment syndromes.



# Protocol 4-3

Continued

## American Burn Association - BURN UNIT REFERRAL CRITERIA

- Partial thickness and full thickness burns greater than 10% of the total body surface area (TBSA) in patients under 10 or over 50 years of age.
- Partial thickness burns and full thickness burns greater than 20% TBSA in other age groups.
- Partial thickness and full-thickness burns involving the face, eyes, ears, hands, feet, genitalia or perineum or those that involve skin overlying major joints.
- Full-thickness burns greater than 5% BSA in any age group.
- Electrical burns, including lightning injuries; (significant volumes of tissue beneath the surface may be injured and result in acute renal failure and other complications).
- Significant chemical burns.
- Inhalation injuries.
- Burn injury in patients with pre-existing illness that could complicate management, prolongs recovery, or affects mortality.
- Any burn patient in whom concomitant trauma poses an increased risk of morbidity or mortality may be treated initially in a trauma center until stable before transfer to a burn center.
- Children with burns seen in hospitals without qualified personnel or equipment for their care should be transferred to a burn center with these capabilities.
- Burn injury in patients who will require special social and emotional or long term rehabilitative support, including cases involving child abuse and neglect.

## Classification of Burn Severity

### Critical Burns:

- All burns complicated by injuries of the respiratory tract, other soft-tissue injuries, and injuries of the bones.
- Partial-thickness or full-thickness burns involving the face, hands, feet, genitalia, or respiratory tract.
- Full-thickness burns of more than 10% (*Less than 5 years of age: any extent*).
- Partial-thickness burns of more than 30% (*Less than 5 years of age: greater than 20%*).
- Burns complicated by musculoskeletal injuries.
- Circumferential burns.

### Moderate Burns:

- Full-thickness burns of 2% to 10%, excluding face, hands, feet, genitalia, or respiratory tract.
- Partial-thickness burns of 15% to 30% (*Less than 5 years of age: 10% to 20%*).
- Superficial burns that involve more than 50%.

### Minor Burns:

- Full-thickness burns of less than 2%, excluding face, hands, feet, genitalia, or respiratory tract.
- Partial-thickness burns of less than 15% (*Less than 5 years of age: less than 10%*)
- Superficial burns of less than 50%.

BURNS

# Protocol

## 4-3

Continued

# BURNS

### PEARLS

1. Remove patient's clothing as appropriate. Remove rings, bracelets and other constricting items in areas of burn, if possible.
2. Critical burns: burns over > 25% TBSA; 2° burns > 10% TBSA; 2° and 3° burns to the face, eyes, hands, or feet; electrical burns; respiratory burns; deep chemical burns; burns with extremes of age or chronic disease; and burns with associated major traumatic injury. These patients should be transferred directly to a Burn Center.
3. Have a high index of suspicion and a low intubation threshold when treating burn patients with possible airway involvement. Early intubation is recommended in significant inhalation injuries.
4. Circumferential burns to extremities are dangerous due to potential vascular compromise secondary to soft tissue swelling.
5. Burn patients are prone to hypothermia; never cool burns that involve > 10% TBSA, however, ensure the burning process has thoroughly ceased (i.e., tar, asphalt).
6. Never overlook the possibility of multi-system trauma.
7. Burns are extremely painful. Strongly consider pain management medications as needed.

# Protocol

## 4-4

**SECTION:** Adult Trauma Emergencies

**PROTOCOL TITLE:** Crush injuries  
**Injury – Crush Syndrome**

**REVISED:** 06/2013

### OVERVIEW:

Crush injuries can result from a variety of mechanisms including mine cave-ins, trench collapses, building collapse, vehicular collisions or industrial accidents. Also called traumatic rhabdomyolysis, it is defined as the prolonged compression, usually 4 - 6 hours but possibly less than 1 hour, of large muscle mass and compromised local circulation. Crush syndrome may also be exacerbated by hypovolemia secondary to hemorrhage. Compression on the body causes a disruption in tissue perfusion to a muscle group leading to cellular hypoperfusion and hypoxia. Cellular perfusion is further decreased due to hemorrhage from torn or compressed vessels. Once the compressive force is relieved, blood flow resumes, releasing the toxic substances that have been collecting in the compressed areas into the systemic circulation. This can result in systemic metabolic acidosis, widespread vasodilation, and hyperkalemia. Metabolic acidosis and high potassium levels could have deleterious effects on the myocardium and lead to patient death. Cardiac arrest due to hyperkalemia typically occurs within the first hour of removal from compression. Because of this, treatment for crush injuries begins prior to patient removal from compression.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"><li>• Entrapment of one or more extremities and/or trunk</li><li>• Time entrapped</li><li>• Medical history</li><li>• Allergies</li><li>• Heart Failure</li></ul>	<ul style="list-style-type: none"><li>• Obvious crushing of a muscle mass (arm, leg, etc.)</li></ul>	<ul style="list-style-type: none"><li>• Extremity fracture</li><li>• Paralysis, Spinal cord injury</li><li>• Compartment syndrome</li></ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems.	•	•	•	•	•
3. Administer oxygen to maintain a $\text{SPO}_2$ between 94 - 99%. Support respirations as necessary with a BVM.	•	•	•	•	•
4. Consider activation of local and / or regional technical rescue team.	•	•	•	•	•
5. Start an IV of normal saline and administer normal saline 20 cc / kg bolus, prior to extrication if possible. Maintain perfusion by following the <u>Medical Patient-Shock protocol</u> . <b>DO NOT USE LACTATED RINGERS.</b>			•	•	•
6. Apply BUT DO NOT TIGHTEN <u>tourniquet</u> on entrapped extremity <b>BEFORE</b> extrication. Tighten <i>only</i> if major hemorrhage occurs with extrication.		•	•	•	•

CRUSH INJURIES

# Protocol

## 4-4

Continued

# CRUSH INJURIES

	A	B	EN	I	P
7. Attach ECG monitor. Obtain / interpret <u>12 Lead ECG</u> . Carefully monitor for dysrhythmias before, immediately after release of pressure and during transport (i.e., peaked T waves, wide QRS, lengthening QT interval, loss of P wave). Contact Medical Control if hyperkalemia is suspected.**				•	•
8. Transport as soon as possible.		•	•	•	•
9. For pain control, consider analgesics					
a. <u>FENTANYL</u> 1 mcg / kg IV / IM, not to exceed 50 mcg single dose. Repeat dose in 10 minutes if necessary. Max total dose is 200 mcg.					
b. If Fentanyl is unavailable, give <u>MORPHINE</u> 0.1 mg / kg IV at 1 mg / min, not to exceed 5 mg single dose with max total dose of 20 mg. If no IV established, administer <u>MORPHINE</u> 0.1 mg / kg IM, not to exceed 10 mg (1.0 mL); repeat IM dose in 10 minutes if necessary.				•	•
10. Consider the following options:					
a. Continued boluses of normal saline.				•	•
b. For significant crush injuries, administer <u>SODIUM BICARBONATE</u> 1 mEq / kg IV bolus over 2 minutes. Consider administration of bicarb containing IV solution (One liter of D <sub>5</sub> W with 2 amps bicarb infused at 150 cc / hour).				•	•
c. If ECG suggestive of hyperkalemia, ** consider <u>ALBUTEROL</u> 5.0 mg via small volume nebulizer.				•	•
d. If ECG suggestive of hyperkalemia, consider <u>CALCIUM CHLORIDE</u> 8 mg / kg of 10% solution IV over 5 minutes.				•	•
11. Transport and perform ongoing assessment as indicated.		•	•	•	•

### \*\*Suggestive signs of Hyperkalemia

- Peaked T waves in V1 and V2
- Widened QRS (> 0.12 seconds)
- QTc > 500

If any of these findings are noted on a 12 lead: Contact Medical Control

# Protocol 4-4

Continued

## **PEARLS:**

1. A patient with a crush injury may initially present with very few signs and symptoms. A high index of suspicion should be maintained for any patient with a compressive mechanism of injury.
2. Elevated potassium levels have an increased risk of affecting the myocardium resulting in ventricular tachycardia and ventricular fibrillation.
3. Suspect hyperkalemia if T-waves become peaked, QRS becomes prolonged (> 0.12 seconds), absent P wave, or prolonged QTc\*\*.
4. If a possible field amputation is anticipated, contact Medical Control for guidance.
5. Sodium Bicarbonate will keep the urine alkalotic and assist in preventing acute renal failure.

# CRUSH INJURIES

# Protocol

## 4-4

Continued

# CRUSH INJURIES

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# Protocol

## 4-5

**SECTION:** Adult Trauma Patient Care

**PROTOCOL TITLE:** Electrical Injuries  
**Injury – Electrical Injuries**

**REVISED:** 06/2013

### OVERVIEW:

Before treating any patient with an electrical injury, ensure your personal safety. Do not touch the patient if the patient is still in contact with the electrical source. The vast majority of electrical injuries are caused by generated electricity, such as that encountered in power lines and household outlets. Relative to the external damage caused by electrical injuries, internal damage is often more severe, and can include damage to muscles, blood vessels, organs, and nerves. Damaged muscle releases myoglobin which can cause acute renal failure. Electrical current as low as 20 mA can cause respiratory arrest and as little as 50 mA can cause ventricular fibrillation. Although long-bone fractures and spinal injuries can occur due to falls after electrocution, they can additionally occur due to severe tetanic muscle spasms with high amplitude electrocutions.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Lightning or electrical exposure</li> <li>Single or multiple victims</li> <li>Trauma secondary to fall from high wire or MVC into line</li> <li>Duration of exposure</li> <li>Voltage and current (AC / DC)</li> </ul>	<ul style="list-style-type: none"> <li>Burns</li> <li>Pain</li> <li>Entry and exit wounds</li> <li>Hypotension and shock</li> <li>Cardiac and/ or respiratory arrest</li> </ul>	<ul style="list-style-type: none"> <li>Cardiac arrest</li> <li>Respiratory arrest</li> <li>Seizure</li> <li>Burns</li> <li>Multisystem trauma</li> </ul>

	A	B	EN	I	P
1. Perform general patient management. Do not touch the patient if they are in contact with the electrical source.	•	•	•	•	•
2. Support life-threatening problems.	•	•	•	•	•
3. Administer oxygen to maintain $SPO_2$ 94 - 99%. Consider supporting respirations with a BVM.	•	•	•	•	•
4. Determine extent of any burn injuries. Refer to the <u><a href="#">Burns protocol</a></u> . Avoid initiating IVs in areas of burn unless absolutely necessary.		•	•	•	•
5. Place patient on cardiac monitor; obtain/interpret <u><a href="#">12 Lead ECG</a></u> . Refer to the appropriate <u><a href="#">Cardiac Care protocol</a></u> for dysrhythmias. If hyperkalemia is suspected, contact Medical Control.				•	•
6. Establish an IV of normal saline at KVO.			•	•	•
7. Consider administration of pain management per <u><a href="#">Pain Management protocol</a></u> .				•	•

# ELECTRICAL INJURIES

# Protocol 4-5

Continued

## ELECTRICAL INJURIES

8. Transport to a trauma facility and perform ongoing assessment as indicated.

The cutaneous system is typically involved in electrocution. Importantly, the initial size of the burn site is not an accurate reflection of the amount of tissue actually involved because the subcutaneous tissue is commonly involved. Therefore, the rule of nines should not be used for calculating fluid resuscitation. Instead, adequate tissue perfusions, vital signs, and urine output should guide fluid resuscitation.

An electrical injury should be treated more like a crush injury rather than a thermal injury. Fluid resuscitation should begin as soon as possible to maintain a urinary output of 0.5 to 1 mL / kg / hr.

MedScape: Electrical Injuries

Jorge A. Martinez, MD, JD, Thai Nguyen, MD

Posted: 12/01/2000; South Med J. 2000;93(12) © 2000 Lippincott Williams & Wilkins

### PEARLS:

1. Ventricular fibrillation and asystole are the common presenting dysrhythmias associated with electrical injuries.
2. Injuries are often hidden. The most severe injuries will occur internally in the muscles, vessels, organs, and nerves.
3. If the victim did not arrest initially, the probability of ROSC and survivability can be higher in lightning strike injuries.
4. Do not overlook other trauma (i.e., falls).
5. Lightning is a massive DC shock most often leading to asystole as a dysrhythmia.
6. In lightning injuries, most of the current will travel over the body surface producing flash burns over the body that appears as freckles.
7. Do not overlook the possibility of spinal injuries or long bone fractures associated with lightning strikes, primarily the cause of trauma or tetanic muscle contractions.

# Protocol 4-6

**SECTION:** Adult Trauma Patient Care

**PROTOCOL TITLE:** Head Injury  
**Injury- Head**

**REVISED:** 06/2013

## OVERVIEW:

Brain injury and its accompanying pathologic processes continue to be a leading cause of mortality associated with trauma. Whether the injury is due to a blunt or penetrating mechanism, bleeding or swelling of the brain and surrounding tissue may lead to an increase in pressure within the cranial cavity, known as intracranial pressure (ICP). If pressure within the skull is not controlled, neurologic changes may produce signs and symptoms ranging from headache to coma with loss of protective reflexes. Blunt force trauma may result in scalp injury, skull fracture, and meningeal and brain tissue injury. Penetrating trauma may produce focal or diffuse injury, depending on the velocity of the penetrating object. Although the pre-hospital provider cannot reverse the brain tissue damage from the initial/ primary brain injury that has already occurred, they can play a major role in preventing or limiting the processes that exacerbate and lead to a secondary brain injury. The pre-hospital provider's goal is to focus on reversing any hypoxia, hypotension, hypercarbia, acidosis, or increasing intracranial pressure.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Time of injury</li> <li>• Mechanism: blunt vs penetrating</li> <li>• Loss of consciousness</li> <li>• Bleeding</li> <li>• Medical history</li> <li>• Medications</li> <li>• Evidence of multi-system trauma</li> </ul>	<ul style="list-style-type: none"> <li>• Pain, swelling, bleeding</li> <li>• Altered mental status, unconsciousness</li> <li>• Respiratory distress, failure</li> <li>• Cushing's reflex triad</li> <li>• Cheyne-Stokes and Biot's respirations</li> <li>• Unequal, dilated, sluggish pupil(s)</li> <li>• Vomiting</li> <li>• Significant mechanism of injury</li> </ul>	<ul style="list-style-type: none"> <li>• Skull fracture</li> <li>• Brain injury (concussion, contusion, hemorrhage, laceration)</li> <li>• Epidural hematoma</li> <li>• Subdural hematoma</li> <li>• Subarachnoid hemorrhage</li> <li>• Spinal injury</li> <li>• Falls</li> <li>• Seizure disorder</li> <li>• Abuse</li> </ul>

	A	B	EN	I	P
1. Perform general patient management .	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%. Consider supporting respirations with a BVM.	•	•	•	•	•
4. Immobilize patient using full spinal precautions. Avoid excessive compression around the neck by cervical collar. Assess and document PMS in all extremities before and after immobilization.	•	•	•	•	•

## HEAD INJURY

# Protocol 4-6

Continued

A | B | EN | I | P

5. Obtain and document baseline GCS and reassessments.		•	•	•	•
6. Monitor <i>capnography</i> , if available. Attempt to maintain between 35 - 45 Torr.				•	•
7. Place patient on cardiac monitor.				•	•
8. Establish an IV of normal saline at KVO. If time permits, establish an additional line.			•	•	•
9. Obtain a blood glucose sample.		•	•	•	•
10. If patient is exhibiting signs of shock, refer to <i>Shock protocol</i> .		•	•	•	•
11. Transport and perform ongoing assessment as indicated.		•	•	•	•

## PEARLS:

1. Hyperventilation is not recommended for head-injury patients who do not have symptoms of herniation syndrome, as auto-regulatory mechanisms are intact and hyperventilation may worsen cerebral perfusion pressure.
2. One of the most important indicators of worsening head injury is a change in LOC and / or GCS.
3. Increased ICP may cause hypertension and bradycardia (Cushing's response).
4. Hypotension usually indicates injury or shock unrelated to the head injury and should be treated aggressively to maintain adequate cerebral perfusion.
5. Supine positioning may also increase ICP transiently. The patient may benefit from a reverse Trendelenburg position; however, it may reduce cerebral blood flow, especially if the head is elevated greater than 30°. If the patient is immobilized to a backboard, slightly elevate (15° or less) the head end of the board.

# Protocol 4-7

**SECTION:** Adult Trauma Patient Care

**PROTOCOL TITLE:** Inhalation Injury  
**Exposure - Airway/Inhalation Irritants**

**REVISED:** 06/2013

## OVERVIEW:

A majority of fire related deaths are the result of smoke inhalation. Suspect inhalation injury and respiratory damage in any victim of a thermal burn, particularly if the patient has facial burns, singed nasal hair, carbonaceous sputum or was in an enclosed space. Be aware that many chemicals are present during ordinary combustion including Hydrogen Sulfide, Hydrogen Cyanide and Carbon Monoxide (CO). CO is a tasteless, odorless, colorless, and non-irritating gas. Almost any flame or combustion device can produce the gas. CO poisoning is a common problem and produces a broad spectrum of signs and symptoms, often imitating the flu. Think about CO poisoning when multiple patients present with the same signs and symptoms at a residence.

Hydrogen cyanide is a by-product of the combustion of materials used in everyday life products (i.e., insulation, carpets, clothing, and synthetics). The culprit is nitrogen. Nitrogen gas in atmospheric air can contribute (under the right circumstances) to the formation of minute amounts of cyanide during combustion. High temperatures and low-oxygen concentrations favor the formation of cyanide gas. Smoke from the combustion of grass clippings, green wood, tobacco, cotton, paper, wool, silk, weeds, and animal carcasses will likely contain some hydrogen cyanide gas. But the real offender is the combustion of manmade plastic and resins containing nitrogen, especially if the fire is hot and in an enclosed space. Common manmade materials that generate cyanide gas during combustion include nylon, polyurethane, melamine, and acrylonitrile.<sup>1</sup>

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"><li>Type of exposure (heat, gas, chemical)</li><li>Inhalation injury</li><li>Time of injury</li><li>Past medical history</li><li>Medications</li><li>Other trauma</li></ul>	<ul style="list-style-type: none"><li>Burns, pain, swelling</li><li>Dizziness</li><li>Loss of consciousness</li><li>Hypotension/ shock</li><li>Airway compromise, distress</li><li>Singed facial or nasal hair</li><li>Hoarseness, wheezing</li></ul>	<ul style="list-style-type: none"><li>Electrical</li><li>Chemical</li><li>Thermal</li><li>Radiation</li></ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•

<sup>1</sup> [www.fireengineering.com](http://www.fireengineering.com): Hydrogen Cyanide: New Concerns for Firefighting and Medical Tactics. Posted 06/29/2009. Author: Richard Rochford

# Protocol

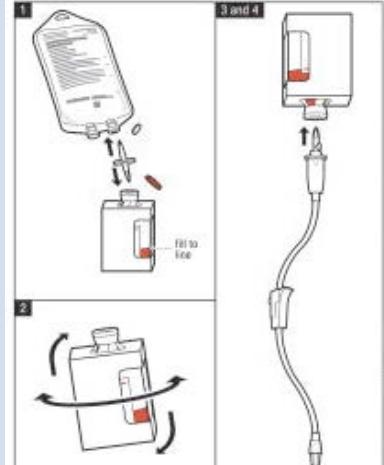
## 4-7

Continued

# INHALATION INJURY

	A	B	EN	I	P
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%. If indicated, support respirations with a BVM.	•	•	•	•	•
4. Consider <u>orotracheal intubation</u> for impending respiratory failure.				•	•
5. Monitor <u>capnography</u> , if available. Maintain a range between 35 - 45 Torr.				•	•
6. Place patient on cardiac monitor and obtain/interpret <u>12 lead ECG</u> . Refer to appropriate <u>Cardiac Care protocol</u> .				•	•
7. Establish an IV of normal saline at KVO.				•	•
8. If carbon monoxide is suspected or confirmed, administer O <sub>2</sub> with non-rebreather mask.				•	•
9. If cyanide is suspected or confirmed, and kit is available, administer Cyanokit®. **See administration instructions.				•	•
10. If available, consider <u>CPAP</u> with 5 - 10 cm H <sub>2</sub> O PEEP.	•	•	•	•	•
11. Transport to Burn Center and perform ongoing assessment as indicated.	•	•	•	•	•

**Cyanokit® Infusion <sup>2</sup>
Mix and administer Cyanokit® infusion:
<ol style="list-style-type: none"> <li>1. Add <b>100 ml of Normal Saline injection to Hydroxocobalamin 2.5 gm vial</b> using transfer spike.</li> <li>2. Fill to line on bottle with vial in upright position.</li> <li>3. Rock or rotate vial for 30 seconds to mix solution. Do not shake.</li> <li>4. Attach included vented IV tubing. <b>Infuse over 7.5 minutes.</b></li> <li>5. Once initial bottle has infused, <b>mix second bottle as noted above and infuse over 7.5 minutes.</b> Do not infuse both bottles simultaneously.</li> <li>6. Total amount infused should be documented as 5.0 gm when both vials are used as directed.</li> </ol>



# Protocol 4-7

Continued

## **PEARLS:**

1. Pulse oximetry may give falsely elevated readings in patients with methemoglobin or CO / CN exposure.
2. Hyperbaric therapy can be indicated for some carbon monoxide poisonings; especially in early pregnancy and patients with failing vital signs. For fire related exposures, transport to the burn center at VCU health systems. For non-fire related CO exposures, contact Medical Control for guidance. Hyperbaric chambers are located at Chippenham, Southside Regional, Retreat Doctor's Hospital, Halifax Regional, UVA, VA Baptist, DePaul Medical Center, and Sentara Leigh hospital.
3. Critical burns: burns over > 25% TBSA; 2° burns > 10% TBSA; 2° and 3° burns to the face, eyes, hands, or feet; electrical burns; respiratory burns; deep chemical burns; burns with extremes of age or chronic disease; and burns with associated major traumatic injury. These patients should be transferred directly to a burn center.
4. Have a high index of suspicion and a low intubation threshold when treating burn patients with possible airway involvement. Early intubation should be considered in significant inhalation injuries.
5. Burn patients are prone to hypothermia – never cool burns that involve > 15% TBSA.
6. Never overlook the possibility of multi-system trauma.

# INHALATION INJURY

# Protocol

## 4-7

Continued

# INHALATION INJURY

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# Protocol 4-8

**SECTION:** Adult Trauma Patient Care

**PROTOCOL TITLE:** Sexual Assault  
***Injury - Sexual Assault***

**REVISED:** 06/2013

## OVERVIEW:

A patient that has experienced the trauma of sexual abuse may present in a variety of ways. Physical trauma may be evident along with emotional trauma, which is very prevalent in these situations. In other cases, emotional trauma may be the only presenting problem. Pre-hospital EMS providers may be thrust into the role of mediator, buffer, or confidant. They may even be subject to violent aggression on the part of the victims or their families. Injuries associated with sexual assault may vary widely. They can be as subtle as slight pain or discomfort or as grossly evident as either debilitating or disfiguring trauma. The victim's injuries also may not be obvious or visible on first inspection; some may even deny injuries and relay untruthful information regarding the occurrence. The pre-hospital provider must develop and foster rapport with the victim to gain the victim's confidence, so that accurate information can be obtained.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Type of injury</li> <li>Mechanism: rape, sodomy, sexual abuse</li> <li>Timeline of incidents</li> <li>Medical history</li> <li>Medications</li> </ul>	<ul style="list-style-type: none"> <li>Physical injuries</li> <li>Emotional injuries</li> <li>Recurring injuries</li> <li>Withdrawal, hostility</li> </ul>	<ul style="list-style-type: none"> <li>Emotional trauma</li> <li>Behavioral disorder</li> <li>Traumatic injury</li> </ul>

	A	B	EN	I	P
1. Obtain general patient assessment.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Assess for signs of trauma; take C-spine precautions per assessment.	•	•	•	•	•
4. Administer Oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
5. Perform wound care only to assess the severity and provide hemorrhage control.	•	•	•	•	•
6. If an acute medical condition is noted, refer to appropriate <u>Medical Patient protocol</u> .	•	•	•	•	•
7. If physical trauma is noted, refer to appropriate <u>Trauma Patient protocol</u> .	•	•	•	•	•
8. Discourage the patient from changing clothes or bathing.	•	•	•	•	•
9. Transport promptly in position of comfort to appropriate facility. Reassess as needed.		•	•	•	•

# SEXUAL ASSAULT

# Protocol

## 4-8

Continued

# SEXUAL ASSAULT

### **PEARLS:**

1. Use paper bags for all clothing and blood-stained articles, if available. If the patient's clothing is removed after leaving the scene, bag and label each item separately.
2. Do not ask questions about the patient's sexual history or practices, or questions that might make the patient feel guilty.
3. Do not examine the patient's genitalia unless there is severe injury, and then do so only with the patient's permission.
4. Maintain the crime scene and chain of evidence by turning over any transported items to forensic nursing staff at receiving facility, if available.
5. The receiving facility should be contacted prior to transport to notify of patient complaint and ascertain if forensic nursing (Sexual Assault Nurse Examiner - SANE) is available. EMS may be diverted due to lack of forensic capabilities.

# Protocol 4-9

**SECTION:** Adult Trauma Patient Care

**PROTOCOL TITLE:** Elder Abuse

**REVISED:** 05/2012

## OVERVIEW:

Patterns of elder abuse can reflect any form of physical and / or mental trauma but are usually characterized by unexplained or poorly explained injuries of different ages and delay in seeking medical care. Sociological changes occur in the elderly and sometimes they feel as though they are a burden and do not seek help for their situation. Other times, they may be incapacitated or unable to alter their surroundings. There are often no external signs of injuries. The provider should note other vague medical symptoms such as repeated vomiting, abdominal pain, and distention in an elderly person with other evidence of abuse. Also be observant of decubitus ulcers, unsanitary conditions, skin conditions and the general nourishment of the elder. Observation, transport, and reporting are the key responsibilities of the pre-hospital provider.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Time of injury</li> <li>• Mechanism: blunt vs penetrating</li> <li>• Loss of consciousness</li> <li>• Bleeding</li> <li>• Past medical history</li> <li>• Medications</li> <li>• Evidence of multi-system trauma</li> </ul>	<ul style="list-style-type: none"> <li>• Pain, swelling, bleeding</li> <li>• Altered mental status, unconsciousness</li> <li>• Respiratory distress, failure</li> <li>• Dehydration</li> <li>• Decubitus</li> <li>• Major traumatic mechanism of injury</li> </ul>	<ul style="list-style-type: none"> <li>• Skull fracture</li> <li>• Brain injury (concussion, contusion, hemorrhage, or laceration)</li> <li>• Epidural hematoma</li> <li>• Subdural hematoma</li> <li>• Subarachnoid hemorrhage</li> <li>• Spinal injury</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems; C-spine precautions.	•	•	•	•	•
3. Administer oxygen, to maintain <u>SPO<sub>2</sub></u> 94 - 99%. Support respirations as necessary with a BVM.	•	•	•	•	•
4. Observe and record objectively the surroundings and conditions of the scene and patient.	•	•	•	•	•
5. Refer to the appropriate <u>Medical</u> or <u>Trauma</u> Patient Care protocol for obvious injuries / illnesses.	•	•	•	•	•
6. UNDER VIRGINIA LAW, EMS PROVIDERS ARE MANDATORY REPORTERS OF SUSPECTED ELDER ABUSE. ( <u>VA code 63.2-1606</u> ) Report suspicions to the receiving facility emergency department attending physician on arrival, or report suspicions immediately to Adult Protective Services. <b>APS Hotline: 888-83-ADULT (888-832-3858).</b>	•	•	•	•	•
7. Transport as soon as possible.		•	•	•	•

ELDER ABUSE

# Protocol

## 4-9

Continued

**ELDER ABUSE**

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# Protocol 4-10

**SECTION:** Adult Trauma Patient Care

**PROTOCOL TITLE:** Conducted Energy Device Injuries  
**Conductive Energy Device Injuries**

**REVISED:** 06/2013

## OVERVIEW:

A conducted energy device is a non-lethal, battery-operated device that can deliver 50,000 volts of electricity in rapid pulses that stimulate the nerves in the body. This high-voltage, low-amperage electrical discharge overrides the body's muscle-triggering mechanisms causing neuromuscular incapacitation. This neuromuscular incapacitation overrides the patient's sensory and motor nerves of the peripheral nervous system by disrupting the electrical impulses sent by the brain to command skeletal muscle function.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"><li>Events leading to incident</li><li>Drug, ETOH ingestion</li><li>Medical history (especially cardiac)</li><li>Medications</li><li>Last tetanus</li></ul>	<ul style="list-style-type: none"><li>Local injury</li><li>Altered mental status, unconsciousness</li><li>Respiratory distress</li><li>Chest pain</li><li>Cardiac, respiratory arrest</li></ul>	<ul style="list-style-type: none"><li>Drug / ETOH ingestion</li><li>Cardiac rhythm disturbance</li><li>Myocardial infarction</li><li>Respiratory arrest</li><li>Cardiac arrest</li></ul>

	A	B	EN	I	P
1. Perform general patient assessment.	•	•	•	•	•
2. Administer oxygen, to maintain $\text{SPO}_2$ 94 - 99%. Support respirations as necessary with a BVM.	•	•	•	•	•
3. Determine history of events between the time the weapon was used until EMS arrived.	•	•	•	•	•
4. Per patient assessment (chest pain / palpitations) place patient on cardiac monitor and obtain / interpret <u>12 lead</u> ECG. Refer to appropriate <u>Cardiac Care protocol</u> .				•	•
5. Establish IV of Normal Saline at KVO rate, per assessment.			•	•	•
6. If patient is agitated or combative, refer to <u>Behavioral Emergencies protocol</u> .		•	•	•	•
7. Transport promptly in position of comfort and reassess as needed.		•	•	•	•

The current medical literature does not support routing performance of laboratory studies, electrocardiograms, or prolonged ED observation or hospitalization for ongoing cardiac monitoring after CEW exposure in an otherwise asymptomatic, awake and alert patient.

MedScape:

Emergency Department Evaluation After Conducted Energy Weapon Use  
Review of the Literature for the Clinician  
Gary M. Vilke, MD; William P. Bozeman, MD; Theodore C. Chan, MD

# CONDUCTED ENERGY DEVICE INJURIES

# Protocol 4-10

Continued

## CONDUCTED ENERGY DEVICE INJURIES



### PEARLS:

1. If deployed by law enforcement, before touching any patient that has been subdued using a conducted energy device, ensure that the law enforcement officer has disconnected the deployment cartridge from the hand held unit.
2. If deployed by law enforcement, the probes and all connecting wires are considered evidence by law enforcement and should be maintained for collection.
3. Due to case reports of deaths associated with subjects subdued with these types of devices, all victims should be transported to the hospital for a thorough evaluation.
4. A known or unknown pre-existing cardiac history may cause unexpected cardiac arrest during or after Taser® use. All patients should have a 12-Lead ECG performed to determine possible cardiac abnormality.
5. Encourage law enforcement to accompany patient, in ambulance, during transport to receiving facility.

# Protocol 4-11

**SECTION:** Adult Trauma Patient Care

**PROTOCOL TITLE:** Thoracic Trauma  
**Injury - Thoracic**

**REVISED:** 06/2013

## OVERVIEW:

Thoracic injuries can be very dramatic, presenting with obvious physical findings that lead to immediate identification and management during the initial assessment, while others may only exhibit subtle signs and symptoms that can be easily missed initially. A high index of suspicion, accurate assessment, and frequent reassessment are necessary to identify both the apparent and less obvious thoracic injuries that could lead to lethal consequences. Thoracic injury may result from both penetrating and blunt trauma. Penetrating trauma has a tendency to be more obvious due to the presence of an open wound while blunt trauma may produce findings such as large contusions, tenderness, fractured ribs or flailed segments, or relatively little external evidence of injury. Although little external injury may be present, the patient may be suffering from multiple and severe organ, vascular, and structural injuries.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Time of injury</li> <li>• Mechanism: blunt vs penetrating</li> <li>• Loss of consciousness</li> <li>• Damage to structure, vehicle</li> <li>• Location in structure or vehicle</li> <li>• Speed, details of MVC: Restraints, protective devices</li> <li>• Medical history</li> <li>• Medications</li> <li>• Evidence of multi-system trauma</li> </ul>	<ul style="list-style-type: none"> <li>• Pain, swelling, bleeding</li> <li>• Deformity, lesions</li> <li>• Altered mental status, unconsciousness</li> <li>• Respiratory distress, failure</li> <li>• Hypotension, shock</li> <li>• Arrest</li> <li>• Significant mechanism of injury</li> </ul>	<ul style="list-style-type: none"> <li>• Tension pneumothorax</li> <li>• Flail chest</li> <li>• Pericardial tamponade</li> <li>• Open chest wound</li> <li>• Hemothorax</li> </ul>

	A	B	EN	I	P
1. Maintain scene and provider safety.	•	•	•	•	•
2. Perform general patient management.	•	•	•	•	•
3. Administer oxygen, to maintain <u>SPO<sub>2</sub></u> 94 - 99%. If needed, assist ventilations with BVM, maintain C-spine precautions.	•	•	•	•	•
4. If airway remains unstable, consider placement of definitive airway ( <u>Supraglottic / dual lumen / ETT I and P only</u> ).				•	•
5. Identify mechanism of injury.	•	•	•	•	•

# THORACIC TRAUMA

# Protocol 4-11

Continued

## THORACIC TRAUMA

	A	B	EN	I	P
6. Assess breath sounds. Stabilize any chest injuries.*		•	•	•	•
7. If patient has clinical findings consistent with tension pneumothorax and has hypotension/signs of shock, perform <i>needle decompression</i> * per protocol.				•	•
8. Establish large bore IV's of normal saline. Titrate to systolic blood pressure of 90 to 100 mmHg.			•	•	•
9. Place patient on cardiac monitor per assessment.				•	•
10. Treat pain if indicated. Refer to <i>pain management protocol</i> .				•	•
11. Transport to the appropriate hospital per <i>trauma triage scheme</i> and reassess patient as indicated.		•	•	•	•

### \*Open Pneumothorax

Occlude initially with gloved hand as soon as found.

As rapidly as possible, apply an occlusive dressing, taped on three sides over wound.

### \*Tension Pneumothorax

Perform chest decompression of the affected side, at the mid-clavicular line between the second and third intercostal space, per *Needle Thoracentesis Clinical Procedure*.

#### PEARLS:

1. The amount of external bleeding is not an indicator of the potential severity of internal bleeding associated with an underlying trauma.
2. Some injuries, such as simple rib fractures, may produce such excruciating pain that the patient intentionally hypoventilates to reduce chest wall movement causing secondary hypoxia.
3. Due to the amount of external noise, a possible pneumothorax should not be determined by lung sounds alone. In the presence of a true tension pneumothorax, the patient will also show signs of increasing tachycardia, decreasing SpO<sub>2</sub>, tachypnea, and anxiety. Tracheal deviation away from the affected side is a late sign and may be difficult to assess in obese patients.
4. Careful reassessment of lung sounds should occur continuously. A patient that initially only has an open pneumothorax may quickly develop a tension pneumothorax and need needle thoracentesis after an occlusive dressing has been applied.
5. A true flail segment is two or three adjacent ribs, fractured in two or more places, which have the ability to move independently of the remaining chest wall.
6. Although paradoxical motion is often thought to be the hallmark sign of a flail chest, when the ribs fracture, the intercostal muscles may spasm, causing the flail segment to be initially stabilized. Paradoxical motion may be initially missed upon inspection while a thorough palpation exam will reveal any instability.
7. Stabilizing a flail segment with sandbags or other devices is no longer recommended.

# Section

# 5

**SECTION:** Environmental Emergencies

**REVISED:** 06/2013

1.	<b><u>Hypothermia</u></b> <i>Environmental - Hypothermia</i>	Protocol 5 - 1
2.	<b><u>Hyperthermia</u></b> <i>Environmental – Heat Exposure/Heat Exhaustion</i> <i>Environmental – Heat Stroke</i>	Protocol 5 - 2
3.	<b><u>Bites and Envenomation</u></b> <i>Injury - Bites and Envenomations – Land</i>	Protocol 5 - 3
4.	<b><u>Drowning / Near-Drowning</u></b> <i>Injury - Drowning/Near Drowning</i>	Protocol 5 - 4

ENVIRONMENTAL EMERGENCIES

# Section 5

Continued

## ENVIRONMENTAL EMERGENCIES

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# Protocol

## 5-1

**SECTION:** Environmental Emergencies

**PROTOCOL TITLE:** Hypothermia  
**Environmental – Hypothermia**

**REVISED:** 06/2013

### OVERVIEW:

Hypothermia is typically defined as a core temperature less than 35° Celsius / 95° Fahrenheit. While most commonly seen in cold climates, it may develop without exposure to extreme environmental conditions. Hypothermia is not uncommon in temperate regions and may develop indoors even during summer. Hypothermia should be considered in any patient with an altered level of consciousness in a cool and /or wet environment. Individuals at the extremes of age and those of altered mental status are more susceptible to developing hypothermia. Vasoconstriction and bradycardia may cause extreme difficulty while attempting to palpate a pulse. Radiation accounts for the greatest form of heat loss. Conduction normally accounts for a much smaller amount, but increases significantly in wet clothes and astronomically in cold water. In patients that are hypothermic, pulse and respiratory rates may be slow or difficult to detect. If the hypothermic victim has no signs of life, begin CPR without delay.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Past medical history</li> <li>Medications</li> <li>Exposure to environment even in normal temperatures</li> <li>Exposure to extreme cold</li> <li>Extremes of age</li> <li>Drug use: alcohol, barbiturates</li> <li>Infection, sepsis</li> <li>Length of exposure, wetness</li> </ul>	<ul style="list-style-type: none"> <li>Cold, clammy</li> <li>Shivering</li> <li>Mental status changes</li> <li>Extremity pain, sensory abnormality</li> <li>Bradycardia</li> <li>Hypotension, shock</li> </ul>	<ul style="list-style-type: none"> <li>Sepsis</li> <li>Environmental exposure</li> <li>Hypoglycemia</li> <li>CNS dysfunction <ul style="list-style-type: none"> <li>Stroke</li> <li>Head injury</li> <li>Spinal cord injury</li> </ul> </li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Hypothermia <b>WITH</b> a perfusing rhythm (pulse):					
a. Prevent additional evaporative heat loss by removing wet garments and insulating the victim from further environmental exposures.	•	•	•	•	•
b. Initiate passive rewarming with warmed blankets and a warm environment.	•	•	•	•	•
c. Perform procedures gently. These patients are prone to develop ventricular fibrillation.	•	•	•	•	•

**HYPOTHERMIA**

# Protocol

## 5-1

Continued

# HYPOTHERMIA

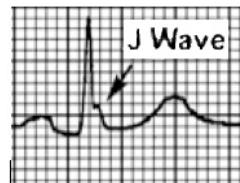
	A	B	EN	I	P
4. Hypothermia <b>WITHOUT</b> a perfusing rhythm (pulse):					
a. Begin CPR immediately.	•	•	•	•	•
b. Initiate rewarming procedures as noted in step #3 above.	•	•	•	•	•
c. If not breathing, start rescue breathing immediately. If possible, administer warmed, humidified oxygen.	•	•	•	•	•
d. If pulseless with no detectable signs of circulation, start chest compressions immediately. If there is any doubt about whether a pulse is present, begin compressions.	•	•	•	•	•
e. Assess cardiac rhythm:					
i. Attach AED / cardiac monitor. If the patient does not respond to one (1) defibrillation, <i>further defibrillation attempts should be deferred</i> .	•	•	•	•	•
f. Secure airway with a definitive ( <u>Supraglottic / dual lumen</u> ) airway device or an <u>endotracheal tube</u> (levels I and P only).		•	•	•	•
g. Establish an IV of Normal Saline.			•	•	•
h. Give initial cardiovascular drugs based on presenting rhythm. If the patient fails to respond to the initial drug therapy, defer additional boluses of medication.				•	•
i. Continue CPR and transport immediately.	•	•	•	•	•
5. Transport and perform ongoing assessment as indicated.	•	•	•	•	•

# Protocol 5-1

Continued

Stages of Hypothermia	
<b>Normal Cold Response (35° C – 37° C / 95.1°F – 98.6°F)</b>	
<ul style="list-style-type: none"><li>• Feeling of cold</li><li>• Shivering</li></ul>	<ul style="list-style-type: none"><li>• Vasoconstriction</li></ul>
<b>Mild Hypothermia (34°C – 35°C / 93°F – 95°F)</b>	
<ul style="list-style-type: none"><li>• Maximum shivering at 35°C / 95°F</li><li>• Cold, pale skin (vasoconstriction)</li><li>• Pulse and BP are normal or <u>elevated</u></li></ul>	<ul style="list-style-type: none"><li>• Increasing rate of respirations</li><li>• Mild confusion</li><li>• Slurred speech</li><li>• Unsteady gait</li><li>• Amnesia</li></ul>
<b>Moderate Hypothermia (30°C – 34°C / 86°F – 93°F)</b>	
<ul style="list-style-type: none"><li>• No longer shivering</li><li>• Bradycardia</li><li>• Decreased respirations</li><li>• Increased risk of cardiac arrhythmia (A-Fib)</li></ul>	<ul style="list-style-type: none"><li>• Intense vasoconstriction – surface pooling</li><li>• Decreased LOC</li><li>• Increased mortality in major trauma by 40 - 50%</li></ul>
<b>Severe Hypothermia (&lt; 30°C / &lt; 86°F)</b>	
<ul style="list-style-type: none"><li>• Intense vasoconstriction – surface pooling</li><li>• Lethal cardiac dysrhythmias (V-Fib)</li></ul>	<ul style="list-style-type: none"><li>• Non-cardiac pulmonary edema</li><li>• As core temp continues to decrease, risk of cardiac arrest increases dramatically</li></ul>

If the core temperature falls below 32°C / 90°F, a characteristic J-wave (Osborn wave) may occur. The J-wave occurs at the junction of the QRS complex and the ST segment. T-wave inversion and prolongation of the PR, QRS, and QT interval may be noted.



HYPOTHERMIA

# Protocol

## 5-1

Continued

# HYPOTHERMIA

### PEARLS:

1. Resuscitation efforts should not be ceased until rewarming efforts have been exhausted, unless patient presents with injuries incompatible with life.
2. Extremes of age, young and old, are more susceptible to effects of temperature.
3. With temperature less than 31°C / 88°F, ventricular fibrillation is a common cause of death.
4. Patient with extreme hypothermia MUST be handled gently.
5. Cardiac arrest patients should be warmed before administering medications, as they may build in the system due to metabolism being ineffective.
6. Defibrillation should be limited to one (1) shock prior to warming core.
7. If the temperature is unable to be measured, treat based on the suspected temperature.
8. Hypothermia may cause severe bradycardia.
9. Shivering typically ceases when core temperature is below 32°C / 90°F.
10. Hot packs can be activated and placed in the armpit and groin areas, if available.
11. If patient is found with wet clothes, patient should be exposed prior to application of blankets.
12. Hypothermic patients also exhibit cold diuresis. Peripheral vasoconstriction initially causes central hypervolemia, to which the kidneys respond by excreting large amounts of dilute urine, causing dehydration. Alcohol and water immersion increase this process.

# Protocol 5-2

**SECTION:** Environmental Emergencies

**PROTOCOL TITLE:** Hyperthermia

**Environmental – Heat Exposure/Heat Exhaustion**

**Environmental – Heat Stroke**

**REVISED:** 06/2013

## OVERVIEW:

The body temperature is contingent upon the balance between heat production and heat loss. Regulation of body temperature is dependent upon the principals of conduction, convection, and evaporation. Populations at a greater risk for hyperthermia emergencies include: the elderly, the poor (who lack adequate air conditioning), those who suffer from malnutrition, and those who have chronic illnesses or substance addiction. Predisposing factors commonly intervene over days rather than minutes or hours. Hyperthermia may occur in the presence of numerous host factors. These factors include many that affect thermoregulation through heat loss mechanisms (lack of acclimatization, fatigue, lack of sleep, dehydration, and skin disorders), while others contribute to heat production (obesity, lack of physical fitness, febrile illness, or sustained exercise). Changes in cognitive function appear to occur before the development of the physical symptoms associated with heat stress. Time distortion, memory impairment, and / or deterioration in attention are frequent characteristics associated with heat stress.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"><li>Past medical history</li><li>Medications</li><li>Exposure to increased temperatures, humidity</li><li>Extremes of age</li><li>Extreme exertion</li><li>Time, length of exposure</li><li>Poor PO intake</li><li>Fatigue, muscle cramping</li></ul>	<ul style="list-style-type: none"><li>Altered mental status</li><li>Unconsciousness</li><li>Hot, dry, or sweaty skin</li><li>Pale, clammy skin</li><li>Hypotension, shock</li><li>Seizures</li><li>Nausea</li><li>Weakness, dizziness, syncope</li><li>Rapid, shallow respirations</li></ul>	<ul style="list-style-type: none"><li>Fever</li><li>Dehydration</li><li>Medications</li><li>Hyperthyroidism (storm)</li><li>Delirium tremens (DT's)</li><li>Heat cramps</li><li>Heat exhaustion</li><li>Heat stroke</li><li>CNS lesions, tumors</li></ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Remove the patient from the hot environment to a cool environment. Do not allow the patient to shiver with cooling techniques.	•	•	•	•	•
4. Administer oxygen, to maintain $\text{SPO}_2$ 94 - 99%. Support respirations as necessary with a BVM.	•	•	•	•	•



# Protocol 5-2

Continued

## HYPERTHERMIA

	A	B	EN	I	P
5. <b>Heat Cramps:</b> Signs and symptoms include muscle twitching, followed by painful spasms, especially involving the lower extremities and abdomen, nausea and vomiting, weakness and diaphoresis.					
a. PO fluids may be given as long as the patient maintains a patent airway and is not vomiting.		•	•	•	•
6. <b>Heat Exhaustion:</b> Signs and symptoms include: pallor, profuse sweating, orthostatic hypotension, headache, weakness, fatigue and thirst.					
a. Establish an IV of Normal Saline. Infuse the fluid amounts listed in the <i>Shock protocol</i> . If the patient develops signs and symptoms of fluid overload respiratory distress (dyspnea, crackles, rhonchi, decreasing SpO <sub>2</sub> ), slow the IV to KVO.			•	•	•
b. Place on cardiac monitor.				•	•
7. <b>Heat Stroke:</b> Signs and symptoms include: <i>altered mental status</i> , increased body temperature, minimal or no sweating, collapse, shortness of breath, shock, nausea and vomiting.					
a. Remove the patient's clothing.	•	•	•	•	•
b. <i>Do not</i> give anything by mouth.	•	•	•	•	•
c. Spray the patient's skin with a lukewarm water mist and fan the patient. Continue misting and fanning during transport.	•	•	•	•	•
d. Wrap the patient with wet sheets if there is good ambient airflow present.	•	•	•	•	•
e. Establish an IV / IO of Normal Saline. Infuse the fluid amounts listed in the <i>Shock protocol</i> . If the patient develops signs and symptoms of fluid overload respiratory distress (dyspnea, crackles, rhonchi, decreasing SpO <sub>2</sub> ), slow the IV to KVO.			•	•	•
f. Place on cardiac monitor and obtain <i>12 lead ECG</i> per assessment.				•	•
8. Transport and perform ongoing assessment as indicated.	•	•	•	•	•

### PEARLS:

1. Extremes of age, young and old, are more susceptible to extreme temperatures.
2. Cocaine, amphetamines, and salicylates may elevate body temperature.
3. Sweating generally stops as core temperature rises above 104° F.
4. Intense shivering may occur as patient is cooled.

# Protocol

## 5-3

**SECTION:** Environmental Emergencies

**PROTOCOL TITLE:** Bites and Envenomations  
**Injury - Bites and envenomations – Land**

**REVISED:** 06/2013

### OVERVIEW:

Insect stings and human, animal, snake, or spider bites from a variety of species can result in serious illness and injury. Animal bites from wild animals such as skunks, bats, raccoons, and foxes pose a special risk of rabies. Snakebites or stings from insects or spiders inject poisonous venom into their victims, generally affecting the cardiovascular or neurological system. Individual reactions to venom vary greatly depending on the person's sensitivity. Five percent of the general population is allergic to the stings of wasps, bees, hornets, yellow jackets, and ants. Insect stings cause twice as many deaths as snakebites each year. Anaphylactic shock can occur from any source, refer to the *Allergic Reaction / Anaphylaxis Patient Care Protocol* as needed. Do not apply ice or cold packs to snakebites as this can cause additional tissue damage. However, ice or cold packs can be applied to insect bites to reduce pain and swelling.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Type of bite / sting</li> <li>Description of creature for identification</li> <li>Time, location, size of bite / sting</li> <li>Previous reaction to bite / sting</li> <li>Domestic vs. wild</li> <li>Tetanus or rabies risk</li> <li>Immuno-compromised patient</li> </ul>	<ul style="list-style-type: none"> <li>Rash, skin break, wound</li> <li>Pain, soft tissue swelling, redness</li> <li>Blood oozing from the bite wound</li> <li>Evidence of infection</li> <li>Shortness of breath, wheezing</li> <li>Allergic reaction, hives, itching</li> <li>Hypotension or shock</li> </ul>	<ul style="list-style-type: none"> <li>Infection risk</li> <li>Rabies risk</li> <li>Tetanus Risk</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Treat for shock and conserve body heat. Keep the patient calm.	•	•	•	•	•
4. If applicable, locate the fang marks and clean the site with soap and water. Note: There may be only one fang mark.	•	•	•	•	•
5. Remove any rings, bracelets, or other constricting items on the bitten / stung extremity.	•	•	•	•	•
6. Keep any bitten / stung extremities immobilized – the application of a splint will help. Keep the injury at the level of the heart. When not possible, keep the injury below the level of the heart.	•	•	•	•	•

BITES AND ENVENOMATIONS

# Protocol 5-3

Continued

## BITES AND ENVENOMATIONS

	A	B	EN	I	P
7. DO NOT apply light constricting bands above and below the wound.	•	•	•	•	•
8. If envenomation is suspected, every 15 minutes, use a pen to mark the border of the advancing edema and document the time.	•	•	•	•	•
9. Consult Medical Control or Poison Control. For serious envenomation, the patient may need to be transported or evacuated to a hospital with the appropriate anti-venom.	•	•	•	•	•
10. Start an IV of Normal Saline at KVO.			•	•	•
11. For signs and symptoms of shock, follow the <u>Shock protocol</u> .	•	•	•	•	•
12. Transport and perform ongoing assessment as indicated.		•	•	•	•

\*\*\*Adequate identification of the snake is important. If the snake is live, contact local animal control and relay any available information regarding the identification of the snake to the receiving facility.\*\*\*

### DO NOT TRANSPORT A LIVE SNAKE IN THE AMBULANCE

#### PEARLS:

1. Do not apply any type of constricting band or tourniquets as a treatment for any kind of bite or envenomation unless used to control severe hemorrhage.
2. Human bites are worse than animal bites due to the normal mouth bacteria.
3. Carnivore bites are more likely to become infected and all have risk of rabies exposure.
4. Cat bites may progress to infection rapidly due to a specific bacterium.
5. Poisonous snakes in this area are generally of the pit viper family: eastern diamondback rattlesnake, copperhead, and water moccasin.
6. The amount of envenomation with snake bites is variable, but is generally worse with larger snakes and early in Spring.
7. If no pain or swelling is noted, envenomation is unlikely.
8. Black Widow spider bites tend to be minimally painful but, over a few fours, muscular pain and severe abdominal pain may develop.
9. Brown Recluse spider bites are minimally painful to painless. Little reaction is noted initially, but tissue necrosis at the site of the bite normally develops over two to three days.
10. Signs and symptoms of infection include swelling, redness, drainage, fever, and red streaks proximal to the wound.
11. Immuno-compromised patients with diabetes, chemotherapy, organ transplants, HIV / AIDS, etc, are at an increased risk for infection.

# Protocol

## 5-4

**SECTION:** Environmental Emergencies

**PROTOCOL TITLE:** Drowning and Near Drowning  
**Injury - Drowning/Near Drowning**

**REVISED:** 06/2013

### OVERVIEW:

Drowning is a leading cause of accidental death. Drowning, like other causes of death, often strikes young or otherwise healthy people. Prevention of drowning and near drowning is the most effective way to reduce the number of deaths. The outcome of a patient following near drowning is dependent upon rapid recognition, rescue and resuscitation. Treatment of near drowning begins at the scene with rapid, cautious removal of the victim from the water. Spinal precautions should be observed if there is suspicion of a significant mechanism of injury, such as: high velocity impact, diving, or surfing. The concern of saltwater vs. freshwater aspiration is not of immediate importance in the pre-hospital environment. Factors that increase survivability include: younger age, cold water, and less time submerged.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Submersion in water, regardless of depth</li> <li>Possible history of trauma (i.e., diving board)</li> <li>Duration of submersion</li> <li>Temperature of the water</li> <li>Type of water</li> </ul>	<ul style="list-style-type: none"> <li>Unresponsive</li> <li>Mental status changes</li> <li>Decreased or absent vital signs</li> <li>Vomiting</li> <li>Coughing</li> </ul>	<ul style="list-style-type: none"> <li>Trauma</li> <li>Pre-existing medical problem</li> <li>Pressure injury (diving) <ul style="list-style-type: none"> <li>Barotraumas</li> <li>Decompression sickness</li> </ul> </li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation. Assess mechanism or injury and C-spine precautions.	•	•	•	•	•
3. Administer oxygen to maintain $\text{SPO}_2$ 94 - 99%. Consider supporting respirations with a BVM.	•	•	•	•	•
4. If the patient is in critical respiratory distress, consider placement of <b>orotracheal</b> intubation.				•	•
5. Remove wet clothing and prevent heat loss. If suspected, refer to <u>Hypothermia protocol</u> .	•	•	•	•	•
6. Monitor <u>capnography</u> .				•	•
7. Place patient on cardiac monitor and obtain / interpret <u>12 lead ECG</u> .				•	•
8. Establish an IV of normal saline at KVO.			•	•	•
9. Transport and perform ongoing assessment as indicated.		•	•	•	•

# DROWNING / NEAR DROWNING

# Protocol

## 5-4

Continued

# DROWNING / NEAR DROWNING

### **PEARLS:**

1. Near drowning patients are at high risk for experiencing secondary drowning several hours after the initial event. Secondary drowning occurs when delayed flash pulmonary edema occurs. All patients suspected of submersion should be transported for further evaluation.
2. Adult Respiratory Distress Syndrome (ARDS) and pneumonia can both occur following the inhalation of water into lungs, causing damage to the alveoli. Make every effort to transport these patients to the hospital for further evaluation.
3. For cold water submersion, attempt resuscitation on all patients unless the patient presents with injuries incompatible with life.
4. Drowning is a leading cause of death among would-be rescuers.

# Section 6

**SECTION:** Obstetrical and Gynecological Emergencies

**REVISED:** 06/2013

## OB / GYN EMERGENCIES

1.	<b><u>Physiologic Changes with Pregnancy</u></b>	Protocol 6 - 1
2.	<b><u>Delivery – Uncomplicated</u></b> <i>OB/GYN - Childbirth/Labor/Delivery</i>	Protocol 6 - 2
3.	<b><u>Neonatal Resuscitation</u></b> <i>Medical - Newborn/Neonatal Resuscitation</i>	Protocol 6 - 3
4.	<b><u>Delivery – Shoulder Dystocia</u></b> <i>OB/GYN - Delivery Shoulder Dystocia</i>	Protocol 6 - 4
5.	<b><u>Delivery – Breech Presentation</u></b> <i>OB/GYN - Delivery Breech Presentation</i>	Protocol 6 - 5
6.	<b><u>Ectopic Pregnancy / Rupture</u></b> <i>OB/GYN - Ectopic Pregnancy Rupture</i>	Protocol 6 - 6
7.	<b><u>Abruption Placenta</u></b> <i>OB/GYN - Placenta Abruptio</i>	Protocol 6 - 7
8.	<b><u>Placenta Previa</u></b> <i>OB/GYN - Placenta Previa</i>	Protocol 6 - 8
9.	<b><u>Umbilical Cord Prolapse</u></b> <i>OB/GYN - Prolapsed Umbilical Cord</i>	Protocol 6 - 9
10.	<b><u>Hypertension / Eclampsia / HELLPs</u></b> <i>OB/GYN - Eclampsia</i>	Protocol 6 - 10
11.	<b><u>Premature Rupture of Membranes (PROM)</u></b> <i>OB/GYN - Premature Rupture of Membranes</i>	Protocol 6 - 11
12.	<b><u>Pre-term Labor</u></b> <i>OB/GYN - Pre-term Labor</i>	Protocol 6 - 12
13.	<b><u>Postpartum Hemorrhage (PPH)</u></b> <i>OB/GYN - Post-partum Hemorrhage</i>	Protocol 6 - 13

## Section

# 6

Continued

# OB / GYN EMERGENCIES

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# Protocol 6-1

**SECTION:** Obstetrical/Gynecological Emergencies

**PROTOCOL TITLE:** Physiologic Changes

**REVISED:** 05/2012

## **OVERVIEW:**

Many changes occur in the pregnant woman's body, starting from the time of conception and throughout the pregnancy. The most obvious body system to undergo change is the reproductive system, but all of the others will change as well. Brief summaries of the physiologic changes that occur during pregnancy have been listed by system. Most of these physiologic changes will resolve during the postpartum period.

### **Respiratory System:**

As the uterus enlarges during pregnancy, it causes the diaphragm to rise, decreasing the resting lung volume, and decreasing the Functional Residual Capacity (FRC).

The tidal volume (volume of air inspired and expired during each breath) increases throughout pregnancy by 40%, which in turn causes the minute ventilation (volume of air inspired or expired in one minute) to also increase by 40%. Because of this hyperventilation (which is caused by the increasing presence of progesterone), there is an increase in the arterial PO<sub>2</sub> to 106 - 108 mmHg, and a decrease in the arterial PCO<sub>2</sub> to 27 - 32 mmHg. These changes are reflected in the appearance of a respiratory alkalosis on an ABG.

Another change occurring during pregnancy is the increase in total body oxygen consumption by about 15 – 20%. This is secondary to the increased requirements of the cardiac and renal systems, with additional requirements from the extra work of respiratory muscles and breasts (in preparation for lactation).

Lastly, the upper respiratory passages are engorged secondary to increased vascularity, predisposing the pregnant patient to nasopharyngeal bleeding, transient blockage of the Eustachian tubes, and nasal stuffiness.

### **Cardiovascular:**

Total blood volume increases by 50% during pregnancy. The bone marrow will increase the production of RBC's, but the plasma component of the blood volume increases more rapidly, causing an "anemia of pregnancy". Normal hemoglobin is 12 g, and normal hematocrit is 31 - 34%. The WBC count also increases slightly to 9,000 to 12,000 /  $\mu$ L. Because of this increased blood volume, the cardiac output is increased by 1 – 1.5 L / minute.

Due to the increasing size of the uterus, the mother's heart is elevated and rotated forward to the left. The patient's heart rate rises gradually throughout pregnancy, to an increase by 12 - 18 beats / minute. Palpitations early in the pregnancy are caused by disturbances in the sympathetic nervous system, while palpitations toward the end of gestation are the result of increasing intra-abdominal pressure of the enlarged uterus.

Baseline arterial blood pressures decrease during pregnancy, and are at their lowest values at 20 - 24 weeks gestation. This is due to the increased cardiac output, and reduced peripheral vascular resistance. They will gradually rise to pre-pregnancy values at term, when vasoconstrictor tone increases. Systolic BP decreases by 4 - 6 mmHg, diastolic BP decreases by 8 - 15 mmHg, and the mean BP decreases by 6 - 10 mmHg.

PHYSIOLOGIC CHANGES

# Protocol

## 6-1

Continued

# PHYSIOLOGIC CHANGES

Hypertension in pregnancy is usually indicative of an obstetrical complication, such as preeclampsia.

Blood pressure is further affected by position. As the pregnancy progresses, the enlarging uterus displaces and compresses the iliac veins, inferior vena cava, and the aorta. When the pregnant woman is in the supine position, this causes increasing venous compression, decreasing venous return, and cardiac output. This may cause significant hypotension, which in turn may cause nausea, dizziness, or syncope. These symptoms can be relieved by turning the patient on her side, either right or left lateral recumbent.

Venous compression can also cause complications such as varicose veins, hemorrhoids, and edema in the lower extremities.

### Gastrointestinal:

Hormonal changes (progesterone) cause the gastro-esophageal sphincter to relax, as well as all of the muscular tone around the stomach and esophagus. This can cause prolonged gastric emptying time, constipation, heartburn, and gastro-esophageal reflux.

The enlarging uterus displaces the stomach and intestines upward, which can also contribute to GE reflux. The gradual stretching of the abdominal wall alters the normal response to peritoneal membrane irritation. The pregnant patient may not be able to note tenderness. The appendix may also be displaced laterally and upward.

Liver function tests (LFT's) may be altered and alkaline phosphatase isoenzymes that are produced by the placenta cause the total alkaline phosphatase levels to nearly double. Serum cholinesterase levels are also decreased while serum leucine aminopeptidase activity is markedly elevated.

The pregnant patient is also more prone to gallstones because of prolonged emptying time from decreased tone and incomplete evacuation of the gallbladder secondary to distension.

### Urinary and Renal:

The pregnant patient may experience urinary frequency during the first months of pregnancy because of hormonal effects, and because of pressure on the bladder caused by the enlarging uterus. UTI's and / or cystitis are common secondary to urinary stasis, and ineffective emptying of the bladder.

There usually is an increase in the amount of urine, and the specific gravity is lower. The spilling of glucose in the urine is not uncommon, as there is a decreased renal threshold for glucose. This should be monitored closely, however, as it may be indicative of pregnancy induced diabetes mellitus. Renal function tests may indicate decreases in the following values: plasma creatinine ( $< 0.7 \text{ mg / dL}$ ), urea concentrations ( $< 10 \text{ mg / dL}$ ), and urine concentration. Renal plasma flow and the glomerular filtration rate (GFR) increase to 40% greater than pre-pregnancy levels. Plasma levels of renin, renin substrate, and angiotensin I and II will increase.

# Protocol 6-1

Continued

## PHYSIOLOGIC CHANGES

The ureters, especially the right, become markedly dilated. This is secondary to endocrine influences, causing a softening of the ureteral walls and also from pressure on the ureters from the uterus as they arise out of the pelvic ring.

### **Integumentary:**

*Striae Gravidarum* ("stretch marks") appear over the abdomen and breasts of a pregnant woman. These elongated streaks, of pink and red, are the results of the rapid stretching of skin and the underlying connective tissues during the rapid weight gain associated with pregnancy.

*Chloasma* is the "mask of pregnancy", an increase in facial pigmentation occurring over the nose and cheeks. Increased pigmentation can also occur as a dark line extending from the mons pubis to the umbilicus. This is referred to as *linea nigra*.

Due to an increase in circulating estrogens, spider hemangiomas may appear on the skin. These are red blemishes with spider-like legs that branch off from a central body, and tend to be more pronounced on fair-skinned women.

Hormonal increases also can cause an increase of the activity of the sebaceous glands, sweat glands, and hair follicles.

### **Musculoskeletal:**

Increased progesterone levels cause a relaxation of the ligaments supporting the joints. The sacroiliac joint relaxes and widens, as well as the symphysis pubis (by 4 to 8 mm), causing instability of the pelvis. This, in turn, causes additional strain on the thigh and back muscles, and amounts for the swayback, waddling gait of the pregnant patient. The torso also tilts backwards to assist with maintaining equilibrium, as the full term, pregnant uterus can weigh up to 12 pounds.

As the uterus enlarges, it creates tension on the abdominal muscle wall. This tension occasionally becomes so great, that the abdominal recti muscles separate in the median line. This separation is known as *diastasis recti*.

### **Endocrine:**

During pregnancy, the placenta acts as the major endocrine gland. It secretes four hormones that are necessary to maintain the pregnancy: human chorionic gonadotropin or HCG, human chorionic somatomammotropin (also known as human placental lactogen or hPL), estrogen, and progesterone. HCG prolongs the life of the corpus luteum (a structure within the ovary), which in turn produces estrogen and progesterone, which maintains the endometrium (the lining of the uterus). The presence of HCG in the urine is the diagnostic indication of pregnancy. HPL influences the somatic cell growth of the fetus, and prepares the breasts for lactation. Both progesterone and estrogen affect the growth of the uterus and the development of the breasts.

The pituitary gland has two lobes, the anterior and the posterior. During pregnancy, the posterior lobe secretes the hormone Oxytocin, which stimulates contractions during

# Protocol

## 6-1

Continued

# PHYSIOLOGIC CHANGES

labor, stimulates the uterus to continue to contract after delivery, and stimulates lactation. The anterior lobe continues to function as usual, except it no longer releases gonadotropins (FSH and LH), and it increases its production of prolactin, the protein necessary for milk production.

The thyroid gland enlarges during pregnancy. This, however, does not cause an increase in thyroid activity. Serum iodine and thyroxine levels increase, but this is due to an elevation in the level of thyroid-binding protein in the blood (probably from an increase in circulating estrogen).

The adrenal glands secrete an increased amount of aldosterone, as early as the 15<sup>th</sup> week of pregnancy. The hormone aldosterone is responsible for sodium retention by the kidneys. This explains the common problem of fluid retention in pregnancy, and possible edema.

Increased levels of glucocorticoids, estrogens, and progesterone affect glucose metabolism. This change in metabolism, along with the stress of pregnancy, increases the pregnant patient's need for insulin. This may actually induce *gestational diabetes mellitus*.

### **Reproductive:**

The uterus will soften, becomes more globular, and increases in size throughout pregnancy to accommodate the growing fetus, placenta, and amniotic fluid. By the 12<sup>th</sup> to 14<sup>th</sup> week of gestation, the uterus has risen out of the pelvis, and is palpable just above the symphysis pubis. By the 16<sup>th</sup> week, it is at a height between the symphysis pubis and the umbilicus. The uterus can be palpated at the level of the umbilicus by 20 weeks, and is at its highest point, almost at the xiphoid process, by the 36<sup>th</sup> week. Two to four weeks before labor begins, the fetal head descends back down into the pelvic cavity. Estrogen stimulates hypertrophy of the uterine muscle fibers, which enables the uterus to contract during labor.

The cervix will soften, and the cervical mucus glands will form a mucus plug, that seals the uterus during pregnancy, protecting it from vaginal bacteria. This plug is expelled, along with a small amount of blood, at the end of the pregnancy, before labor begins. This event has been termed as the “*bloody show*”.

The mammary glands further develop in pregnancy by stimulation from placental estrogen and progesterone. The ductile system within the breasts will grow from the effects of estrogen, while progesterone enables alveolar glands to develop at the ends of these ducts. The glandular tissue replaces pre-pregnancy adipose tissue in the breasts, causing them to almost double in size. Actual milk production does not occur during pregnancy, as it is inhibited by the presence of progesterone. However, the watery precursor to milk, *colostrum*, may be present.

# Protocol

## 6-2

**SECTION:** Obstetrical/ Gynecological Emergencies

**PROTOCOL TITLE: Delivery-Uncomplicated**  
**OB/GYN - Childbirth/Labor/Delivery**

**REVISED:** 06/2013

### OVERVIEW:

In women with regular menstrual cycles, a history of one or more missed cycles (periods) is suggestive of pregnancy. Labor is defined as progressive dilation of the uterine cervix in association with repetitive uterine contractions resulting in complete dilation (10 cm) and effacement (thinning) of the cervical lining. Vertex, or head-first presentation, is the ideal presentation for all deliveries. Crowning is observed as the second stage of labor begins.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Due date</li> <li>• Time contractions started</li> <li>• Duration and time between contractions</li> <li>• Time, amount of any vaginal bleeding</li> <li>• Sensation of fetal activity</li> <li>• Past medical and delivery history</li> <li>• Medications</li> <li>• Trauma</li> <li>• Recent infection</li> <li>• Drug use and / or smoking</li> </ul>	<ul style="list-style-type: none"> <li>• Childbirth</li> </ul>	<ul style="list-style-type: none"> <li>• Spontaneous abortion</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Administer oxygen to maintain <u>SPO<sub>2</sub></u> > 94%.	•	•	•	•	•
3. If time permits, establish IV of Normal Saline at KVO.			•	•	•
4. Apply gloves, mask, gown, eye protection for infection control precautions.	•	•	•	•	•
5. Have mother lie with knees drawn up and spread apart.	•	•	•	•	•
6. Elevate buttocks - with blankets or pillow.	•	•	•	•	•
7. Create sterile field around vaginal opening. If available, use OB kit.	•	•	•	•	•
8. If the amniotic sac does not break, or has not broken, use a clamp to puncture the sac and push it away from the head and mouth as they appear.	•	•	•	•	•

**DELIVERY - UNCOMPLICATED**

# Protocol

## 6-2

Continued

# DELIVERY - UNCOMPLICATED

	A	B	EN	I	P
9. When the head appears during crowning, place fingers on bony part of skull (not fontanelle or face) and exert very gentle pressure to prevent explosive delivery. Use caution to avoid fontanelle.	•	•	•	•	•
10. As the head is being born, determine if the umbilical cord is around the neck; slip over the shoulder or clamp, cut and unwrap.	•	•	•	•	•
11. After the head is born, support the head. Suctioning is no longer recommended at this point.	•	•	•	•	•
12. As the torso and full body are born, support the newborn with both hands.	•	•	•	•	•
13. As the feet are born, grasp the feet.	•	•	•	•	•
14. Wipe blood and mucus from mouth and nose with sterile gauze, suction mouth and nose.	•	•	•	•	•
15. Keep newborn level with vagina until the cord is cut.	•	•	•	•	•
16. Clamp, tie and cut umbilical cord (between the clamps) as pulsations cease. May consider delay cutting in infants that do not require resuscitation by one minute. Apply the first clamp approximately 4 inches from newborn and the second clamp approximately 6 inches from the newborn.			•	•	•
17. Obtain 1 and 5 minute APGAR scores.		•	•	•	•
18. Assign partner to monitor newborn and refer to <u>Neonatal Resuscitation Protocol</u> .	•	•	•	•	•
19. Observe for delivery of placenta while preparing mother and newborn for transport.		•	•	•	•
20. When delivered, wrap placenta in towel and put in plastic bag; transport placenta to hospital with mother.		•	•	•	•
21. Place sterile pad over vaginal opening, lower mother's legs, help her hold them together.		•	•	•	•
22. Record time of delivery and transport mother, newborn and placenta to hospital.		•	•	•	•

### APGAR Score – 1<sup>st</sup> & 5<sup>th</sup> Minute Post Birth

Sign	0 Points	1 Point	2 Points
<b>Activity (Muscle Tone)</b>	Flaccid	Some Flexion	Active Motion
<b>Pulse</b>	Absent	< 100	> 100
<b>Grimace (Reflex Irritability)</b>	No Response	Some	Vigorous
<b>Appearance (Skin Color)</b>	Blue, Pale	Blue Extremities	Fully Pink
<b>Respirations</b>	Absent	Slow, Irregular	Strong Cry

# Protocol 6-2

Continued

## **PEARLS:**

1. Normal number of vessels in umbilical cord is three, two arteries and one vein.
2. There is increasing evidence of benefit of delaying cord clamping for at least one minute in term and preterm infants not requiring resuscitation.
3. Calculate estimated date of confinement (EDC) by adding 7 days to the first day of the last normal menses and subtracting 3 months.

# DELIVERY - UNCOMPLICATED

# Protocol 6-2

Continued

**DELIVERY - UNCOMPLICATED**

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# Protocol

## 6-3

**SECTION:** Obstetrical/Gynecological Emergencies

**PROTOCOL TITLE: Neonatal Resuscitation**

**Medical - Newborn/Neonatal Resuscitation**

**REVISED:** 06/2013

### OVERVIEW:

The majority of newborns will require only warmth, stimulation, and occasionally some oxygen after birth. That treatment is recommended before attempting the more aggressive interventions of Positive-Pressure Ventilation (PPV) and chest compressions. Remember that a newborn's cardiac output is rate dependent. Bradycardia usually is the result of hypoxia. Once the hypoxia is corrected, the heart rate may spontaneously correct itself. A "newborn" is defined as within one month of age post delivery.

	A	B	EN	I	P
1. If obvious obstruction to spontaneous breathing or requires positive pressure ventilation, gently suction the newborn's mouth, then nostrils, with a bulb syringe for 3 to 5 seconds. Don't routinely suction an active baby.	•	•	•	•	•
2. Evaluate respirations, heart rate (apical pulse or pulse at the base of the umbilical cord), and state of oxygenation. Obtain 1 minute APGAR.	•	•	•	•	•
3. If respirations are inadequate, HR > 100 bpm:					
a. Initiate positive-pressure ventilation with a BVM NOT attached to oxygen. Deliver 40 to 60 breaths per minute. Use only enough volume to make the newborn's chest rise.			•	•	•
b. If the newborn is vigorous (strong respiratory effort, good muscle tone, and a heart rate greater than 100 bpm), no routine suctioning is required.	•	•	•	•	•
4. If respirations are inadequate and HR less than 100 bpm:					
a. If the newborn is NOT vigorous (poor or absent respiratory effort, flaccid, lethargic), consider immediate meconium aspiration via endotracheal suctioning. Suctioning of meconium should not distract from the need for emergent oxygenation and ventilation of the newly born. In the patient with meconium aspiration and respiratory failure or apnea, quickly suction meconium and then begin BVM ventilations.				•	•
b. Initiate positive-pressure ventilation with a BVM on room air. If no increase in HR after 90 seconds, administer 100% oxygen.	•	•	•	•	•
c. If HR is below 60 bpm, begin compressions.	•	•	•	•	•

# NEONATAL RESUSCITATION

# Protocol 6-3

Continued

## NEONATAL RESUSCITATION

### APGAR Score – 1<sup>st</sup> and 5<sup>th</sup> Minute Post Birth

Sign	0 Points	1 Point	2 Points
<b>Activity</b> (Muscle Tone)	Flaccid	Some Flexion	Active Motion
<b>Pulse</b>	Absent	< 100	> 100
<b>Grimace</b> (Reflex Irritability)	No Response	Some	Vigorous
<b>Appearance</b> (Skin Color)	Blue, Pale	Blue Extremities	Fully Pink
<b>Respirations</b>	Absent	Slow, Irregular	Strong Cry

### Supportive Care

Maintain airway. Suction as needed with bulb syringe.

Obtain blood glucose sample. If BGL is < 40 mg / dL, administer Dextrose 10% 2cc / kg (0.5 g / kg) slow IV / IO push. Repeat as necessary.

Maintain warmth via blankets and / or skin-to-skin.

### Procedure for making Dextrose 10%

In 50 ml syringe, mix 10 ml of Dextrose 50% with 40 ml Normal Saline.  
Mixture will yield 50 ml of Dextrose 10%

Age	Pre-Term	Term
Weight (lb / kg)	3.3 lbs 1.5 kg	6.6 lbs 3.0 kg
Epinephrine 1:10,000 (1 mg / 10 ml) 0.01 mg / kg	0.015 mg	0.03 mg
Dextrose 10% 2.0 ml / kg	3.0 ml	6.0 ml

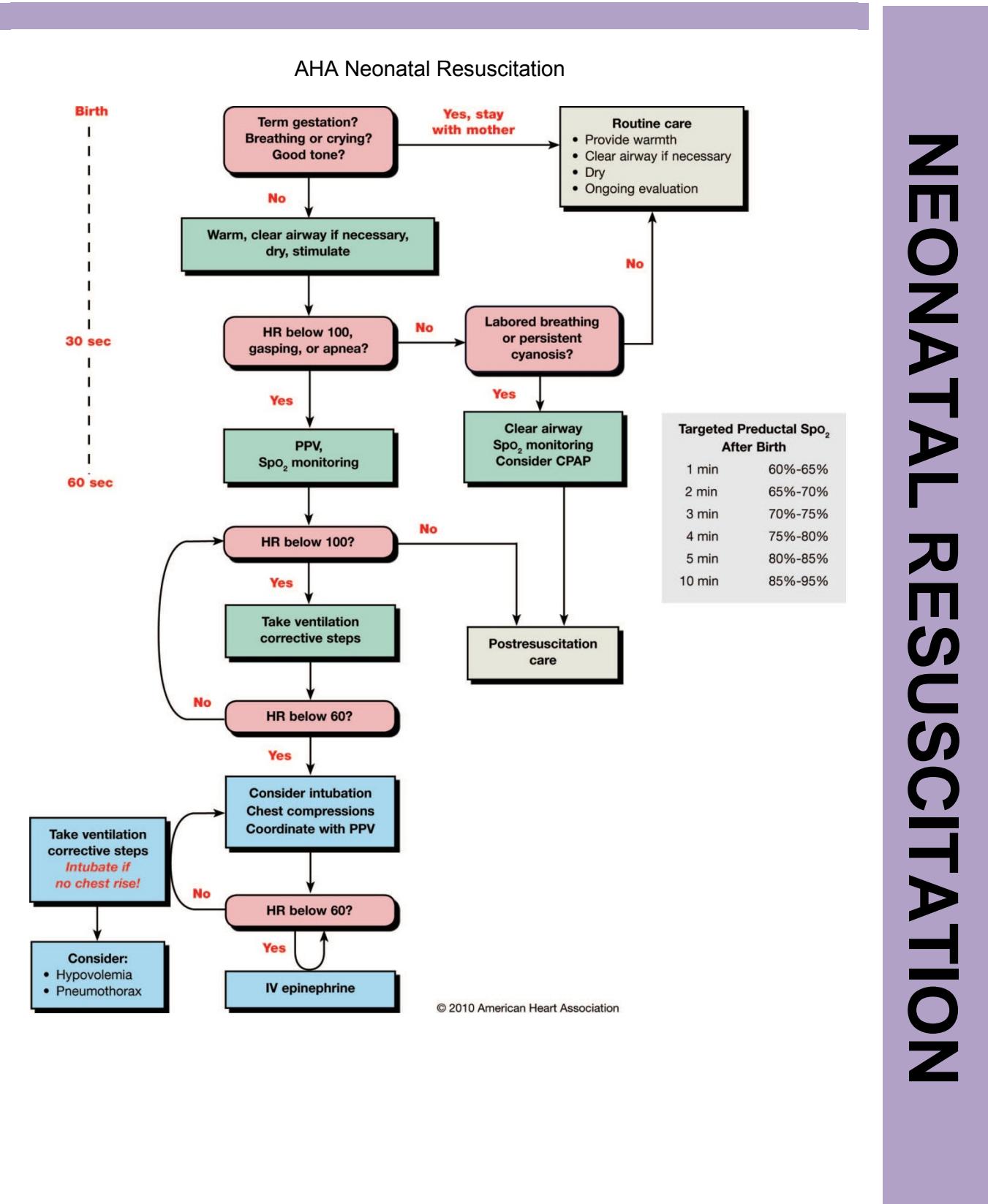
### PEARLS:

1. The primary measure of adequate initial ventilation is prompt improvement in heart rate.
2. In the presence of thick meconium and an infant who is limp, aggressive suctioning is required.
3. A 3:1 ratio of compressions to ventilations with 90 compressions and 30 breaths should be used to achieve approximately 120 events per minute to maximize ventilation at an achievable rate. Each event should be allotted approximately ½ second, with exhalation occurring during the first compression following ventilation.
4. Arterial saturations of a term infant at birth can be as low as 60% and can require more than 10 minutes to reach saturations of > 90%. Hyperoxia can be toxic, particularly to the preterm baby.

# NEONATAL RESUSCITATION

## Protocol 6-3

Continued



# Protocol

## 6-3

Continued

# NEONATAL RESUSCITATION

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# Protocol

## 6-4

**SECTION:** Obstetrical/Gynecological Emergencies

**PROTOCOL TITLE: Delivery – Shoulder / Dystocia**  
**OB/GYN - Delivery Shoulder Dystocia**

**REVISED:** 06/2013

### OVERVIEW:

Shoulder dystocia is a labor complication caused by difficulty delivering the fetal shoulders. After delivery of the head, the fetus seems to try to withdraw back into the birth canal (Turtle Sign). Further birth of the infant is prevented by impaction of the fetal shoulders within the maternal pelvis. Digital exam reveals that the anterior shoulder is stuck behind the pubic symphysis. In more severe cases, the posterior shoulder may be stuck at the level of the sacral promontory. Although this is more common among women with gestational diabetes and those with very large fetuses, it can occur with babies of any size. Unfortunately, it cannot be predicted or prevented. Improperly relieving the dystocia can result in unilateral or bilateral clavicular fractures.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Due date</li> <li>• Time contractions started</li> <li>• Duration and time between contractions</li> <li>• Time, amount of any vaginal bleeding</li> <li>• Sensation of fetal activity</li> <li>• Past medical and delivery history</li> <li>• Medications</li> <li>• Trauma</li> <li>• Recent infection</li> <li>• Drug use and/ or smoking</li> </ul>	<ul style="list-style-type: none"> <li>• “Turtle sign” of infants head protruding and withdrawing into the birth canal</li> </ul>	<ul style="list-style-type: none"> <li>• Breech delivery</li> <li>• Spontaneous abortion</li> </ul>

	A	B	EN	I	P
1. Perform patient assessment.	•	•	•	•	•
2. Administer Oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%.	•	•	•	•	•
3. Assess for presence of nuchal cord (around the baby's neck). If present, remove by slipping over the neck or by cutting and clamping.	•	•	•	•	•
4. Keep the patient's knees pushed back to her abdomen / chest.	•	•	•	•	•
5. Do not apply excessive downward traction on the head. Initially apply gently downward traction on the chest and back to try and free the shoulder. If this has no effect, do not exert increasing pressure.		•	•	•	•

# DELIVERY- SHOULDER / DYSTOCIA

# Protocol 6-4

Continued

## DELIVERY- SHOULDER / DYSTOCIA

	A	B	EN	I	P
6. Place the mother in MacRobert's position and apply gently downward traction on the baby again.				•	•
7. If MacRobert's maneuver fails, have an assistant apply downward, suprapubic pressure to drive the fetal shoulder downward and clear the pubic bone. Apply coordinated, gentle downward traction on the baby.				•	•
8. If pressure straight down is ineffective, have assistant apply it in a more lateral direction. This should nudge the shoulder into a better position.				•	•
9. If newborn continues not to progress, transport immediately to closed appropriate facility.	•	•	•	•	•



### PEARLS:

1. Applying fundal pressure, in coordination with the other maneuvers, may be helpful. Fundal pressure, applied alone, may aggravate the problem by further impacting the shoulder against the pubic symphysis.

# Protocol 6-5

**SECTION:** Obstetrical / Gynecological Emergencies

**PROTOCOL TITLE:** Breech Deliveries  
**OB/GYN - Delivery Breech Presentation**

**REVISED:** 06/2013

## OVERVIEW:

Although most babies are born without difficulty, complications may occur. Breech presentation is an abnormality in which the buttocks or legs of the fetus, rather than the head, appear first in the birth canal. This is the most common atypical birth presentation, occurring in approximately 4% of all full-term deliveries, and up to 25% of all premature births. In any breech birth there are increased risks of umbilical cord prolapse or compression and delivery of the feet through an incompletely dilated cervix, leading to arm or head entrapment. These risks are greatest when a foot is presenting ("footling breech"). Delivery may be prolonged for these newborns, which are at great risk of delivery trauma. Birth trauma can occur from forceful delivery management, such as cervical spine trauma, injury to the brachial plexus, and fractures to the humerus, clavicle, skull, and neck. The cause of breech presentation is only known in approximately half of the cases. Predisposing factors can include fetal and uterine anomalies, abnormal placental implantation, uterine over-distention, previous breech, multiple gestation, high parity, and pelvic obstruction (from placenta previa or tumors).



Figure 1

Management for All Levels - Medical Control Only	A	B	EN	I	P
1. Place mother in delivery position, elevate pelvis with pillows (modified Trendelenburg). <i>Figure 1</i>	MC	MC	MC	MC	MC
2. If possible, allow the infant to deliver until the buttock appears.	MC	MC	MC	MC	MC
3. When providing traction, grasp the baby so that your thumbs are over the baby's hips (iliac crests). Do not pull on the legs or apply pressure to the soft lower back	MC	MC	MC	MC	MC
4. Rotate the torso so the baby is face down in the birth canal. <i>Figure 2</i>	MC	MC	MC	MC	MC

# BREECH DELIVERIES

# Protocol 6-5

Continued

## BREACH DELIVERIES

**Management for All Levels - Medical Control Only**      A    B    EN    I    P



Figure 2

5. If possible, extract a 4 - 6 inch loop of umbilical cord for slack.	MC	MC	MC	MC	MC
6. Apply gentle downward traction until the hairline is visible.	MC	MC	MC	MC	MC
7. Place one hand under the trunk, so that the infant's body rests on the palm, and the index and middle finger of that same hand support the mouth and chin.	MC	MC	MC	MC	MC
8. Place the other hand on the infant's back and shoulders, with the middle and index finger of that hand resting on the infant's shoulders, supporting the posterior neck.	MC	MC	MC	MC	MC
9. A towel can be wrapped around the lower body to provide a more stable grip, as needed.	MC	MC	MC	MC	MC
10. Have your assistant apply suprapubic pressure to keep the fetal head flexed, expedite delivery, and reduce risk of spinal injury. <i>Figure 3</i>	MC	MC	MC	MC	MC



Figure 3

11. Continue light downward traction until shoulder blades or armpits appear.	MC	MC	MC	MC	MC
12. If resistance is felt, arms may need to be freed prior to continuing. Exert gentle outward traction on the baby while rotating the baby clockwise and then counterclockwise a few degrees to free the arms.	MC	MC	MC	MC	MC

# Protocol

## 6-5

Continued

Management for All Levels - Medical Control Only	A	B	EN	I	P
13. If the arms are trapped in the birth canal, you may need to reach up along the side of the baby and sweep them one at a time, across the chest and out of the vagina.	MC	MC	MC	MC	MC
14. After the shoulders have delivered, rotate the infant so that the back is anterior. <i>Figure 4</i>	MC	MC	MC	MC	MC

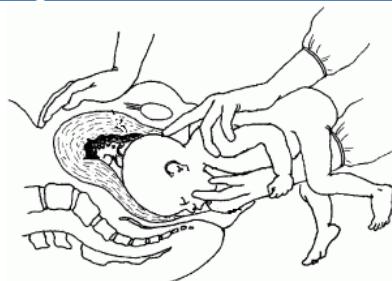


Figure 4

15. Apply gentle downward traction until the hairline is visible.	MC	MC	MC	MC	MC
16. Place one hand under the trunk, so that the infant's body rests on the palm, and the index and middle finger of that same hand support the mouth and chin.	MC	MC	MC	MC	MC
17. Place the other hand on the infant's back and shoulders, with the middle and index finger of that hand resting on the infant's shoulders, supporting the posterior neck.	MC	MC	MC	MC	MC
18. Slowly bring the body upward, while a second person applies suprapubic pressure to facilitate the delivery of the head.	MC	MC	MC	MC	MC
19. Slowly allow the chin, face, and then brow to be delivered. Try not to let the head "pop" out of the birth canal. A slower, controlled delivery is less traumatic.	MC	MC	MC	MC	MC
20. Perform post birth procedures and / or neonatal resuscitation per normal patient care protocol.	MC	MC	MC	MC	MC
21. If unable to deliver head, place gloved index and middle finger in the vagina with the palm towards the baby's face to maintain airway and pushing the infant up to relieve pressure on the cord.	MC	MC	MC	MC	MC
22. Transport immediately.	MC	MC	MC	MC	MC

# BREECH DELIVERIES

# Protocol 6-5

Continued

## BREACH DELIVERIES

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# Protocol

## 6-6

**SECTION:** Obstetrical/Gynecological Emergencies

**PROTOCOL TITLE:** Ectopic Pregnancy/Rupture  
**OB/GYN - Ectopic Pregnancy Rupture**

**REVISED:** 06/2013

### OVERVIEW:

An ectopic pregnancy is one in which the fetus implants anywhere outside of the uterus. This can occur in the fallopian tubes, interstitial portion of the tube, horn of the uterus, cervix, abdomen, or the ovary. Generally the patient will begin complaining of cramping, dull abdominal pain within 3 - 5 weeks of the first missed menstrual period. However, if the ectopic pregnancy ruptures the fallopian tube, the patient may complain of sudden, sharp abdominal pain. The pain may be concentrated on one side of the abdomen, or may be generalized. There may or may not be vaginal bleeding, as blood loss may be concealed in the pelvic cavity causing referred shoulder pain. Blood in the peritoneal cavity may cause a blue tinge around the umbilicus, known as Cullen's sign. Depending on the amount of blood loss, the patient may also exhibit signs of shock.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Due date</li> <li>• Time, amount of any vaginal bleeding</li> <li>• Sensation of fetal activity</li> <li>• Past medical and delivery history</li> <li>• Medications</li> <li>• Trauma</li> <li>• Recent infection</li> <li>• Drug use and/or smoking</li> </ul>	<ul style="list-style-type: none"> <li>• Abdominal pain</li> <li>• Vaginal bleeding</li> <li>• Uterine tenderness to palpation</li> <li>• Fetal demise</li> <li>• Rigid, board-like abdomen on palpation</li> <li>• Shock</li> </ul>	<ul style="list-style-type: none"> <li>• Abdominal trauma</li> <li>• Appendicitis</li> <li>• Ovarian cysts or torsion</li> <li>• Shock (Hemorrhagic, Hypovolemic)</li> </ul>

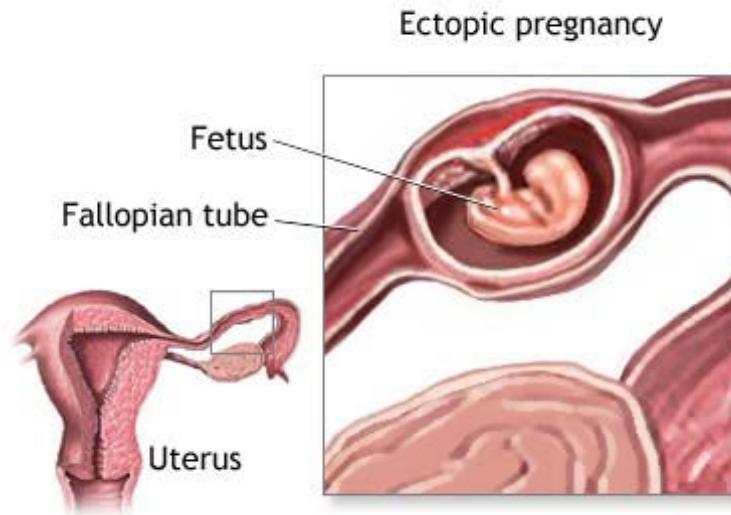
	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
4. Place patient in a position of comfort.	•	•	•	•	•
5. Establish an IV of Normal Saline.			•	•	•
6. If the patient is exhibiting symptoms of shock, refer to the <u>Shock protocol</u> .	•	•	•	•	•
7. Transport promptly and reassess as indicated.		•	•	•	•

# ECTOPIC PREGNANCY/RUPTURE

# Protocol 6-6

Continued

## ECTOPIC PREGNANCY/RUPTURE



### PEARLS:

1. Risk factors of fallopian tube narrowing or constriction include: previous pelvic inflammatory disease (causing scarring), previous inflammatory processes (from infections), endometriosis, developmental abnormalities, and adhesions from previous abdominal or tubal surgeries, tubal sterilization, and use of low-dose progesterone oral contraceptives. Other causes include smoking and IUD use.
2. If the fetus dies at an early gestation, there is no harm to the fallopian tube. However, if the fetus continues to grow within the fallopian tube, it will rupture the wall of the fallopian tube, causing bleeding.
3. Slow blood loss will cause pain and lower abdominal pressure.
4. Rapid blood loss will cause a sudden drop in blood pressure, and may lead to severe hemorrhage, shock, and / or death.

# Protocol

## 6-7

**SECTION:** Obstetrical/Gynecological Emergencies

**PROTOCOL TITLE:** Abruptio Placenta

**OB/GYN - Placenta Abruptio**

**REVISED:** 06/2013

### OVERVIEW:

Abruptio placenta (placental abruption) refers to premature separation of the normally implanted placenta from the uterine wall after the 20<sup>th</sup> week of gestation and prior to birth. Patients with abruptio placenta typically present with bleeding, uterine contractions, and fetal distress. A significant cause of third-trimester bleeding associated with both fetal and maternal morbidity and mortality, abruptio placenta must be considered whenever bleeding is encountered in the second half of pregnancy. The frequency of placental abruption in the United States is approximately 1% of all pregnancies, and a severe abruption leading to fetal death occurs in 0.12% of pregnancies (1:830). This mortality rate approaches 100% when > 50% of the placenta is involved. Placental Abruption begins with arterial hemorrhaging into the decidua basalis. A hematoma is formed and progresses in size causing the expanding abruption. As the abruption continues, more vessels become involved, further contributing to the expanding retro-placental hematoma. Abruptio placenta is a surgical emergency and should be transported without delay with interventions completed during transport.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Due date</li> <li>• Time contractions started</li> <li>• Duration and time between contractions</li> <li>• Time, amount of any vaginal bleeding</li> <li>• Sensation of fetal activity</li> <li>• Past medical and delivery history</li> <li>• Medications</li> <li>• Trauma</li> </ul>	<ul style="list-style-type: none"> <li>• Abdominal pain</li> <li>• Uterine contractions</li> <li>• Vaginal bleeding</li> <li>• Uterine tenderness to palpation</li> <li>• Rigid, board-like abdomen on palpation</li> <li>• Back pain</li> <li>• Signs of shock</li> <li>• Lack of fetal heart tones</li> <li>• Fetal demise</li> </ul>	<ul style="list-style-type: none"> <li>• Abdominal trauma</li> <li>• Appendicitis</li> <li>• Ovarian cysts or torsion</li> <li>• Placenta previa</li> <li>• Pre-eclampsia</li> <li>• Preterm labor</li> <li>• Spontaneous abortion</li> <li>• Shock (Hemorrhagic, Hypovolemic)</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
4. Place patient in a position of comfort. The preferred position for pregnant patients is on their left side.	•	•	•	•	•
5. Establish an IV of Normal Saline.			•	•	•
6. If the patient is exhibiting symptoms of shock, refer to the <u>Shock protocol</u> .	•	•	•	•	•

ABRUPTIO PLACENTA

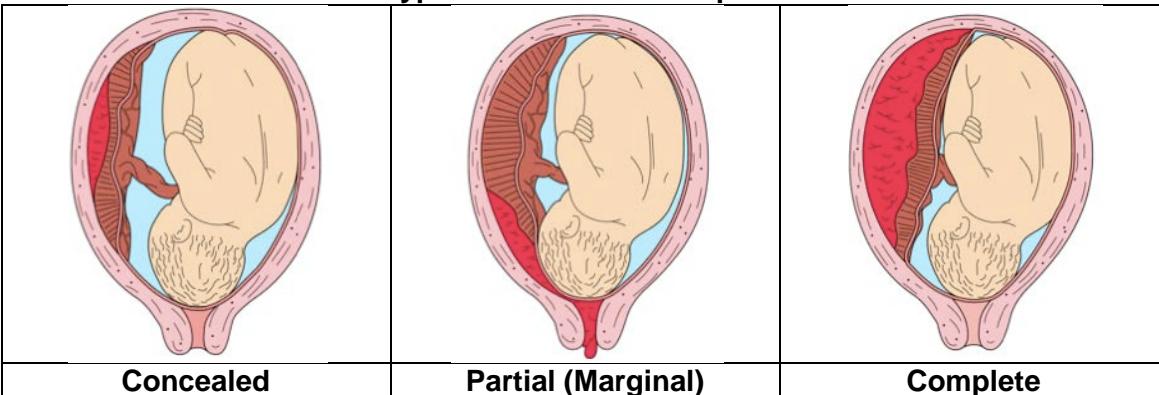
# Protocol 6-7

Continued

## ABRUPTIO PLACENTA

	A	B	EN	I	P
7. Transport promptly, in the preferred left lateral recumbent position (if tolerated) and reassess as indicated.		•	•	•	•

**Types of Placental Abruptio**



### PEARLS:

1. The uterus will often contract during an episode of abruption and the separation of the placenta can be partial (marginal) or complete.
2. 90% of all abruptions involve vaginal bleeding and are teamed with external hemorrhage; while the remaining 10% may have no vaginal bleeding noted and are called a "concealed" abruption. In these cases, the bleeding is contained by the part of the placenta attached to the uterine wall and may be diagnosed mistakenly as premature labor. Shock eventually ensues from the concealed blood loss.
3. Abruptio placenta associated with trauma is less common and is usually due to direct trauma to the abdomen. However, it is a complication in 1 - 5% of minor injuries that occur during pregnancy and up to 40 - 50% of major trauma injuries that occur during pregnancy.
4. Placental abruption is more common in African American women than in either white or Latin American women.
5. An increased risk of placental abruption has been demonstrated in patients younger than 20 years and those older than 35 years.

# Protocol 6-8

**SECTION:** Obstetrical/Gynecological Emergencies

**PROTOCOL TITLE:** Placenta Previa

**OB/GYN - Placenta Previa**

**REVISED:** 06/2013

## OVERVIEW:

Placenta previa is an obstetric complication that occurs in the second and third trimesters of pregnancy and accounts for 20% of vaginal bleeding during these last trimesters. Placenta previa occurs when the placenta is implanted low in the uterus and covers the cervical canal in varying amounts. The placenta may be marginally, partially, or completely covering the internal cervical opening. Risk factors for placenta previa include prior placenta previa, first pregnancy following a cesarean delivery, multi-parity, age > 30 years, multiple gestations, prior induced abortions, and smoking.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Due date</li> <li>• Time, amount of any vaginal bleeding</li> <li>• Sensation of fetal activity</li> <li>• Past medical and delivery history</li> <li>• Medications</li> <li>• Recent vaginal exam, sexual intercourse</li> </ul>	<ul style="list-style-type: none"> <li>• Painless but profuse bright red vaginal hemorrhage</li> <li>• Hypotension</li> <li>• Tachycardia</li> <li>• Soft and non-tender uterus</li> <li>• Lack of abdominal pain</li> <li>• Detectable fetal movement and heart sounds</li> </ul>	<ul style="list-style-type: none"> <li>• Abruptio placenta</li> <li>• Ectopic pregnancy</li> <li>• Preterm labor</li> <li>• Vasa-previa</li> <li>• Shock, (hemorrhagic or hypovolemic)</li> <li>• Spontaneous abortion</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
4. Place patient in a position of comfort.	•	•	•	•	•
5. Establish an IV of Normal Saline			•	•	•
6. If the patient is exhibiting symptoms of shock, refer to the <u>Shock protocol</u> .	•	•	•	•	•
7. Transport promptly and reassess as indicated.		•	•	•	•

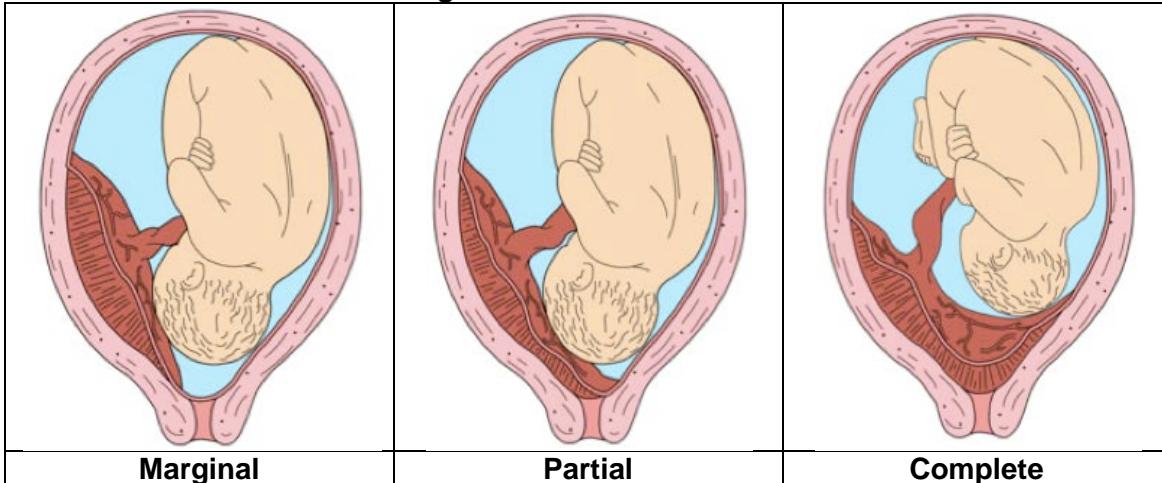
## PLACENTA PREVIA

# Protocol 6-8

Continued

## PLACENTA PREVIA

Degrees of Placenta Previa



**PEARLS:**

1. Providers must **NOT** perform a pelvic exam on a patient with placenta previa. Due to the placenta precariously placed over the cervical opening, minimal maneuvers to the cervix or uterus may induce heavy vaginal bleeding.
2. Avoid palpating the fundus, which may cause fetal movement and possible placental tearing.
3. Women older than 30 years are 3 times more likely to have placenta previa than women younger than 20 years.

# Protocol 6-9

**SECTION:** Obstetrical/Gynecological Emergencies

**PROTOCOL TITLE:** Cord Prolapse  
**OB/GYN - Prolapsed Unbilical Cord**

**REVISED:** 06/2013

## OVERVIEW:

Although most babies are born without difficulty, complications may occur. Umbilical Cord Prolapse (UCP) is a condition when the umbilical cord presents through the birth canal after the amniotic sac ruptures before delivery of the head. If the umbilical cord presents in front of the fetal presenting part and the membranes rupture, the risk that the cord will prolapse through the cervix into the vagina is significant. Occult prolapse occurs when the cord lies alongside the presenting part. The risk is increased with abnormal fetal presentations, especially when the presenting part does not fill the lower uterine segment, as is the case with incomplete breech presentations, premature infants, and multi-parous women. This presents a serious medical emergency, endangering the life of the unborn fetus. In this situation the umbilical cord may get compressed against the vaginal walls by the pressure of the infants head. As a result, the infant's supply of oxygenated blood can be cut off.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Due date</li> <li>• Time contractions started</li> <li>• Duration and time between contractions</li> <li>• Rupture of membranes</li> <li>• Time, amount of any vaginal bleeding</li> <li>• Sensation of fetal activity</li> <li>• Past medical and delivery history</li> <li>• Medications</li> </ul>	<ul style="list-style-type: none"> <li>• Spasmodic pain</li> <li>• Vaginal discharge, bleeding</li> <li>• Crowning, urge to push</li> <li>• Lower back, pelvis pain</li> <li>• Meconium</li> <li>• *Asymptomatic: sometimes <u>visual</u> inspection is the only sign of UCP</li> </ul>	<ul style="list-style-type: none"> <li>• Abnormal presentation <ul style="list-style-type: none"> <li>◦ Buttock</li> <li>◦ Foot</li> <li>◦ Hand</li> </ul> </li> <li>• Premature labor</li> <li>• PROM (premature rupture of membrane)</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation. <b>Do not delay immediate transport.</b> Early hospital notification is indicated.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•

# CORD PROLAPSE

# Protocol 6-9

Continued

## CORD PROLAPSE

	A	B	EN	I	P
4. If the umbilical cord presents externally or can be visualized in the vagina, use two fingers of a gloved hand to prevent any presenting part of the delivering fetus from occluding/compressing the cord. <b>Pressure relieving maneuvers must be maintained throughout transport.</b>		•	•	•	•
5. Check cord for pulsation.	•	•	•	•	•
6. Keep the cord warm and moist.	•	•	•	•	•
7. Establish an IV of Normal Saline.			•	•	•
8. Place patient in the knee-chest position.	•	•	•	•	•
9. Transport emergently to an appropriate facility with obstetrical services and reassess as indicated.		•	•	•	•

Relieving Cord Pressure

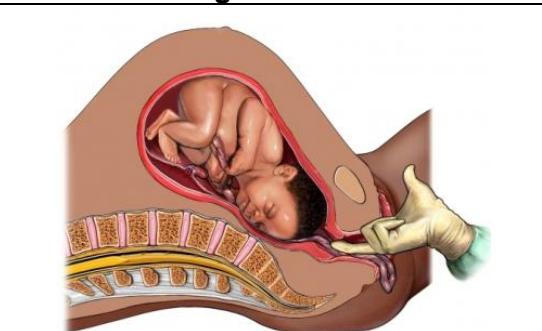


Photo Courtesy of empowher.com

Knee-Chest Position

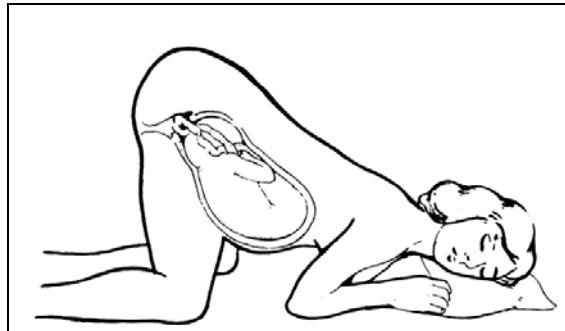
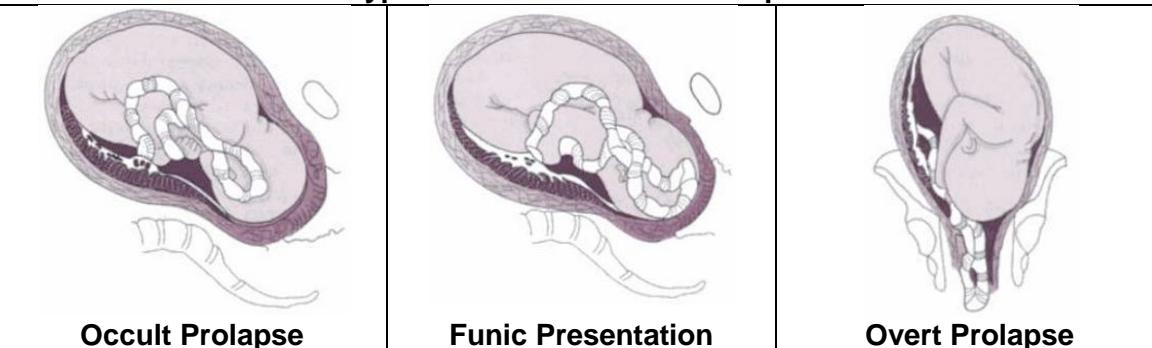


Photo Courtesy of writeaboutbirth.com

Types of Umbilical Cord Prolapse



### PEARLS:

- Once you have relieved pressure on the cord, you must keep the pressure off the cord.
- The knee-chest position uses gravity to shift the fetus out of the pelvis. The woman's thighs should be at right angles to the stretcher and her chest flat on the stretcher.

# Protocol 6-10

**SECTION:** Obstetrical/Gynecological Emergencies

**PROTOCOL TITLE:** Hypertension/Eclampsia/HELLPS  
**OB/GYN - Eclampsia**

**REVISED:** 06/2013

## OVERVIEW:

Pre-eclampsia is characterized by elevated BP, proteinuria, and edema after the 20<sup>th</sup> week of pregnancy in a patient who previously has been normal in these respects. The risk of pre-eclampsia / eclampsia is thought to continue through six (6) weeks post-partum. Unless the pre-eclamptic process is halted, seizure activity (eclampsia) may occur. Once the first eclamptic seizure occurs, the infant / fetal mortality rate soars. Once the seizure process is established, the ultimate patient outcome can be coma and death. The actual cause of the disease process is unknown. HELLP Syndrome (HELLPS) is a variant of severe PIH in which hematologic abnormalities exist with severe pre-eclampsia or eclampsia. HELLP is an acronym for **H**emolysis, **E**levated Liver enzymes, and **L**ow Platelets, which are the hallmark signs of this syndrome.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Due date</li> <li>• Time contractions started</li> <li>• Duration and time between contractions</li> <li>• Time, amount of any vaginal bleeding</li> <li>• Sensation of fetal activity</li> <li>• Past medical and delivery history</li> <li>• Medications</li> <li>• Trauma</li> <li>• Recent infection</li> <li>• Drug use and / or smoking</li> </ul>	<ul style="list-style-type: none"> <li>• Seizures</li> <li>• Hypertension</li> <li>• Proteinuria</li> <li>• Edema</li> <li>• Headache</li> <li>• Visual disturbances or changes</li> <li>• Abdominal pain</li> <li>• Epigastric pain</li> <li>• Hyper-reflexia</li> <li>• Anxiety</li> <li>• Shock</li> <li>• Coma</li> </ul>	<ul style="list-style-type: none"> <li>• Pre-eclampsia</li> <li>• Eclampsia</li> <li>• Idiopathic thrombocytopenia</li> <li>• Pre-existing seizure disorder</li> <li>• Withdrawal: <ul style="list-style-type: none"> <li>◦ Drug</li> <li>◦ Alcohol</li> </ul> </li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation. Suction the oropharynx if needed.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
4. Obtain blood glucose sample. If < 60 mg / dL or > 300 mg / dL refer to <u>Hypoglycemia</u> or <u>Hyperglycemia protocol</u> .	•	•	•	•	•
5. Establish an IV of Normal Saline. If signs of shock are present, refer to <u>Shock protocol</u> .			•	•	•

# HYPERTENSION/ECLAMPSIA

# Protocol 6-10

Continued

## HYPERTENSION/ECLAMPSIA

	A	B	EN	I	P
6. If eclampsia is noted (characterized by seizures, hypertension, and / or coma), administer bolus of <u>MAGNESIUM SULFATE</u> 4 Gm IV over 5 - 10 minutes.				•	•
7. If seizure persists, administer <u>MIDAZOLAM</u> 0.1 mg / kg IV / IM (max single dose 5 mg). If midazolam is unavailable, give <u>DIAZEPAM</u> 0.25 mg / kg up to 5 mg slow IV.				•	•
8. Transport promptly to an appropriate facility with obstetrical services and reassess as indicated.	•	•	•	•	•

### PEARLS:

1. Magnesium may be given IM if IV cannot be established. For IM administration, divide dose into 1.0 gm injections and inject into separate locations.
2. Respirations during an active seizure should be considered ineffective and airway maintenance should occur per assessment.
3. Be prepared to assist ventilations as dosage of midazolam or Valium is increased.
4. The predominant during pregnancy risk factors for development of preeclampsia include: age extremes (< 20 years or > 35 years), primigravida, glomerulonephritis, multiple gestation, hydramnios, large fetus, hydatidiform mole, and fetal hydrops.
5. HELLPs patients may also present with epigastric or upper quadrant abdominal pain resulting from liver distention and many patients will not meet the standard hypertension criteria for severe preeclampsia. Approximately 15% will have a diastolic BP ≤ 90 mmHg.
6. One explanation of HELLPs is that platelet disposition at the sites of endothelial damage caused by intense vasospasm may account for the depleted platelet levels.
7. Definitive treatment can only be accomplished through delivery of the fetus(es).
8. Eclampsia can occur after birth for up to six weeks until hormone levels return to pre-pregnancy levels.

# Protocol 6-11

**SECTION:** Obstetrical/Gynecological Emergencies

**PROTOCOL TITLE:** Premature Rupture of Membranes (PROM)  
**OB/GYN - Premature Rupture of Membranes**

**REVISED:** 06/2013

## OVERVIEW:

Premature Rupture of Membranes (PROM) is the leakage of amniotic fluid at least one (1) hour before the onset of labor. This can occur at any gestational age, and occurs in approximately 10% of all pregnancies. The exact cause of PROM is not known and can lead to premature labor, umbilical cord prolapse, and intrauterine infection. The patient usually reports a gush of fluid from the vagina. There may also be a continual leak of fluid, suggestive of a small tear in the amniotic sac.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Due date</li> <li>• Time contractions started</li> <li>• Duration and time between contractions</li> <li>• Time, amount of any vaginal bleeding</li> <li>• Sensation of fetal activity</li> <li>• Past medical and delivery history</li> <li>• Medications</li> <li>• Trauma</li> <li>• Drug use and/ or smoking</li> </ul>	<ul style="list-style-type: none"> <li>• Abdominal pain</li> <li>• Uterine contractions</li> <li>• Vaginal bleeding</li> <li>• Uterine tenderness to palpation</li> <li>• Fetal demise</li> </ul>	<ul style="list-style-type: none"> <li>• Abdominal trauma</li> <li>• Preeclampsia</li> <li>• Pregnant</li> <li>• Delivery</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
4. Place patient in the left lateral recumbent position.	•	•	•	•	•
5. Observe for signs of preterm labor, refer to <u>Pre-term Labor protocol</u> .	•	•	•	•	•
6. Establish an IV of Normal Saline if clinically indicated.			•	•	•
7. Transport promptly and reassess as indicated.		•	•	•	•

PREMATURE ROM

# Protocol 6-11

Continued

**PREMATURE ROM**

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# Protocol 6-12

**SECTION:** Obstetrical/Gynecological Emergencies

**PROTOCOL TITLE:** Pre-Term Labor

**OB/GYN - Pre-term Labor**

**REVISED:** 06/2013

## OVERVIEW:

Pre-term labor is defined as regular and rhythmic contractions of the uterus that produce cervical changes after the 20<sup>th</sup> week of gestation but prior to the 36<sup>th</sup> week of gestation. Of all pregnant patients, some patients will experience contractions without being in preterm labor, known as Braxton-Hicks contractions. Regular uterine contractions with rupture of the membranes are the hallmark sign for pre-term labor diagnosis.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Due date</li> <li>• Time contractions started</li> <li>• Duration and time between contractions</li> <li>• Time, amount of any vaginal bleeding- Sensation of fetal activity</li> <li>• Past medical and delivery history</li> <li>• Medications</li> <li>• Trauma</li> <li>• Recent infection</li> <li>• Drug use and / or smoking</li> </ul>	<ul style="list-style-type: none"> <li>• Rhythmic uterine contractions</li> <li>• History of cervical dilation</li> <li>• Rupture of membranes</li> <li>• Passage of blood-stained mucous (mucous plug)</li> </ul>	<ul style="list-style-type: none"> <li>• Abruptio placenta</li> <li>• Ectopic pregnancy</li> <li>• Placenta previa</li> <li>• Spontaneous abortion</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
4. Place patient in left lateral recumbent position.	•	•	•	•	•
5. Determine if patient is in labor and monitor frequency, intensity, and durations of contractions.	•	•	•	•	•
6. Prepare for delivery.	•	•	•	•	•
7. Establish an IV of Normal Saline if clinically indicated.			•	•	•
8. If the patient is exhibiting symptoms of shock, refer to the <u>Shock protocol</u> .	•	•	•	•	•
9. Transport promptly and reassess as indicated.		•	•	•	•

## PRE-TERM LABOR

# Protocol 6-12

Continued

## PRE-TERM LABOR

Known Causes of Pre-Term Labor		
Decreased Blood Flow to the Uterus (Uterine Irritability)	Increased Hormonal Levels	Cervical Incompetence
<ul style="list-style-type: none"><li>• Dehydration secondary to viral illness with nausea, vomiting, and diarrhea</li><li>• PIH with arterial vasospasm</li><li>• Diabetes</li><li>• Cardiovascular or renal disease</li><li>• Over-distension of the uterus with multiple gestation or tumors</li><li>• Heavy smoking</li><li>• Abruptio placenta or placenta previa</li></ul>	<ul style="list-style-type: none"><li>• Prostaglandin production with PROM, bacterial infection, abdominal trauma, or over-distension of the uterus</li><li>• Oxytocin levels found in meconium stained fluid</li></ul>	<ul style="list-style-type: none"><li>• Traumatic</li><li>• Congenital anomalies</li></ul>

### PEARLS:

1. Early signs and symptoms of pre-term labor may be as unspecific as abdominal, intestinal, or menstrual-like cramps; pelvic pressure; diarrhea; low back pain; and increased vaginal discharge.
2. In general, resuscitation of infants with gestations less than 20 weeks is futile. However, due to varying birth weights, growth progression, and developmental changes differing in every baby and pregnancy, a specific week of gestation cannot be identified as a point of viability.

# Protocol 6-13

**SECTION:** Obstetrical/Gynecological Emergencies

**PROTOCOL TITLE:** Post-Partum Hemorrhage  
**OB/GYN - Post-partum Hemorrhage**

**REVISED:** 06/2013

## OVERVIEW:

Post-partum hemorrhage is defined as the loss of more than 500 mL of blood loss following vaginal delivery or more than 1,000 mL following a Cesarean delivery. However, many women tolerate losses of up to 1,000 mL of blood. It can cause debilitation and diminished immunity, which can subsequently lead to post-partum infection, another leading cause of maternal death. Post-partum hemorrhage can occur up to 6 weeks after delivery. It is imperative that hemorrhage is diagnosed early, and treated aggressively.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Time, amount of any vaginal bleeding</li> <li>• Twins, triplets, etc.</li> <li>• Past medical and delivery history</li> <li>• Medications</li> <li>• Trauma</li> <li>• Recent infection</li> <li>• Drug use and / or smoking</li> </ul>	<ul style="list-style-type: none"> <li>• Abdominal pain</li> <li>• Uterine contractions</li> <li>• Vaginal bleeding</li> <li>• Uterine tenderness to palpation</li> <li>• Rigid, board-like abdomen on palpation</li> <li>• Shock</li> </ul>	<ul style="list-style-type: none"> <li>• Abdominal trauma</li> <li>• Twins, triplets, etc.</li> <li>• Disseminated intravascular coagulation (DIC)</li> <li>• Ovarian cysts or torsion</li> <li>• Placenta previa</li> <li>• Preeclampsia</li> <li>• Shock (Hemorrhagic, Hypovolemic)</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
4. If atonic uterus is noted, firmly massage fundus.	•	•	•	•	•
5. Place patient on cardiac monitor.				•	•
6. Establish an IV of Normal Saline. Establish a second IV if clinically indicated. Do not delay transport to start a second IV.			•	•	•
7. If the patient is exhibiting symptoms of shock, refer to the <u>Shock protocol</u> .	•	•	•	•	•
8. Transport promptly and reassess as indicated.		•	•	•	•

# POST-PARTUM HEMMORRHAGE

# Protocol 6-13

Continued

## POST-PARTUM HEMORRHAGE

### PEARLS:

1. Many times, the *estimated* blood loss is only about half of the *actual* blood loss.
2. Uterine atony, birth canal lacerations, and retention of placental fragments are the three leading causes of post-partum hemorrhage. Other causes include uterine inversion, and retained placenta. These all usually occur during the immediate post-partum period.
3. Post-partum hemorrhage can occur up to 6 weeks after delivery. The causes of delayed or late post-partum hemorrhage include sub-involution of the placental site, retained placental tissue, and infection.
4. Uterine atony is usually caused by over-distention of the uterus from multiple pregnancies, polyhydramnios, or an abnormally large fetus. The large blood vessels in the uterus become open and gaping when the placenta separates from the uterine wall. If the uterus fails to contract, as with uterine atony, large blood loss can occur from those blood vessels.
5. Small, retained fragments of the placenta may interfere with proper uterine contraction, leading to hemorrhage. The placenta should be inspected at delivery to ensure that no pieces are missing. This is rarely a cause of immediate post-partum hemorrhage, but can be the cause of sudden profuse bleeding one week or more post-partum.
6. Sub-involution of the placental site in the uterus, or failure for it to return to normal size, can cause late post-partum hemorrhage. It takes about 42 days for these cells to epithelialize. During this healing time, clots can slough off and cause bleeding.

# Section

7

**SECTION:** Toxicological Emergencies

**REVISED:** 06/2013

1.	<b>Opiate Overdose</b> <i>Medical - Opiate Overdose</i>	Protocol 7 - 1
2.	<b>Stimulant Overdose</b> <i>Medical - Stimulant Overdose</i>	Protocol 7 - 2
3.	<b>Tricyclic Anti-depressant Overdose</b> <i>Medical - Tricyclic Anti-depressant Overdose</i>	Protocol 7 - 3
4.	<b>Organophosphate Exposure</b> <i>Medical - Organophosphate Exposure</i>	Protocol 7 - 4
5.	<b>Calcium Channel Blocker Overdose</b> <i>Medical - Calcium Channel Blocker Overdose</i>	Protocol 7 - 5
6.	<b>Beta Blocker Overdose</b> <i>Medical - Beta Blocker Overdose</i>	Protocol 7 - 6

TOXICOLOGICAL EMERGENCIES

## Section

7

Continued

# TOXICOLOGICAL EMERGENCIES

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SECTION: Toxicological Emergencies

PROTOCOL TITLE: Opiate Overdose

**Medical - Opiate Overdose**

REVISED: 06/2013

**OVERVIEW:**

The goal in treating an opiate overdose patient is generally not to wake the patient, but to maintain breathing and the airway. While difficult, this is especially important as opiates are often mixed with stimulants and other drugs at the street level, and the opiate may be masking or suppressing other toxic effects. Unfortunately, the history of poisoning / overdose is notoriously unreliable whether it is obtained from the patient, friends and family members or emergency services personnel, and especially **what else** was taken. Poison Control may be contacted at any time for information on poisoning (1-800-222-1222) but **only Medical Control may give patient care direction**. Despite the possible inaccuracies, the most important historical factors include **what** poison was involved, **how much** was taken, **how** it was taken, **when** it was taken, **why** it was taken **treatment orders**.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Use or suspected use of a potentially toxic substance</li> <li>• Substance ingested, route, and quantity used</li> <li>• Time of use</li> <li>• Reason (suicidal, accidental, criminal)</li> <li>• Available medications in home</li> <li>• Past medical history</li> </ul>	<ul style="list-style-type: none"> <li>• Mental status changes</li> <li>• Hypotension / hypertension</li> <li>• Hypothermia / hyperthermia</li> <li>• Decreased respiratory rate</li> <li>• Tachycardia, other dysrhythmias</li> <li>• Seizures</li> </ul>	<ul style="list-style-type: none"> <li>• Tricyclic anti-depressants (TCAs)</li> <li>• Acetaminophen (Tylenol)</li> <li>• Depressants</li> <li>• Stimulants</li> <li>• Anticholinergic</li> <li>• Cardiac medications</li> <li>• Solvents, alcohols, Cleaning agents</li> <li>• Insecticides</li> </ul>

	A	B	EN	I	P
1. Obtain general patient assessment.	•	•	•	•	•
2. Administer Oxygen to maintain $\text{SPO}_2$ 94 - 99%	•	•	•	•	•
3. Suction oropharynx as necessary.	•	•	•	•	•
4. Obtain blood glucose sample. If glucose is < 60 mg / dL or > 300 mg / dL, refer to the <u><a href="#">Hypoglycemia</a></u> or <u><a href="#">Hyperglycemia</a></u> Protocol.	•	•	•	•	•
5. If necessary, refer to <u><a href="#">Patient Restraint protocol</a></u> .	•	•	•	•	•
6. Place patient on cardiac monitor.				•	•
7. Establish IV of Normal Saline. Titrate rate to maintain systolic BP > 90 mmHg.			•	•	•

# Protocol

## 7-1

Continued

# OPiate Overdose

	A	B	EN	I	P
8. If respiratory effort remains diminished and opiate administration is suspected, give <u>NARCAN</u> 0.2 mg / kg INTRANASAL max 2mg –OR- administer <u>NALOXONE</u> , 0.4 - 2.0 mg slow IVP/IM to maintain an adequate respiratory effort. Dose may be repeated as necessary.			•	•	•
9. Transport promptly in position of comfort. Reassess VS as indicated.	•	•	•	•	•

### Opiate Toxicodrome

<ul style="list-style-type: none"><li>• Altered Mental Status</li><li>• Miosis</li><li>• Unresponsiveness</li><li>• Shallow Respirations</li></ul>	<ul style="list-style-type: none"><li>• Slow Respiratory Rate</li><li>• Decreased Bowel Sounds</li><li>• Hypothermia</li><li>• Hypotension</li></ul>
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### PEARLS:

1. If patient is a suspected opiate addict, the administration of Naloxone should be titrated to increase respirations to normal levels without fully awakening patient to prevent hostile and confrontational episodes and withdrawal symptoms.
2. Any patient receiving Naloxone should be transported for continued monitoring. Many opiates have a longer bioavailability than Naloxone, therefore re-sedation may occur.
3. Do not rely on patient history of ingestion, especially in suicide attempts.

# Protocol

## 7-2

**SECTION:** Toxicological Emergencies

**PROTOCOL TITLE:** Stimulant Overdose  
**Medical - Stimulant Overdose**

**REVISED:** 06/2013

### OVERVIEW:

Hyperdynamic “stimulant” drugs, also known as sympathomimetics, include cocaine, methamphetamine, amphetamine, and MDMA (ecstasy). Patient care should be focused on preventing / mitigating hyperthermia, agitated delirium, positional asphyxia, hypoxia, and physical self-harm. With a stimulant overdose (tachycardia, agitation, hyperthermia, and / or hypertension), treatment with benzodiazepines is indicated in addition to rhythm specific therapy or anti- hypertensive meds (with the exception of beta-blockers). Unfortunately, the history of poisoning / overdose is notoriously unreliable whether it is obtained from the patient, friends and family members or emergency services personnel. Despite the possible inaccuracies, the most important historical factors include **what** poison was involved, **how much** was taken, **how** it was taken, **when** it was taken, **why** it was taken, and especially **what else** was taken. Poison Control may be contacted at any time for information on poisoning (1-800-222-1222) but **only Medical Control** may give patient treatment orders.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Use or suspected use of a potentially toxic substance</li> <li>• Substance ingested, route, and quantity used</li> <li>• Time of use</li> <li>• Reason (suicidal, accidental, criminal)</li> <li>• Available medications in home</li> <li>• Past medical history</li> </ul>	<ul style="list-style-type: none"> <li>• Mental status changes</li> <li>• Hypertension</li> <li>• Hyperthermia</li> <li>• Tachypnea</li> <li>• Tachycardia, other dysrhythmias</li> <li>• Seizures</li> </ul>	<ul style="list-style-type: none"> <li>• Anticholinergic</li> <li>• Solvents</li> <li>• Cleaning agents</li> <li>• Insecticides</li> </ul>

	A	B	EN	I	P
1. Obtain general assessment of the patient.	•	•	•	•	•
2. Administer Oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
3. Suction oropharynx as necessary.	•	•	•	•	•
4. Obtain blood glucose sample. If glucose is < 60 mg / dL or > 300 mg / dL, refer to <u>Hypoglycemia</u> or <u>Hyperglycemia</u> protocol.	•	•	•	•	•
5. Establish IV of Normal Saline. Titrate to maintain a systolic BP > 90 mmHg.				•	•
6. Place the patient on a cardiac monitor and obtain / interpret <u>12 lead ECG</u> .				•	•

# STIMULANT OVERDOSE

# Protocol 7-2

Continued

## STIMULANT OVERDOSE

	A	B	EN	I	P
7. For chest pain due to suspected <u>cocaine</u> use, WITHOUT ST elevation, administer <u>MIDAZOLAM</u> 5 mg IV. If Midazolam is not available, administer <u>DIAZEPAM</u> 2.5 - 5 mg IV. Refer to <u>Cardiac Care: Non-traumatic Chest Discomfort protocol</u> as needed.				•	•
8. If patient is seizing, refer to the <u>Medical Care Seizure protocol</u> .	•	•	•	•	•
9. Transport promptly in position of comfort. Reassess vital signs as indicated.		•	•	•	•

Toxicdrome		
<ul style="list-style-type: none"><li>Restlessness</li><li>Excessive speech and motor activity</li><li>Tremors</li></ul>	<ul style="list-style-type: none"><li>Insomnia</li><li>Tachycardia</li><li>Hypertension</li></ul>	<ul style="list-style-type: none"><li>Hyperthermia</li><li>Hallucinations</li><li>Seizures</li></ul>

### PEARLS:

- Do not rely on patient history of ingestion, especially in suicide attempts.
- Bring bottles and contents to ER with patient.
- Ecstasy (MDMA), and the more toxic drug para-Methoxyamphetamine (PMA), have both amphetamine and hallucinatory like effects. The stimulant effects of MDMA / PMA, which enable users to perform physical exertion (like dancing) for extended periods, may also lead to dehydration, tachycardia, and hypertension. MAOI's may potentiate toxic effects. While any of the hyperdynamics can be dangerous, MDMA and PMA especially have been known to cause a marked increase in body temperature (malignant hyperthermia) leading to rapid onset of muscle breakdown, DIC, seizures, renal failure, and cardiovascular system failure.

# Protocol

## 7-3

**SECTION:** Toxicological Emergencies

**PROTOCOL TITLE:** Tricyclic Antidepressant (TCA) Overdose  
**Medical - Tricyclic Anti-depressant Overdose**

**REVISED:** 06/2013

### OVERVIEW:

Aggressive care at onset of signs and symptoms of a TCA overdose is essential, as the patient can decompensate quickly. Early signs and symptoms include: widening of the QRS, tachycardia, hypotension and altered LOC. Unfortunately, the history of poisoning / overdose is notoriously unreliable whether it is obtained from the patient, friends and family members or emergency services personnel. Despite the possible inaccuracies, the most important historical factors include **what** poison was involved, **how much** was taken, **how** it was taken, **when** it was taken, **why** it was taken, and especially **what else** was taken. Poison Control may be contacted at any time for information on poisoning (1-800-222-1222) but **only Medical Control may give patient treatment orders.**

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Use or suspected use of a potentially toxic substance</li> <li>• Substance ingested, route, and quantity used</li> <li>• Time of use</li> <li>• Reason (suicidal, accidental, criminal)</li> <li>• Available medications in home</li> <li>• Past medical history</li> </ul>	<ul style="list-style-type: none"> <li>• Mental status changes</li> <li>• Hypotension / hypertension</li> <li>• Hypothermia / hyperthermia</li> <li>• Decreased respiratory rate</li> <li>• Tachycardia, other dysrhythmias</li> <li>• Seizures</li> </ul>	<p><i>Co-ingestions such as:</i></p> <ul style="list-style-type: none"> <li>• Acetaminophen (Tylenol)</li> <li>• Depressants</li> <li>• Stimulants</li> <li>• Anticholinergic</li> <li>• Cardiac medications</li> <li>• Solvents, alcohols, Cleaning agents</li> <li>• Insecticides</li> </ul>

	A	B	EN	I	P
1. Obtain general assessment of the patient.	•	•	•	•	•
2. Administer Oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
3. Suction oropharynx as necessary.	•	•	•	•	•
4. Obtain blood glucose sample. If glucose is < 60 mg / dL or > 300 mg / dL, refer to <u>Hypoglycemia</u> or <u>Hyperglycemia</u> protocol.	•	•	•	•	•
5. Establish IV of Normal Saline. Titrate to maintain a systolic BP > 90 mmHg.			•	•	•
6. Place the patient on a cardiac monitor and obtain / interpret <u>12 lead ECG</u> .				•	•
7. If TCA overdose is suspected and any progressive widening of QRS, >.12 ms, seizure activity, hypotension, tachycardia or heart block is noted, administer <u>SODIUM BICARBONATE</u> 50 mEq IVP.				•	•
8. Transport promptly in position of comfort. Reassess vital signs as indicated.	•	•	•	•	•

# TRICYCLIC ANTIDEPRESSANT

# Protocol

## 7-3

Continued

# TRICYCLIC ANTIDEPRESSANT

### PEARLS:

1. Amiodarone is contraindicated, as are other drugs that widen the QRS.
2. Common TCA's include but are not limited to: Elavil, Triavil, Etrafon, and Amitriptyline.
3. Flexeril (cyclobenzaprine) can mimic TCA overdose.
4. Do not rely on patient history of ingestion, especially in suicide attempts.
5. Bring bottles and contents to ER with patient.

# Protocol

## 7-4

**SECTION:** Toxicological Emergencies

**PROTOCOL TITLE:** Organophosphate Exposure  
**Medical - Organophosphate Exposure**

**REVISED:** 06/2013

### OVERVIEW:

Organophosphates irreversibly bind to cholinesterase, causing the phosphorylation and deactivation of acetylcholinesterase. The accumulation of acetylcholine at the neural synapse causes an initial overstimulation, followed by exhaustion and disruption of postsynaptic neural transmission in the central nervous system (CNS) and peripheral nervous systems (PNS). If the organophosphate / cholinesterase bond is not broken by pharmacologic intervention within 24 hours, large amounts of cholinesterase are destroyed, causing long-term morbidity or death. Carbamate poisoning exhibits a similar clinical picture to organophosphate toxicity. However, unlike organophosphates, carbamate compounds temporarily bind cholinesterase for approximately 6 hours with no permanent damage. Carbamates have poor CNS penetration and cause minimal CNS symptoms. The most important historical factors to obtain include: **what** poison was involved, **how long** the exposure lasted and **how** and **when** they were exposed. Poison Control may be contacted at any time for information on poisoning (1-800-222-1222) but **only Medical Control may give patient treatment orders.**

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"><li>Exposure or suspected exposure of a potentially toxic substance</li><li>Substance exposure, route, and quantity</li><li>Time of exposure</li><li>Reason (suicidal, accidental, criminal)</li><li>Available medications in home</li><li>Past medical history</li></ul>	<ul style="list-style-type: none"><li>S.L.U.D.G.E.</li><li>D.U.M.B.E.L.S.</li><li>Bradycardia</li><li>Hypotension</li><li>Severe respiratory distress</li><li>Blurred vision</li><li>Paralysis</li></ul>	<ul style="list-style-type: none"><li>Agricultural pesticides</li><li>Home gardening products</li><li>Industrial manufacturing products</li></ul>

	A	B	EN	I	P
1. Scene Safety and consider HAZ MAT activation.	•	•	•	•	•
2. Ensure patient has been thoroughly decontaminated.	•	•	•	•	•
3. Obtain general assessment of the patient.	•	•	•	•	•
4. Administer Oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
5. Suction oropharynx as necessary.	•	•	•	•	•
6. Establish IV of Normal Saline. Titrate to maintain a systolic BP > 90 mmHg.			•	•	•
7. Place the patient on a cardiac monitor and obtain / interpret <u>12 lead ECG</u> .				•	•

**ORGANOPHOSPHATE**

# Protocol

## 7-4

Continued

# ORGANOPHOSPHATE

	A	B	EN	I	P
8. If the patient has respiratory distress due to secretions, administer <u>ATROPINE SULFATE</u> 1 - 2 mg IVP every 5 minutes until signs of pulmonary secretions decrease improve or medication supply is exhausted. There is no maximum dose in this situation.				•	•
9. If available, administer 2PAM 1 - 2 Gram IV <i>one dose</i> – OR - 0.6 Gram IM x 3 doses in rapid succession.				•	•
10. If patient is seizing, refer to the <u>Medical Care Seizure protocol</u> .	•	•	•	•	•
11. For bronchospasm, administer <u>ALBUTEROL</u> and <u>ATROVENT</u> per <u>Medical Care: Respiratory Distress protocol</u> .			•	•	•
12. Transport promptly in position of comfort. Reassess vital signs as indicated.		•	•	•	•

### Nerve Agent / Organophosphate / Carbamate Exposure Mnemonics

<b>S.L.U.D.G.E.</b>  Salivation (excessive production of saliva) Lacrimation (excessive tearing) Urination (uncontrolled urine production) Defecation (uncontrolled bowel movement) Gastrointestinal distress (cramping) Emesis (excessive vomiting)	<b>D.U.M.B.E.L.S. (Muscarinic)</b>  Diarrhea Urination Miosis Bradycardia / Bronchospasm / Bronchorrhea Emesis Lacrimation Salivation / Secretion / Sweating
<b>B.A.M.</b>  Breathing difficulty (wheezing) Arrhythmias (bradycardia, ventricular arrhythmias, AV blocks) Miosis (pinpoint pupils)	<b>Days of the week (Nicotinic)</b>  Mydriasis Tachycardia Weakness Hypertension / Hyperglycemia Fasciculation's
<b>Three C's of CNS effect</b>  Confusion Convulsions Coma	

# Protocol

## 7-4

Continued

**\*\*\*Decontamination MUST be completed prior to transport\*\*\***

**PEARLS:**

1. Decontamination should be initiated and completed by qualified personnel.
2. Decontamination takes precedence over ALS interventions.
3. Consider calling for additional drug kits for additional atropine.
4. Separate patient from causative agent. Most exposures are to liquid solutions.
5. Clothes should be removed on scene, bagged and sealed by personnel wearing appropriate PPE, and left for appropriate disposal. DO NOT transport clothes in ambulance or to hospital where they may spread contamination.
6. DO NOT use personal antidote kit, if issued to provide patient care.

**ORGANOPHOSPHATE**

# Protocol

## 7-4

Continued

# ORGANOPHOSPHATE

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# Protocol

## 7-5

**SECTION:** Toxicological Emergencies

**PROTOCOL TITLE:** Calcium Channel Blocker Overdose  
**Medical - Calcium Channel Blocker Overdose**

**REVISED:** 06/2013

### OVERVIEW:

Overdose by immediate-release agents is characterized by rapid progression to hypotension, brady-arrhythmias, and cardiac arrest. Overdose by extended-release formulations can result in delayed onset of arrhythmias, shock, delayed cardiac collapse, and bowel ischemia. Unfortunately, the history of poisoning / overdose is notoriously unreliable whether it is obtained from the patient, friends and family members or emergency services personnel. Despite the possible inaccuracies, the most important historical factors include **what** poison was involved, **how much** was taken, **how** it was taken, **when** it was taken, **why** it was taken, and especially **what else** was taken.

Poison Control may be contacted at any time for information on poisoning (1-800-222-1222) but **only Medical Control may give patient treatment orders.**

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Use or suspected use of a potentially toxic substance</li> <li>• Substance ingested, route, and quantity used</li> <li>• Time of use</li> <li>• Reason (suicidal, accidental, criminal)</li> <li>• Available medications in home</li> <li>• Past medical history</li> </ul>	<ul style="list-style-type: none"> <li>• Mental status changes</li> <li>• Hypotension</li> <li>• Bradycardia, other dysrhythmias</li> </ul>	<ul style="list-style-type: none"> <li>• Co-ingestions</li> <li>• Cardiac medications</li> <li>• Anti-hypertensive medications</li> </ul>

	A	B	EN	I	P
1. Obtain general assessment of the patient.	•	•	•	•	•
2. Administer Oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
3. Suction oropharynx as necessary.	•	•	•	•	•
4. Obtain blood glucose sample. If glucose is < 60 mg / dL or > 300 mg / dL, refer to <u>Hypoglycemia</u> or <u>Hyperglycemia</u> protocol.	•	•	•	•	•
5. Establish IV of Normal Saline. Titrate to maintain a systolic BP > 90 mmHg.			•	•	•
6. Administer Normal Saline 250 ml Bolus as needed to maintain systolic BP > 90 mmHg. Bolus amount should not exceed 20 cc / kg. Caution should be used with patients with history of renal failure and HF. Re-assess after 250 ml for signs of fluid overload.			•	•	•

CALCIUM CHANNEL BLOCKER

# Protocol

## 7-5

Continued

# CALCIUM CHANNEL BLOCKER

	A	B	EN	I	P
7. Place the patient on a cardiac monitor and obtain / interpret <u>12 lead ECG</u> . Refer to appropriate <u>Cardiac Care protocol</u> .				•	•
8. Administer <u>CALCIUM CHLORIDE</u> 2.0 – 4.0 mg / kg IVP / IO every 10 minutes until signs and symptoms improve.				•	•
9. If no response noted to Calcium Chloride, administer <u>GLUCAGON</u> 1 mg IVP / IO. If no response in five (5) minutes, administer one (1) repeat dose of Glucagon 1 mg IVP / IO.				•	•
10. Administer <u>DOPAMINE</u> Infusion 5 - 20 mcg / kg / minute for hypotension that remains after fluid bolus administration.				•	•
11. Transport promptly in position of comfort. Reassess vital signs as indicated.	•	•	•	•	•

### Common Calcium Channel Blocker Medications

<ul style="list-style-type: none"> <li>Amlodipine (Norvasc)</li> <li>Bepridil (Vascor)</li> <li>Diltiazem (Cardizem)</li> <li>Felodipine (Plendil)</li> </ul>	<ul style="list-style-type: none"> <li>Isradipine (Dynacirc)</li> <li>Nicardipine (Cardene)</li> <li>Nifedipine (Adalat, Procardia)</li> </ul>	<ul style="list-style-type: none"> <li>Nimodipine (Nimotop)</li> <li>Nisoldipine (Sular)</li> <li>Verapamil (Calan, Isoptin)</li> </ul>
---	--	---

### Dopamine IV Infusion

Add 400 mg of Dopamine to 250 ml of NS (1600 mcg / ml) and attach 60 gtt/s IV tubing.

Mcg / min	Weight in kilograms						
	50 Kg 110 Lb	60 Kg 132 Lb	70 Kg 154 Lb	80 Kg 176 Lb	90 Kg 198 Lb	100 Kg 220 Lb	125 Kg 275 Lb
5.0 mcg	9	11	13	15	17	19	23
10.0 mcg	19	23	26	30	34	38	47
15.0 mcg	28	34	39	45	51	56	70
20.0 mcg	38	45	53	60	68	75	94

### PEARLS:

- Aggressive cardiovascular support is necessary for management of massive calcium channel blocker overdose. While calcium may overcome some adverse effects of calcium channel blockers, it rarely restores normal cardiovascular status.
- Consider using calcium only if a witness confirms a CCB overdose; calcium may induce fatal arrhythmias in digoxin overdose, which can present with similar findings.
- Empiric use of glucagon (adults: 5 - 15 mg IV) may be warranted for patients with an unknown overdose presenting with bradycardia or hypotension.

# Protocol 7-5

Continued

4. Atropine may be tried if hemodynamically significant bradycardia occurs; however, heart block is usually resistant to atropine in CCB toxicity. Mid-dose dopamine (5 - 10 mcg / kg / min) may improve heart rate and contractility.<sup>1</sup>
5. According to many case reports, glucagon has been used with good results. However, vasopressors are frequently necessary for adequate resuscitation and should be administered early if hypotension occurs.
6. Be prepared to manage the airway after Glucagon administration due to possible emesis.
7. Do not rely on patient history of ingestion, especially in suicide attempts.
8. Bring bottles and contents to ER with patient.

## CALCIUM CHANNEL BLOCKER

<sup>1</sup> MedScape: Emergent Management of Calcium Channel Blocker Toxicity ; Author B. Zane Horowitz, MD, FACMT

# Protocol 7-5

Continued

**CALCIUM CHANNEL BLOCKER**

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# Protocol

## 7-6

**SECTION:** Toxicological Emergencies

**PROTOCOL TITLE:** Beta Blocker Overdose  
**Medical - Beta Blocker Overdose**

**REVISED:** 06/2013

### OVERVIEW:

Beta blockers are a type of drug generally used to treat hypertension. Although the specific ingredients vary among manufacturers, the main ingredient among them all is a beta-adrenergic blocking substance. This substance blocks the effects of epinephrine on the body. Medical complications of beta-blocker overdose include hypotension, bradycardia, heart failure, impaired atrio-ventricular conduction, bronchospasm and, occasionally, seizures. Unfortunately, the history of poisoning / overdose is notoriously unreliable whether it is obtained from the patient, friends and family members or emergency services personnel. Despite the possible inaccuracies, the most important historical factors include **what** poison was involved, **how much** was taken, **how** it was taken, **when** it was taken, **why** it was taken, and especially **what else** was taken.

Poison Control may be contacted at any time for information on poisoning (1-800-222-1222) but **only Medical Control may give patient treatment orders.**

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Use or suspected use of a potentially toxic substance</li> <li>• Substance ingested, route, and quantity used</li> <li>• Time of use</li> <li>• Reason (suicidal, accidental, criminal)</li> <li>• Available medications in home</li> <li>• Past medical history</li> </ul>	<ul style="list-style-type: none"> <li>• Mental status changes</li> <li>• Hypotension</li> <li>• Bradycardia</li> </ul>	<ul style="list-style-type: none"> <li>• Co-ingestions</li> <li>• Cardiac medications</li> <li>• Anti-hypertensive medications</li> </ul>

	A	B	EN	I	P
1. Obtain general assessment of the patient.	•	•	•	•	•
2. Administer Oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
3. Suction oropharynx as necessary.	•	•	•	•	•
4. Establish IV of Normal Saline. Titrate to maintain a systolic BP > 90 mmHg.			•	•	•
5. Place the patient on a cardiac monitor and obtain / interpret <u>12 lead ECG</u> .				•	•
6. If symptomatic bradycardia is present, administer <u>ATROPINE</u> 0.5 - 1 mg IVP / IO. If no response to initial dose, administer one (1) repeat dose of Atropine 0.5 - 1 mg IVP / IO.				•	•

**BETA BLOCKER OVERDOSE**

# Protocol 7-6

Continued

## BETA BLOCKER OVERDOSE

	A	B	EN	I	P
7. If no response noted to Atropine, administer <u>GLUCAGON</u> 1 mg IVP / IO. If no response in five (5) minutes, administer one (1) repeat dose of Glucagon 1 mg IVP / IO.				•	•
8. Transport promptly in position of comfort. Reassess vital signs as indicated.		•	•	•	•

Common Beta Blocker Medications			
• Acebutolol (Sectral) • Atenolol (Apotenol) • Bisoprolol (Zebeta)	• Labetalol (Normodyne) • Metoprolol (Toprol, Lopressor)	• Nadolol (Corgard) • Sotalol (Betapace) • Penbutolol (Levatol)	• Pindolol (Novopindol) • Propranolol (Inderal) • Bystolic (nebivolol)

### PEARLS:

1. Bradycardia with associated hypotension and shock (systolic BP < 80 mm Hg, HR < 60 BPM) defines severe beta-blocker toxicity. Bradycardia by itself is not necessarily helpful as a warning sign because slowing of the heart rate and dampening of tachycardia in response to stress is observed with therapeutic levels.
2. Glucagon increases heart rate and myocardial contractility, and improves atrio-ventricular conduction. These effects are unchanged by the presence of beta-receptor blocking drugs. This suggests that glucagon's mechanism of action may bypass the beta-adrenergic receptor site. Because it may bypass the beta-receptor site, glucagon can be considered as an alternative therapy for profound beta-blocker intoxications.
3. Be prepared to manage the airway after Glucagon administration due to possible emesis.
4. While case reports have documented hypotension in the absence of bradycardia, blood pressure usually does not fall before the onset of bradycardia. Bradycardia may be isolated or accompanied by mild conduction disturbances affecting the entire cardiac conduction system from the sinus node to the intraventricular Purkinje system.
5. Cardiac pacing may be effective in increasing the rate of myocardial contraction. Electrical capture is not always successful and, if capture does occur, blood pressure is not always restored. *Reserve cardiac pacing for patients unresponsive to pharmacological therapy.* Multiple case reports describe complete neurological recovery, even with profound hypotension, if a cardiac rhythm can be sustained.
6. Agents with combined alpha- and beta-selective properties (Dopamine and Epinephrine) may be necessary to maintain blood pressure. A beta-agonist may competitively antagonize the effect of the beta-blocker. The amount of beta-agonist required might be several orders of magnitude above those recommended in standard ACLS protocols.
7. Do not rely on patient history of ingestion, especially in suicide attempts.
8. Bring bottles and contents to ER with patient.

# Section

# 8

**SECTION:** Pediatric Cardiovascular Emergencies

**REVISED:** 06/2013

1.	<b>BLS Pulseless Arrest</b>	Protocol 8 - 1
2.	<b>ALS Pulseless Arrest</b> <i>General – Cardiac Arrest</i>	Protocol 8 - 2
3.	<b>Newborn Resuscitation</b> <i>Medical - Newborn/Neonatal Resuscitation</i>	Protocol 8 - 3
4.	<b>Tachycardia with a pulse</b> <i>Medical – Supraventricular Tachycardia (including atrial fibrillation)</i> <i>Medical - Ventricular Tachycardia with a Pulse</i>	Protocol 8 - 4
5.	<b>Bradycardia</b> <i>Medical - Bradycardia</i>	Protocol 8 - 5

# Section 8

Continued

## PEDIATRIC CARDIAC

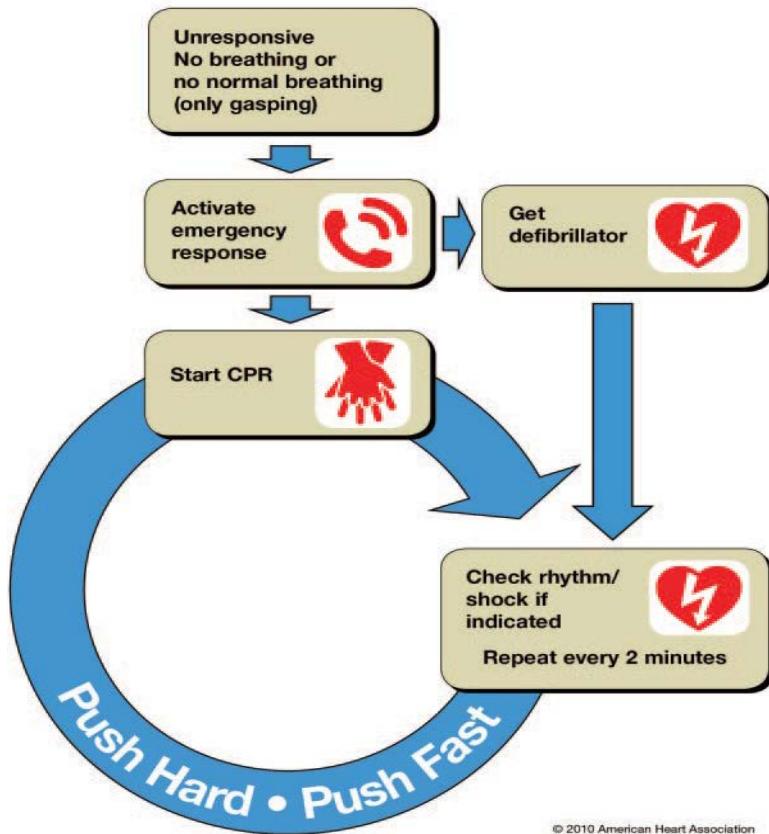
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# Protocol 8-1

**SECTION:** Pediatric Cardiovascular Emergencies

**PROTOCOL TITLE:** BLS Pulseless Arrest

**REVISED:** 05/2012



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## POSSIBLE CAUSES OF PULSELESS ARREST

A	Alcohol, Abuse, Acidosis	T	Toxicodromes, Trauma, Temperature, Tumor
E	Endocrine, Electrolytes, Encephalopathy	I	Infection, Intussusception
I	Insulin	P	Psychogenic, Porphyria, Pharmacological
O	Oxygenation, Overdose, Opiates	S	Space occupying lesion, Sepsis, Seizure, Shock
U	Uremia		

### PEARLS:

1. If airway is maintainable initially with a BVM, delay rescue airway insertion until after initial defibrillation. The best airway is an effective airway with the least potential complications.
2. Continue CPR while AED is charging.
3. CPR should not be stopped for any reason, if at all avoidable, other than to check rhythm immediately prior to defibrillation. Any stop of compressions should be kept

# BLSPULSELESSARREST

# Protocol

## 8-1

Continued

# BLS PULSELESS ARREST

- as short as possible, preferably a maximum of 10 seconds. Alternate airway placement should be performed during compressions.
4. Pay close attention to rate of manual ventilation. Hyperventilation produces decrease in preload, cardiac output, coronary perfusion, and cerebral blood flow.
5. AED's may be used for patients all ages. For children less than 8 years of age, use an AED equipped with a pediatric attenuator. If an AED with pediatric attenuator is not available, use a standard AED.

# Protocol 8-2

**SECTION:** Pediatric Cardiovascular Emergencies

**PROTOCOL TITLE:** ALS Pulseless Arrest

**General – Cardiac Arrest**

**REVISED:** 06/2013

## OVERVIEW:

During cardiac arrest, there is no effective pumping activity, pulse, or blood pressure. Most commonly, the rhythms that cause pulseless arrest are: ventricular fibrillation, ventricular tachycardia, pulseless electrical activity or asystole. The ECG of ventricular fibrillation shows a fine to coarse zigzag pattern without discernible P waves or QRS complexes. Ventricular fibrillation / ventricular tachycardia is most commonly seen in patients with severe ischemic heart disease and is the most frequently encountered rhythm in sudden cardiac death in adults. Defibrillation is required to stop VF / VT. It constitutes the most important aspect of therapy for VF / VT. The sooner the shocks are given, the more likely they are to be successful.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"><li>Estimated down time</li><li>Past medical history</li><li>Medications</li><li>Events leading to arrest</li><li>Renal failure / dialysis</li><li>DNR or living will</li></ul>	<ul style="list-style-type: none"><li>Unresponsive, apneic, pulseless</li><li>Ventricular fibrillation or pulseless ventricular tachycardia on ECG</li></ul>	<ul style="list-style-type: none"><li>Asystole</li><li>Artifact / Device failure</li><li>Cardiac</li><li>Endocrine / metabolic</li><li>Drugs</li><li>Respiratory Arrest</li></ul>

## POSSIBLE CAUSES OF PULSELESS ARREST

A	Alcohol, Abuse, Acidosis	T	Toxidromes, Trauma, Temperature, Tumor
E	Endocrine, Electrolytes, Encephalopathy	I	Infection, Intussusception
I	Insulin	P	Psychogenic, Porphyria, Pharmacological
O	Oxygenation, Overdose, Opiates	S	Space occupying lesion, Sepsis, Seizure, Shock
U	Uremia		

ALS PULSELESS ARREST

# Protocol

## 8-2

Continued

# ALS PULSELESS ARREST

**Infant Dosing Chart**

Age	Term	6 months
<b>Weight (lb/kg)</b>	6.6 lb 3 kg	17.6 lb 8 kg
<b>Defibrillation 2 joules / kg</b>	6 joules	16 joules
<b>Defibrillation 4 joules / kg</b>	12 joules	32 joules
<b>Epinephrine 1:10,000 (1 mg / 10 ml) 0.01 mg / kg</b>	0.03 mg	0.08mg
<b>Amiodarone 5 mg / kg</b>	15 mg	40 mg
<b>Magnesium Sulfate 25 - 50 mg / kg</b>	75 mg	200 mg

Ensure you are operating according to the specifications of the manufacturer of your particular monitor.

**Pediatric Dosing Chart**

Age	1 years	3 years	6 years	8 years	10 years	12 years	14 years
<b>Weight (lb / kg)</b>	22 lb 10 kg	30.8 lb 14 kg	44 lb 20 kg	55 lb 25 kg	75 lb 34 kg	88 lb 40 kg	110 lb 50 kg
<b>Defibrillation 2 joules / kg</b>	20 joules	28 joules	40 joules	50 joules	68 joules	80 joules	100 joules
<b>Defibrillation 4 joules / kg</b>	40 joules	56 joules	80 joules	100 joules	136 joules	160 joules	200 joules
<b>Epinephrine 1:10,000 (1 mg / 10 ml) 0.01 mg / kg</b>	0.1 mg	0.14 mg	0.2 mg	0.25 mg	0.34 mg	0.4 mg	0.5 mg
<b>Amiodarone 5 mg / kg</b>	50 mg	70 mg	100 mg	125 mg	170 mg	200 mg	250 mg
<b>Magnesium Sulfate 25 - 50 mg / kg</b>	250 mg	350 mg	500 mg	625 mg	850 mg	1 gm	1.25 gm

# Protocol 8-2

Continued

## **PEARLS:**

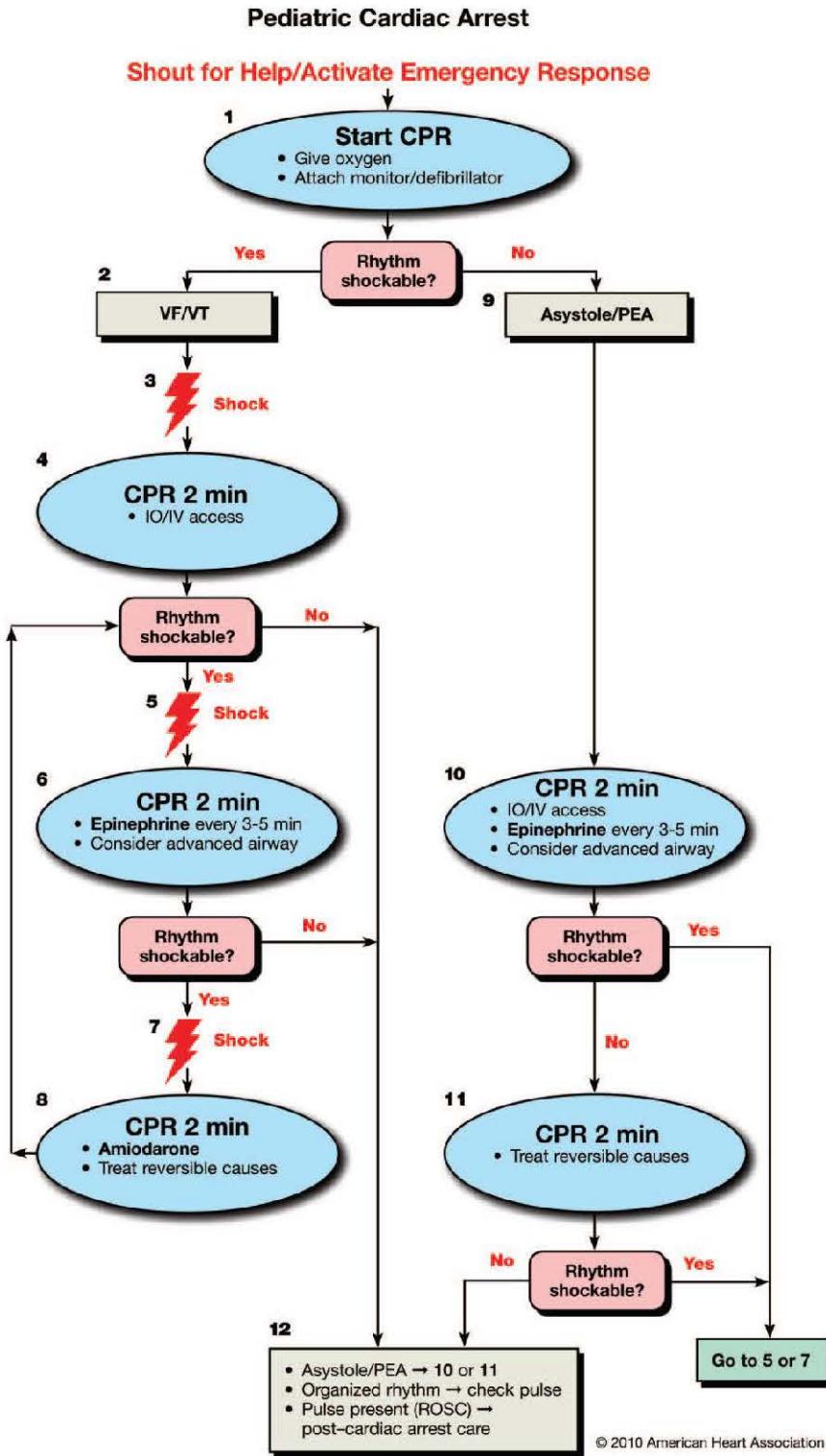
1. If airway maintainable initially with BVM, delay advanced airway insertion until after initial medication administration. The best airway is an effective airway with the least potential complications.
2. Do not stop CPR to give ventilations once advanced airway has been secured.
3. CPR should not be stopped for any reason, if at all avoidable, other than to check for rhythm change. Any stop of compressions should kept as short as possible, preferably a maximum of 10 seconds. IV / IO access and advanced airway placement should be performed while compressions are being performed.
4. Pay close attention to rate of manual ventilation. Hyperventilation produces decrease in preload, cardiac output, coronary perfusion, and cerebral blood flow.

**ALS PULSELESS ARREST**

# Protocol 8-2

Continued

## ALS PULSELESS ARREST



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### Doses/Details

#### CPR Quality

- Push hard ( $\geq 1/3$  of anterior-posterior diameter of chest) and fast (at least 100/min) and allow complete chest recoil
- Minimize interruptions in compressions
- Avoid excessive ventilation
- Rotate compressor every 2 minutes
- If no advanced airway, 15:2 compression-ventilation ratio. If advanced airway, 8-10 breaths per minute with continuous chest compressions

#### Shock Energy for Defibrillation

First shock 2 J/kg, second shock 4 J/kg, subsequent shocks  $\geq 4$  J/kg, maximum 10 J/kg or adult dose.

#### Drug Therapy

- Epinephrine IO/IV Dose:** 0.01 mg/kg (0.1 mL/kg of 1:10 000 concentration). Repeat every 3-5 minutes. If no IO/IV access, may give endotracheal dose: 0.1 mg/kg (0.1 mL/kg of 1:1000 concentration).
- Amiodarone IO/IV Dose:** 5 mg/kg bolus during cardiac arrest. May repeat up to 2 times for refractory VF/pulseless VT.

#### Advanced Airway

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place give 1 breath every 6-8 seconds (8-10 breaths per minute)

#### Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Spontaneous arterial pressure waves with intra-arterial monitoring

#### Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypoglycemia
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

# Protocol 8-3

**SECTION:** Pediatric Cardiovascular Emergencies

**PROTOCOL TITLE:** Neonatal Resuscitation

**Medical - Newborn/Neonatal Resuscitation**

**REVISED:** 06/2013

## OVERVIEW:

The majority of newborns will require only warmth, stimulation, and occasionally some oxygen after birth. That treatment is recommended before attempting the more aggressive interventions of positive-pressure ventilation (PPV) and chest compressions. Remember that a newborn's cardiac output is rate dependent. Bradycardia usually is the result of hypoxia. Once the hypoxia is corrected, the heart rate may spontaneously correct itself. A "newborn" is defined as within one month of age post delivery.

	A	B	EN	I	P
1. If obvious obstruction to spontaneous breathing or requires positive pressure ventilation, gently suction the newborn's mouth, then nostrils, with a bulb syringe for 3 to 5 seconds. Don't routinely suction an active baby.	•	•	•	•	•
2. If meconium staining is present:					
a. If the newborn is vigorous (strong respiratory effort, good muscle tone, and a heart rate greater than 100 bpm), no routine suctioning is required.	•	•	•	•	•
b. If the newborn is NOT vigorous (poor or absent respiratory effort, flaccid, lethargic), consider immediate MECONIUM ASPIRATION via endotracheal suctioning. Suctioning of meconium should not distract from the need for emergent oxygenation and ventilation of the newly born. In the patient with meconium aspiration and respiratory failure or apnea, quickly suction meconium and then begin BVM ventilations.					•
3. If meconium staining is not present, rub the newborn's back vigorously. Simultaneously begin drying and warming measures.	•	•	•	•	•
4. <i>KEEP THE NEWBORN WARM AND DRY.</i>	•	•	•	•	•
5. Evaluate respirations, heart rate (apical pulse or pulse at the base of the umbilical cord), and state of oxygenation. Obtain 1 minute APGAR.	•	•	•	•	•
6. If respirations are inadequate, HR > 100 bpm:					
a. Initiate positive-pressure ventilation with a BVM NOT attached to oxygen. Deliver 40 to 60 breaths per minute. Use only enough volume to make the newborn's chest rise.	•	•	•	•	•
7. If respirations are inadequate and HR less than 100 bpm:					
a. Initiate positive-pressure ventilation with a BVM on room air. If no increase in HR after 90 seconds, administer 100% oxygen.	•	•	•	•	•

# NEONATAL RESUSCITATION

# Protocol 8-3

Continued

## NEONATAL RESUSCITATION

	A	B	EN	I	P
b. If HR is below 60 bpm, begin compressions.	•	•	•	•	•

APGAR Score – 1 <sup>st</sup> and 5 <sup>th</sup> Minute Post Birth			
Sign	0 Points	1 Point	2 Points
<b>Activity</b> (Muscle Tone)	Flaccid	Some Flexion	Active Motion
<b>Pulse</b>	Absent	< 100	> 100
<b>Grimace</b> (Reflex Irritability)	No Response	Some	Vigorous
<b>Appearance</b> (Skin Color)	Blue, Pale	Blue Extremities	Fully Pink
<b>Respirations</b>	Absent	Slow, Irregular	Strong Cry

### Supportive Care

- Maintain airway. Suction as needed with bulb syringe.
- Obtain blood glucose sample. If BGL is < 40 mg/dL, administer Dextrose 10% 2cc / kg (0.5 g / kg) slow IV / IO push. Repeat as necessary.
- Maintain warmth via blankets and Porta-Warm mattress or skin-to-skin.

### Procedure for making Dextrose 10%

In 50 ml syringe, mix 10 ml of Dextrose 50% with 40 ml Normal Saline.  
Mixture will yield 50 ml of Dextrose 10%

Age	Pre-Term	Term
Weight (lb / kg)	3.3 lbs 1.5 kg	6.6 lbs 3.0 kg
Epinephrine 1:10,000 (1 mg / 10 ml) 0.01 mg / kg	0.015 mg	0.03 mg
Dextrose 10% 2.0 ml / kg	3.0 ml	6.0 ml

### PEARLS:

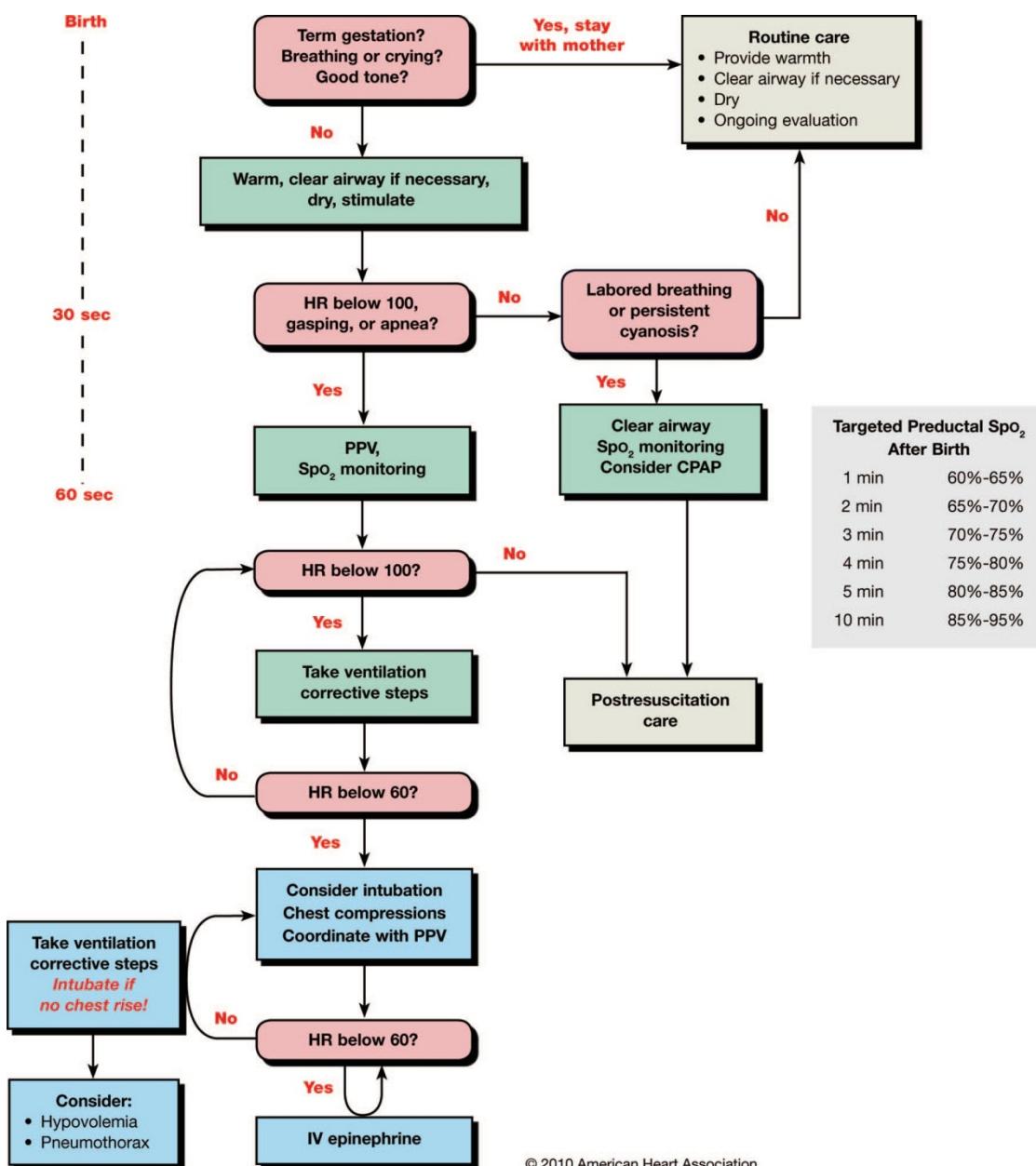
- The primary measure of adequate initial ventilation is prompt improvement in heart rate.
- In the presence of thick meconium and an infant who is limp, aggressive suctioning is required.
- A 3:1 ratio of compressions to ventilations with 90 compressions and 30 breaths should be used to achieve approximately 120 events per minute to maximize ventilation at an achievable rate. Each event should be allotted approximately ½ second, with exhalation occurring during the first compression following each ventilation.

# Protocol 8-3

Continued

# NEONATAL RESUSCITATION

4. Arterial saturations of a term infant at birth can be as low as 60% and can require more than 10 minutes to reach saturations of > 90%. Hyperoxia can be toxic, particularly to the preterm baby.



# Protocol

## 8-3

Continued

# NEONATAL RESUSCITATION

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# Protocol 8-4

**SECTION:** Pediatric Cardiovascular Emergencies

**PROTOCOL TITLE:** Tachycardia with a Pulse

**Medical – Supraventricular Tachycardia (including atrial fibrillation)**

**Medical - Ventricular Tachycardia with a Pulse**

**REVISED:** 06/2013

## OVERVIEW:

Tachycardia is an abnormally fast rhythm of the heart. It is most commonly caused by a reentry mechanism that involves an accessory pathway or the AV conduction system. SVT is the most common tachyarrhythmia producing cardiovascular compromise during infancy.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Past medical history</li> <li>Medications, toxin ingestion (aminophylline, diet pills, thyroid supplements, decongestants, digoxin)</li> <li>Drugs (nicotine, cocaine)</li> <li>Respiratory distress</li> <li>Congenital heart disease</li> <li>Syncope, near syncope</li> </ul>	<ul style="list-style-type: none"> <li>Heart rate: <ul style="list-style-type: none"> <li>Child &gt; 180 / min</li> <li>Infant &gt; 220 / min</li> </ul> </li> <li>QRS &lt; 0.08 seconds</li> <li>Pale or cyanosis</li> <li>Diaphoresis</li> <li>Tachypnea</li> <li>Vomiting</li> <li>Hypotension</li> <li>Altered mental status</li> <li>Pulmonary congestion</li> <li>Syncope</li> </ul>	<ul style="list-style-type: none"> <li>Heart disease (congenital)</li> <li>Hypo / hyperthermia</li> <li>Hypovolemia</li> <li>Anemia</li> <li>Electrolyte imbalance</li> <li>Anxiety, pain, emotional stress</li> <li>Fever, infection, sepsis</li> <li>Hypoxia</li> <li>Hypoglycemia</li> <li>Medication, toxin, drugs</li> <li>Pulmonary embolus</li> <li>Trauma</li> </ul>

## Infant Dosing Chart:

Age	Term	6 months
Weight (lb / kg)	6.6 lb 3 kg	17.6 lb 8 kg
Defibrillation 2 joules / kg	6 joules	16 joules
Defibrillation 4 joules / kg	12 joules	32 joules
Epinephrine 1:10,000 (1 mg / 10 ml) 0.01 mg / kg	0.03 mg	0.08mg
Amiodarone 5 mg / kg	15 mg	40 mg
Magnesium	75 mg	200 mg

TACHYCARDIA WITH A PULSE

# Protocol

## 8-4

Continued

# TACHYCARDIA WITH A PULSE

Sulfate 25 - 50 mg / kg							
Age	1 years	3 years	6 years	8 years	10 years	12 years	14 years
Weight (lb / kg)	22 lb 10 kg	30.8 lb 14 kg	44 lb 20 kg	55 lb 25 kg	75 lb 34 kg	88 lb 40 kg	110 lb 50 kg
Defibrillation 2 joules / kg	20 joules	28 joules	40 joules	50 joules	68 joules	80 joules	100 joules
Defibrillation 4 joules / kg	40 joules	56 joules	80 joules	100 joules	136 joules	160 joules	200 joules
Epinephrine 1:10,000 (1 mg / 10 ml) 0.01 mg / kg	0.1 mg	0.14 mg	0.2 mg	0.25 mg	0.34 mg	0.4 mg	0.5 mg
Amiodarone 5 mg / kg	50 mg	70 mg	100 mg	125 mg	170 mg	200 mg	250 mg
Magnesium Sulfate 25 - 50 mg / kg	250 mg	350 mg	500 mg	625 mg	850 mg	1 gm	1.25 gm

### Amiodarone Drip

(5 mg / kg over 40 minutes)

Dilute calculated volume of Amiodarone in 50 mL D<sub>5</sub>W

Using a 60 gtt / mL administration set, flow infusion at 60 gtt.

(1 mL / min, 1 gtt / sec)

### PEARLS:

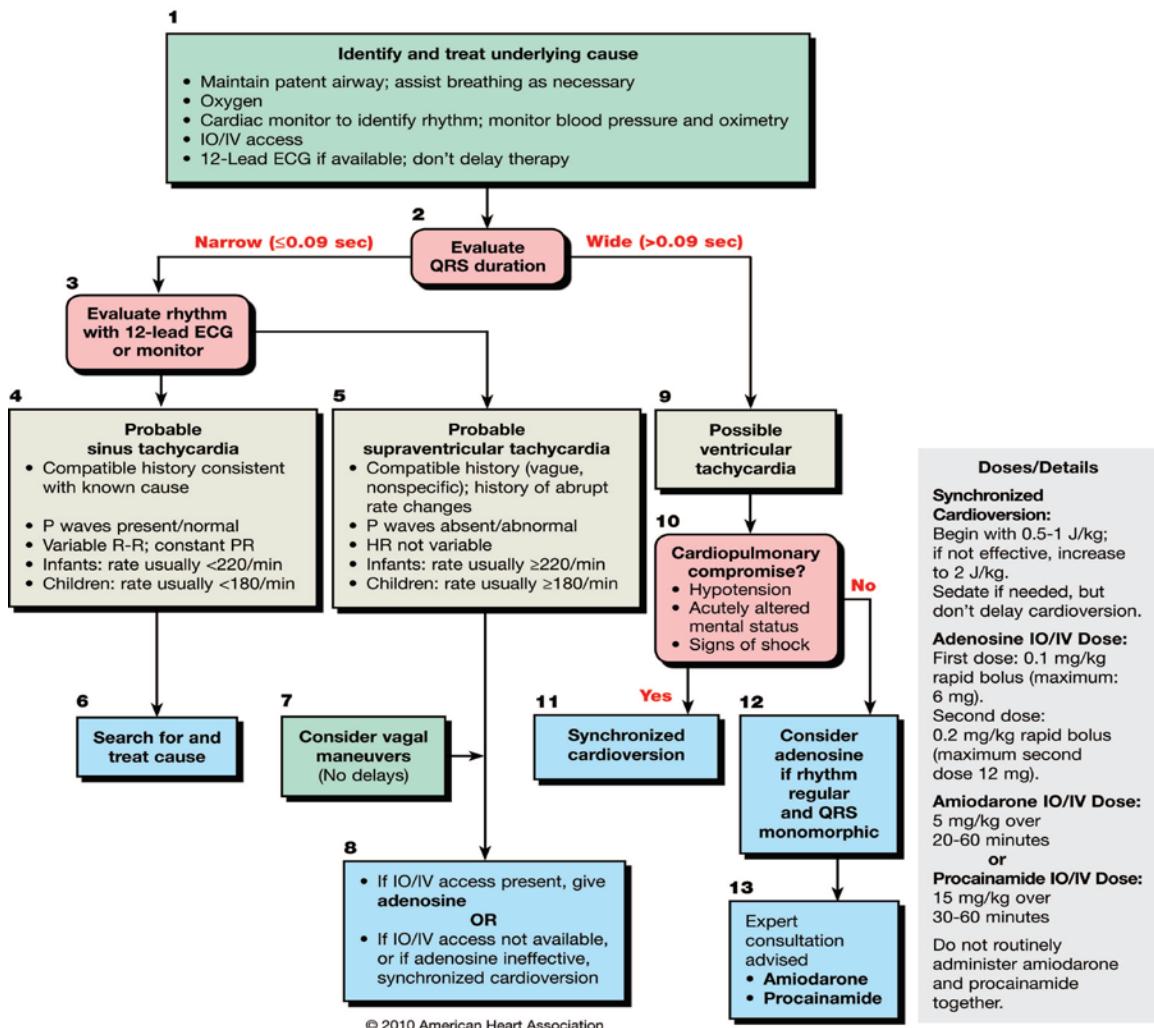
1. SVT is often diagnosed in infants because of symptoms of congestive heart failure. SVT usually presents differently in older children. Common signs and symptoms of SVT in infants include: poor feeding, rapid breathing, irritability, unusual sleepiness, pale or blue skin color, and vomiting. SVT is initially well tolerated in most infants and older children. It can, however, lead to heart failure and clinical evidence of shock, particularly if baseline myocardial function is impaired by congenital heart disease or cardiomyopathy. It can ultimately cause cardiovascular collapse.
2. Approved vagal maneuvers include coughing, bearing down as if attempting a bowel movement. **Carotid sinus massage and / or ocular massage is not approved.**

# Protocol 8-4

Continued

# TACHYCARDIA WITH A PULSE

## Pediatric Tachycardia With a Pulse and Poor Perfusion



# Protocol

## 8-4

Continued

### TACHYCARDIA WITH A PULSE

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# Protocol 8-5

**SECTION:** Pediatric Cardiovascular Emergencies

**PROTOCOL TITLE:** Bradycardia  
**Medical - Bradycardia**

**REVISED:** 06/2013

## OVERVIEW:

Bradycardia is the most common dysrhythmia in the pediatric population. Bradycardia, in pediatric patients, typically is the result of some form of respiratory depression and initial treatment should be directed to ensuring that the patient is breathing adequately and providing supplemental oxygenation and ventilation as needed. Since the etiology of bradycardia is usually hypoxemia, initial management is ventilation and oxygenation while perfusion is maintained with chest compressions in children with a heart rate of less than 60 beats per minute. Symptomatic bradycardia is defined in pediatrics as hypotension or other Signs and / or Symptoms of poor perfusion, with a (relative to age) bradycardia. Most bradycardia is hypoxia related, and will usually respond to oxygenation.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"><li>Past medical history</li><li>Foreign body exposure</li><li>Respiratory distress or arrest</li><li>Apnea</li><li>Possible toxic or poison Environmental exposure</li><li>Congenital disease</li><li>Medication (maternal or infant)</li></ul>	<ul style="list-style-type: none"><li>Heart rate &lt; 60 bpm</li><li>Delayed capillary refill or cyanosis</li><li>Mottled, cool skin</li><li>Hypotension or arrest</li><li>Altered mental status</li></ul>	<ul style="list-style-type: none"><li>Respiratory effort</li><li>Respiratory obstruction</li><li>Foreign body, secretions</li><li>Croup, epiglottitis</li><li>Hypovolemia</li><li>Hypothermia</li><li>Infection, sepsis</li><li>Medication, toxin</li><li>Hypoglycemia</li><li>Trauma</li></ul>

## PEARLS:

1. Pharmacological treatment of bradycardia is based upon the presence or absence of significant signs and symptoms (symptomatic vs. asymptomatic).
2. Although noninvasive pacing may be attempted, typically bradycardias of hypoxic etiology do not respond. First line therapy is prompt airway support, ventilation and oxygenation.
3. Capture thresholds in children are similar to those in adults. Studies indicate no relationship between body surface area, weight, and capture thresholds and although many children will achieve capture between 50 - 100 mA, higher current requirements are possible. The pacing rate must be set high enough to perfuse the patient.
4. Electrical capture during transcutaneous pacing is defined as an electrical stimulus marker followed by a wide QRS complex, with no underlying intrinsic rhythm, followed by a T-wave. This should occur for each electrical complex.
5. Mechanical capture is confirmed when the patient's pulse matches the displayed pace rate. Because pacing stimuli generally causes muscular contractions that can be mistaken for a pulse, you should never take a pulse on the left side of the body to confirm mechanical capture. Pectoral muscle contractions due to pacing also do not indicate mechanical capture. To avoid mistaking muscular response to pacing stimuli for arterial

**BRADYCARDIA**

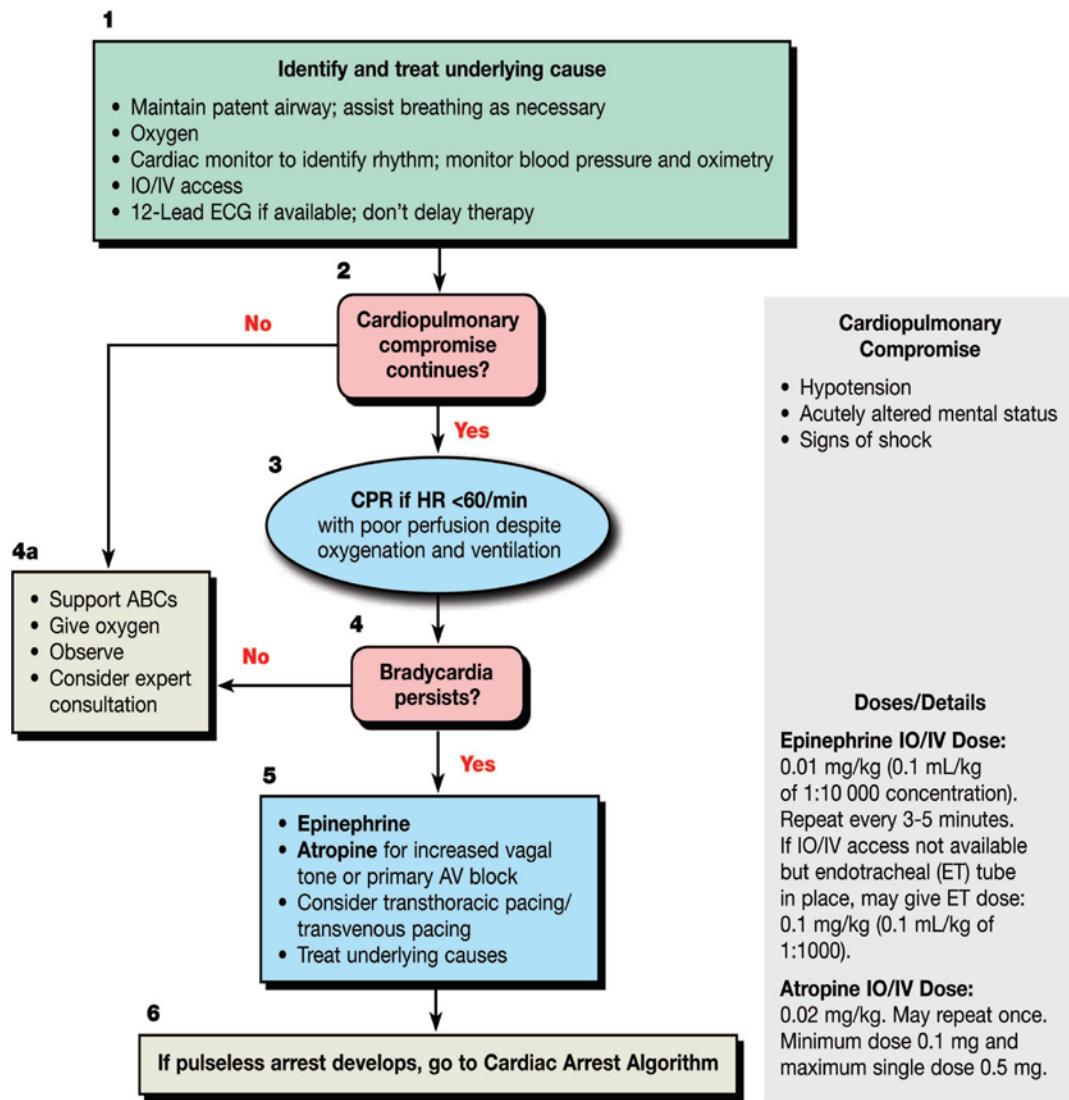
# Protocol 8-5

Continued

## BRADYCARDIA

pulsations, use ONLY the (1) Femoral artery or (2) Right brachial or radial artery for confirming mechanical capture.

### Pediatric Bradycardia With a Pulse and Poor Perfusion



# Section 9

**SECTION:** Pediatric Medical Emergencies

**REVISED:** 06/2013

<b>Pediatric Medical Patient Assessment</b>		<b>Protocol 9 - 1</b>
<b>2.</b>	<b>Allergic Reaction / Anaphylaxis</b> <i>Medical - Allergic Reaction/Anaphylaxis</i>	<b>Protocol 9 - 2</b>
<b>3.</b>	<b>Fever</b> <i>General - Fever</i>	<b>Protocol 9 - 3</b>
<b>4.</b>	<b>Foreign Body Airway Obstruction</b> <i>Airway – Obstruction/Foreign Body</i>	<b>Protocol 9 - 4</b>
<b>5.</b>	<b>Hyperglycemia</b> <i>Medical - Hyperglycemia</i>	<b>Protocol 9 - 5</b>
<b>6.</b>	<b>Hypoglycemia</b> <i>Medical - Hypoglycemia/Diabetic Emergency</i>	<b>Protocol 9 - 6</b>
<b>7.</b>	<b>Nausea / Vomiting</b> <i>Medical - Nausea/Vomiting</i>	<b>Protocol 9 - 7</b>
<b>8.</b>	<b>Pain Management</b> <i>General - Pain Control</i>	<b>Protocol 9 - 8</b>
<b>9.</b>	<b>Poisoning / Overdose</b> <i>Medical - Overdose/Poisoning/Toxic Ingestion</i>	<b>Protocol 9 - 9</b>
<b>10.</b>	<b>Respiratory Distress - Asthma</b> <i>Medical - Respiratory Distress / Asthma / COPD / Croup / Reactive Airway</i>	<b>Protocol 9 - 10</b>
<b>11.</b>	<b>Respiratory Distress - Croup / Epiglottitis</b> <i>Medical - Respiratory Distress / Asthma / COPD / Croup / Reactive Airway</i>	<b>Protocol 9 - 11</b>
<b>12.</b>	<b>Seizures</b> <i>Medical - Seizure</i>	<b>Protocol 9 - 12</b>
<b>13.</b>	<b>Shock</b> <i>Medical - Hypotension/Shock (Non-trauma)</i>	<b>Protocol 9 - 13</b>
<b>14.</b>	<b>Unconscious / Syncope / AMS</b> <i>Medical - Altered Mental Status</i>	<b>Protocol 9 - 14</b>

**PEDIATRIC MEDICAL**

## Section

9

Continued

**PEDIATRIC MEDICAL**

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# Protocol 9-1

**SECTION:** Pediatric General Medical Emergencies

**PROTOCOL TITLE:** Medical Assessment

**REVISED:** 05/2012

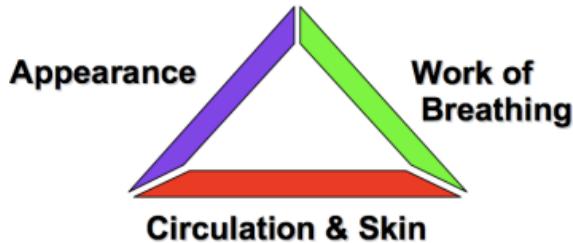
## OVERVIEW:

Few encounters cause greater anxiety for medical providers than a pediatric patient experiencing a life-threatening situation. Although pediatric calls only account for approximately 10% of all EMS calls, they can be among the most stressful. Pre-hospital providers need to be prepared to face these challenges, as prompt recognition and treatment of potentially life-threatening diseases in children in the field may have a significant impact on the outcome of the patient. Of the 10% of EMS calls that involve pediatric patients, fewer than 5% are for life- or limb-threatening situations. When EMS does respond to a pediatric call, treatment such as administering oxygen, starting an IV or performing endotracheal intubation can be involved in more than 50% of the cases.

## PRIMARY ASSESSMENT:

Approach to the pediatric patient varies with the patient's age and the nature of illness or injury. It is critical that EMS providers be cognizant of the emotional and physiological needs of a child throughout the assessment. It is equally important to identify the needs of the child's family members. In this stressful environment, family members will be trying to find the cause of injury or illness in their child and may be unruly when the answers they seek are not available or are contrary to what is expected.

The key to pediatric assessment in EMS is to identify and manage immediate life threats. It is often easy to determine whether a child is sick just by looking at him. Sick kids look sick. If a child is active, appropriate and alert, he is not sick. The opposite is true as well. If a child is inactive and non-interactive, assume he is sick until proven otherwise. The most widely accepted approach to forming a general impression in a child is using the Pediatric Assessment Triangle. This tool is especially useful because the assessment criteria are determined during the general impression. This assessment can be performed from across the room, before contact with the patient is ever made.



## AIRWAY:

The patient's airway should be assessed to determine whether it is patent, maintainable, or not maintainable. For any patient who may have a traumatic injury, cervical spine precautions should be utilized while the airway is evaluated. Assessment of the patient's level of consciousness, in conjunction with assessment of the airway, provides an impression of the effectiveness of the patient's current airway status. If an airway problem is identified, the appropriate intervention should be initiated. The decision to use a particular intervention depends on the nature of the patient's problem and the potential for complications during transport. Specific equipment, such as a pulse oximetry or capnography, help provide continuous airway evaluation during transport.

In addition, it is important to also be able to identify differences between adult and pediatric anatomy and physiology. The anatomical and physiologic variations between

# Protocol 9-1

Continued

## MEDICAL ASSESSMENT

adults and children can cause confusion if the EMS provider does not fully understand these differences.

### Summary of Primary Airway Assessment

- Airway: Patent, maintainable, un-maintainable
- Level of consciousness
- Skin appearance: Ashen, pale, gray, cyanotic, or mottled
- Preferred posture to maintain airway
- Airway clearance
- Sounds of obstruction

### Differences in the Pediatric Airway

- Larger tongue in relation to free space in oropharynx.
- Trachea is more pliable and smaller in diameter with immature tracheal rings
- Epiglottis is large and is more u-shaped or oblong
- Larynx is at the level of the 1<sup>st</sup> or 2<sup>nd</sup> vertebrae
- Mainstem bronchi has less angle

### BREATHING:

The assessment of ventilation begins with noting whether the patient is breathing. Patients presenting with apnea or severe respiratory distress, require immediate intervention. If the patient has any difficulty with ventilation, the problem must be identified and the appropriate intervention initiated. Emergent interventions may include manual ventilation of the patient via bag valve mask, endotracheal intubation, and / or needle thoracentesis.

Normal respirations in an infant can be irregular and, as a result, respiratory rates should be assessed over a minimum of 30 seconds, but ideally 60 seconds. The variability of respiration in infants may not produce an accurate rate when only observed for 15 seconds. It is important to note that the variable rate of respiration in infants may include cessation in breathing for up to 20 seconds. Anything greater than 20 seconds should be considered abnormal and will require intervention.

### Summary of Primary Breathing Assessment

- Rate and depth of respirations
- Cyanosis
- Work of breathing
- Use of accessory muscles
- Flaring of nostrils
- Presence of bilateral breath sounds
- Presence of adventitious breath sounds
- Asymmetric chest movements
- Oxygen saturation measured with pulse oximetry

# Protocol 9-1

Continued

## MEDICAL ASSESSMENT

### CIRCULATION:

Palpation of both the peripheral and the central pulse provides information about the patient's circulatory status. The quality, location, and rate of the patient's pulses should be noted along with the temperature of the patient's skin being assessed while obtaining the pulses. Observation of the patient's level of consciousness may also help evaluate the patient's perfusion status initially.

Although the pediatric and adult hearts share identical anatomy, several important distinctions need to be made between the adult and pediatric cardiovascular systems. First, the adult heart increases its stroke volume by increasing inotropy (strengthening contractions) and chronotropy (increasing heart rate). In contrast, the pediatric heart can only increase chronotropy in an attempt to increase stroke volume. The pediatric heart has low compliance as it relates to volume; therefore, it cannot compensate well by increasing stroke volume. Consequently, heart rate should be seen as a significant clinical marker when monitoring cardiac output in the fetus, neonate and pediatric patient. When the pediatric patient becomes bradycardic, it should be assumed that cardiac output has been drastically reduced. Bradycardia is most commonly caused by hypoxia. Bradycardia may be an early sign of hypoxia in the neonate; however, it is an ominous sign of severe hypoxia in the infant and child.

Capillary refill time is typically quite accurate in children and considered to be reliable in most cases. Just as in the adult patient, environmental factors like cold ambient temperatures can influence capillary refill times and should be taken into consideration. For this reason, capillary refill time should be assessed closer to the core in areas like the kneecap or forearm. Normal capillary refill time is less than two to three seconds.

#### Summary of Primary Circulation Assessment

- Pulse rate and quality
- Skin appearance: Color
- Peripheral pulses
- Skin temperature
- Level of consciousness
- Urinary output
- Blood Pressure
- Cardiac monitor
- Invasive monitor

### DISABILITY:

The basic, primary neurological assessment includes assessment of the level of consciousness; the size, shape, and response of the pupils; and motor sensory function. The simple method if AVPU should be used to evaluate the patient's overall level of consciousness.

# Protocol 9-1

Continued

## MEDICAL ASSESSMENT

### Summary of Primary Disability (Neurological) Assessment

A - Alert

V - Responds to verbal stimuli

P - Responds to painful stimuli

U - Unresponsive

The Glasgow Coma Scale (GCS) provides assessment of the patient's level of consciousness and motor function and may serve as a predictor of morbidity and mortality after brain injury.

If the patient has an altered mental status, it must be determined whether the patient has ingested any toxic substances, such as alcohol or other drugs, or may be hypoxic because of illness or injury. A patient with an altered mental status may pose a safety problem during transport. Use of chemical sedation or physical restraint may be necessary to ensure safe transport of the patient and EMS providers.

Glasgow Coma Scale (GCS)				
	Infant < 1 year		Child 1 - 4 yrs	
Eye Opening	Spontaneous	4	Spontaneous	4
	To voice	3	To voice	3
	To pain	2	To pain	2
	No response	1	No response	1
Verbal Response	Coos, babbles	5	Speaks, interacts, social	5
	Irritable cry, consolable	4	Confused speech, consolable	4
	Cries persistently to pain	3	Inappropriate, inconsolable	3
	Moans to pain	2	Incomprehensible, agitated	2
	No response	1	No response	1
Motor Response	Spontaneous	6	Spontaneous	6
	Withdraws (touch)	5	Localizes (pain)	5
	Withdraws (pain)	4	Withdraws (pain)	4
	Decorticate flexion	3	Decorticate flexion	3
	Decerebrate extension	2	Decerebrate extension	2
	No response	1	No response	1

# Protocol 9-1

Continued

## MEDICAL ASSESSMENT

### EXPOSURE:

As much of the patient's body as possible should be exposed for examination, depending on complaint, with the effects of the environment on the patient kept in mind. Discovery of hidden problems before the patient is loaded for transport may allow time to intervene and avoid disastrous complications. Although exposure for examination is emphasized most frequently in care of the trauma patient, it is equally important in the primary assessment of the patient with a medical illness.

The pre-hospital provider should always look under dressings or clothing, which may hide complications or potential problems. Clothing may hide bleeding that occurs as a result of thrombolytic therapy or rashes that may indicate potentially contagious conditions. In inter-facility transport, intravenous access can be wrongly assumed underneath a bulky cover. Once patient assessment has been completed, keep in mind that the patient must be kept warm. Hypothermia can cause cardiac arrhythmias, increased stress response, and hypoxia.

#### Summary of Primary Exposure Assessment

- Identification of injury, active bleeding, or indication of a serious illness.
- Appropriate tube placement:
  - Endotracheal tubes,
  - Chest tubes, feeding tubes,
  - Naso-gastric or oro-gastric tubes, and urinary catheters.
- Intravenous access:
  - Peripheral
  - Central
  - Intraosseous

### SECONDARY FOCUSED ASSESSMENT:

The secondary assessment is performed after the primary assessment is completed and involves evaluation of the patient from head to toe. Illness specific information is collected by means of inspection, palpation, and auscultation during the secondary assessment. Whether the patient has had an injury or is critically ill, the pre-hospital provider should observe, and listen to the patient.

The secondary assessment begins with an evaluation of the patient's general appearance. The pre-hospital provider should observe the surrounding environment and evaluate its effects on the patient. Is the patient aware of the environment? Is there appropriate interaction between the patient and the environment?

Determination of the amount of pain the patient has as a result of illness or injury is also an important component of the patient assessment. Baseline information should be obtained about the pain the patient has so that the effectiveness of interventions can be assessed during transport. Pain relief is one of the most important interventions for pre-hospital patient care providers.

# Protocol

## 9-1

Continued

# MEDICAL ASSESSMENT

Assessment Acronyms:	
S.A.M.P.L.E.	O.P.Q.R.S.T.
<b>S</b> Signs and Symptoms <b>A</b> Allergies <b>M</b> Medications <b>P</b> Pertinent past medical history <b>L</b> Last oral intake <b>E</b> Events leading up to the event	<b>O</b> <b>Onset:</b> ( <i>When did the problem / pain begin?</i> ) <b>P</b> <b>Provocation:</b> ( <i>What makes the problem / pain worse?</i> ) <b>Q</b> <b>Quality:</b> ( <i>Can you describe the problem / pain?</i> ) <b>R</b> <b>Radiation:</b> ( <i>Does the pain move anywhere?</i> ) <b>S</b> <b>Severity:</b> ( <i>On a scale of 1-10, how bad is the pain?</i> ) <b>T</b> <b>Time:</b> ( <i>Does the condition come and go? Duration?</i> )
Summary of Secondary Assessment	
Skin	<ul style="list-style-type: none"> <li>Presence of petechia, purpura, abrasions, bruises, scars, or birthmarks</li> <li>Lacerations, uncontrolled hemorrhage</li> <li>Rashes</li> <li>Abnormal skin turgor</li> <li>Temperature</li> <li>Signs of abuse or neglect</li> </ul>
Head and Neck	<ul style="list-style-type: none"> <li>Gross visual examination</li> <li>Presence of lacerations, contusions, raccoon eyes, Battle's sign, or drainage from the nose, mouth, and ears</li> <li>Abnormal extra-ocular movements</li> <li>Position of the trachea</li> <li>Neck veins</li> <li>Swallowing difficulties</li> <li>Nuchal rigidity</li> <li>Presence of lymphadenopathy or neck masses</li> </ul>
Eyes, Ears, and Nose	<ul style="list-style-type: none"> <li>Lack of tearing, Drainage, Sunken eyes</li> <li>Color of sclera</li> <li>Gross assessment of the hearing</li> <li>Signs of infection or drainage</li> </ul>
Mouth and Throat	<ul style="list-style-type: none"> <li>Mucous membranes</li> <li>Drooling</li> <li>Breath odor</li> <li>Drainage</li> <li>Airway obstruction</li> </ul>
Thorax, Lungs, and Cardiovascular System	<ul style="list-style-type: none"> <li>Breath sounds</li> <li>Heart Sounds</li> </ul>

# Protocol 9-1

Continued

Abdomen	<ul style="list-style-type: none"><li>• Shape and size</li><li>• Bowel sounds</li><li>• Tenderness</li><li>• Firmness</li><li>• Masses (i.e., suprapubic masses)</li><li>• Color of drainage from naso-gastric or oro-gastric tubes</li></ul>
Genitourinary	<ul style="list-style-type: none"><li>• Rectal bleeding</li><li>• Color of urine</li><li>• Urine output</li></ul>
Extremities and Back	<ul style="list-style-type: none"><li>• Gross motor and sensory function</li><li>• Peripheral &amp; Central pulse comparison</li><li>• Lack of use of an extremity</li><li>• Deformity, angulation</li><li>• Wounds, abrasions</li><li>• Vertebral column, flank, buttocks</li></ul>

**MEDICAL ASSESSMENT**

# Protocol 9-1

Continued

## MEDICAL ASSESSMENT

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# Protocol 9-2

**SECTION:** Pediatric General Medical Emergencies

**PROTOCOL TITLE:** Allergic Reaction  
**Medical - Allergic Reaction/Anaphylaxis**

**REVISED:** 06/2013

## OVERVIEW:

Acute respiratory emergencies in the pediatric patient are common. When not properly treated, respiratory distress can result in significant morbidity and mortality. Anaphylaxis in children commonly results from insect stings and, less frequently, from food or medications. Signs of shock as well as upper and lower airway obstruction are frequently present. If the reaction involves the respiratory system, signs similar to severe asthma may be present (cyanosis, wheezing, and respiratory arrest). Patients with allergic reactions frequently have local or generalized swelling while anaphylaxis can be characterized by wheezing, airway compromise, and/ or hypotension.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Onset and location</li> <li>Insect sting or bite</li> <li>Food allergy / exposure</li> <li>New clothing, soap, detergent</li> <li>Past history of reactions</li> <li>Medication history</li> </ul>	<ul style="list-style-type: none"> <li>Itching or hives</li> <li>Coughing / wheezing or respiratory distress</li> <li>Chest or throat constriction</li> <li>Difficulty swallowing</li> <li>Hypotension or shock</li> <li>Edema</li> </ul>	<ul style="list-style-type: none"> <li>Urticaria (rash only)</li> <li>Anaphylaxis (systemic effect)</li> <li>Shock (vascular effect)</li> <li>Angioedema (drug induced)</li> <li>Aspiration / airway obstruction</li> <li>Vaso-vagal event</li> <li>Asthma</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
4. Administer <u>DIPHENHYDRAMINE</u> 1 mg / kg up to 50 mg IM or IV. The IV route is preferred for the patient in severe shock. If an IV cannot be readily established, give diphenhydramine via the IM route.			•	•	•
5. If the patient is experiencing respiratory distress with wheezing, refer to the <u>Respiratory Distress protocol</u> .	•	•	•	•	•
6. Transport as soon as possible.	•	•	•	•	•
7. For severe symptoms such as airway compromise, severe respiratory distress, or hypotension:					
a. If available, administer epinephrine via an EpiPen® or EpiPen Jr.® Autoinjector.		•	•	•	•

ALLERGIC REACTION

# Protocol

## 9-2

Continued

# ALLERGIC REACTION

	A	B	EN	I	P
b. If EpiPen® or EpiPen Jr.® is unavailable; give <u>EPINEPHERINE</u> 1:1,000 0.01 mg / kg up to 0.3 mg IM. Call Medical Control if no improvement.			•	•	•
8. Establish an IV of normal saline at KVO. Titrate to a systolic pressure appropriate for child:			•	•	•
a. Birth to 1 month - 60 mmHg					
b. 1 month to 1 year - > 70 mmHg					
c. Greater than 1 year – 70 + [2 x Age (years)]					
9. If hypoperfusion persists following the first dose of epinephrine, consider administration of 20mL/kg normal saline IV. While administering a fluid bolus, frequently reassess perfusion for improvement. If perfusion improves, slow the IV to KVO and monitor closely. If patient develops fluid overload respiratory distress (dyspnea, crackles, rhonchi, decreasing SpO <sub>2</sub> ), slow the IV to KVO.			•	•	•
10. Administer <u>PREDNISONE</u> 1 - 2 mg / kg up to 60 mg PO if patient is > 3 years old and can swallow pills.			•	•	
11. Transport and perform ongoing assessment as indicated.	•	•	•	•	

Age	Term	6 months	1 year	3 years	6 years	8 years	10 years	12 years	14 years
Weight (lb / kg)	6.6 lb 3 kg	17 lb 8 kg	22 lb 10 kg	30 lb 14 kg	44 lb 20 kg	55 lb 20 kg	75 lb 34 kg	88 lb 40 kg	110 lb 50 kg
Epinephrine 1:1,000 (1 mg / ml) 0.01 mg / kg	0.03 mg	0.08 mg	0.1 mg	0.14 mg	0.2 mg	0.25 mg	0.3 mg	0.3 mg	0.3 mg
Diphenhydramine 1 mg / kg	3.0 mg	8.0 mg	10.0 mg	14.0 mg	20.0 mg	25.0 mg	34.0 mg	40.0 mg	50.0 mg
Prednisone 1 – 2 mg / kg				20.0 mg	20.0 mg	20.0 mg	40.0 mg	40.0 mg	60.0 mg

### PEARLS:

1. The most important component of respiratory distress is airway control.
2. Any pediatric patient presenting with substernal and intercostal retractions is in immediate need of treatment and transport. Do not delay transport with treatments that can be completed enroute.
3. Avoid intravenous initiation or medication administration into same extremity as bite or allergen site.

# Protocol 9-3

**SECTION:** Pediatric General Medical Emergencies

**PROTOCOL TITLE:** Fever  
**General - Fever**

**REVISED:** 06/2013

## OVERVIEW:

Fever is a common chief complaint of children encountered in the pre-hospital environment. Patients with fever present in many different ways, depending on the age of the patient, the rate of rise of the temperature, the magnitude of the fever, the etiology of the fever, and the underlying health of the patient. The patient's skin will be warm to the touch, and may be flushed on observation. The patient may also complain of being warm and perspiring. It is important to recognize that fever represents a symptom of an underlying illness and the actual illness must be determined and treated. Flu-like symptoms may accompany fevers, but it should not be assumed that fevers with these symptoms are minor, as there may be a serious underlying medical condition. Febrile seizures usually are self-limiting and typically occur once from a rapid rise in temperature, usually above 101.8°F / 38.7°C. If more than one seizure occurs, causes other than fever should be suspected. The first occurrence of a seizure warrants the most concern, because the benign nature of the illness has not been established.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"><li>• Age</li><li>• Duration of fever</li><li>• Severity of fever</li><li>• Any previous decrease or elevation of fever since onset</li><li>• Past medical history</li><li>• Medications</li><li>• Immuno-compromised (transplant, HIV, diabetes, cancer)</li><li>• Recent illness or socialization with others with illness.</li><li>• Vaccinations</li><li>• Poor PO intake</li><li>• Urine production, decrease in diapers</li><li>• Last acetaminophen dose</li></ul>	<ul style="list-style-type: none"><li>• Altered mental status</li><li>• Unconsciousness</li><li>• Hot, dry, or flushed skin</li><li>• Tachycardia</li><li>• Hypotension, shock</li><li>• Seizures</li><li>• Nausea, vomiting</li><li>• Weakness, dizziness, syncope</li><li>• Restlessness</li><li>• Loss of appetite</li><li>• Decreased urine output</li><li>• Rapid, shallow respirations</li><li>• Associated symptoms (helpful in localizing source): Myalgias, cough, chest pain, headache, dysuria, abdominal pain, mental status changes, rash</li></ul>	<ul style="list-style-type: none"><li>• Infection, sepsis</li><li>• Neoplasm's, cancer, tumors, lymphomas</li><li>• Medication or drug reaction</li><li>• Connective tissue disease</li><li>• Vasculitis</li><li>• Thermoregulatory disorder</li><li>• Hyperthyroid</li><li>• Heat Stroke</li><li>• Drug fever</li></ul>

FEVER

# Protocol 9-3

Continued

## FEVER

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen to maintain $\text{SPO}_2$ 94 - 99%	•	•	•	•	•
4. If the patient is having a seizure, refer to the <i>Pediatric Seizure protocol</i> .	•	•	•	•	•
5. If temperature is greater than 106° F / 41°C, refer to <i>Hyperthermia Patient Care Protocol</i> .	•	•	•	•	•
6. Begin passive cooling by removing excess and constrictive clothing. Avoid over-exposure.	•	•	•	•	•
7. Obtain blood glucose sample. If glucose is < 60 mg / dL or > 300 mg / dL, refer to <i>Pediatric Hypoglycemia</i> or <i>Hyperglycemia Patient Care Protocol</i> .		•	•	•	•
8. Establish an IV of normal saline at KVO. Titrate to a systolic pressure appropriate for child: a. Birth to 1 month - 60 mmHg b. 1 month to 1 year - > 70 mmHg c. Greater than 1 year - 70 + [2 x Age (years)]			•	•	•
9. If hypoperfusion is suspected, refer to the <i>Pediatric Shock protocol</i> .	•	•	•	•	•
10. Perform ongoing assessment as indicated and transport promptly.		•	•	•	•

### PEARLS:

1. Fevers with rashes are abnormal and should be considered very serious.
2. Fevers in infant's ≤ 3 months old should be considered very serious.
3. Patient may seize if temperature change is rapid, be cautious and prepared to manage both seizure activity and airway at all times.
4. If fever is present with hypotension, it may indicate the patient is in septic shock.
5. Febrile seizures are more likely in children with a history of febrile seizures.
6. It is important to know if an elevation in temperature signals the abrupt onset of fever or represents the gradual worsening of a long-term fever.
7. Cooling in the pre-hospital environment with water, alcohol, or ice is discouraged.
8. Fevers in children of 104°F / 40°C for greater than 24 hours should be considered serious.
9. A common error in the treatment of fever is to wrap the patient in multiple layers of clothing and blankets. This only contributes to the rise in temperature.

# Protocol 9-4

**SECTION:** Pediatric General Medical Emergencies

**PROTOCOL TITLE:** Foreign Body Aspiration  
**Airway – Obstruction/Foreign Body**

**REVISED:** 06/2013

## OVERVIEW:

Airway obstruction is one of the most readily treatable yet immediately life-threatening emergencies faced by pre-hospital providers. Approximately 3000 deaths occur each year in the United States from choking. Most of these deaths are in children younger than four years of age. In children, you should consider the possibility of foreign body aspiration in any patient who presents with ongoing respiratory distress or resolved respiratory distress. The child may have a history of a sudden onset of respiratory distress with choking and cough, by an absence of symptoms and then followed by delayed stridor or wheezing. This cycle occurs when the foreign body is not cleared from the airway but passes distally into the smaller airways. In children, a foreign body may also lodge in the esophagus, causing stridor. Patients may present with any degree of obstruction from simple hoarseness cleared with a cough to complete obstruction requiring a surgical airway, such as a cricothyrotomy. Significant airway obstruction can occur at any time. Early recognition and treatment is essential to a successful outcome. Because of this, it is important to distinguish this problem from more serious conditions that cause sudden respiratory failure, but are treated differently.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"><li>• Age</li><li>• What was happening at onset? (Missing Toys?)</li><li>• Fever</li><li>• Traumatic mechanism</li><li>• Improvement or worsening with movement</li><li>• Past medical / surgical history</li><li>• Medications</li></ul>	<ul style="list-style-type: none"><li>• Stridor, hoarseness, wheezing</li><li>• Ineffective respirations</li><li>• Universal sign of choking</li><li>• Tachycardia</li><li>• Tachypnea</li><li>• Flushing, cyanosis, chills, diaphoresis</li><li>• Presence of drooling, trismus, angio-neurotic edema</li></ul>	<ul style="list-style-type: none"><li>• Croup</li><li>• Epiglottitis</li><li>• Angio-neurotic edema</li><li>• Traumatic obstruction</li><li>• Chemical or thermal injury</li><li>• Abscesses</li><li>• Tumors and cysts</li></ul>

## FBAO – CONSCIOUS PATIENT: ≥ 1 YEAR OF AGE

	A	B	EN	I	P
1. For the suspected conscious choking victim, quickly ask, “Are you choking?” If the victim indicates “yes” by nodding his head without speaking, this will verify that the victim has severe airway obstruction.	•	•	•	•	•
a. Note: If the patient has a mild obstruction and is coughing forcefully; do not interfere with the patient’s spontaneous coughing / breathing effort.	•	•	•	•	•
2. Apply abdominal thrusts (Heimlich maneuver) in rapid sequence until the obstruction is relieved.	•	•	•	•	•

# FOREIGN BODY ASPIRATION

# Protocol

## 9-4

Continued

# FOREIGN BODY ASPIRATION

	A	B	EN	I	P
a. If the choking patient is obese and the rescuer cannot encircle the patient's abdomen, use chest thrusts instead of abdominal thrusts.	•	•	•	•	•
b. If the choking patient is in the late stages of pregnancy, use chest thrusts instead of abdominal thrusts.	•	•	•	•	•
3. If the patient becomes unresponsive, carefully support the patient to the ground and follow the FBAO – UNCONSCIOUS PATIENT GREATER THAN OR EQUAL TO 1 YEAR OF AGE protocol.	•	•	•	•	•
4. Transport and perform ongoing assessment.		•	•	•	•

### FBAO – CONSCIOUS PATIENT: ≤ 1 YEAR OF AGE

	A	B	EN	I	P
1. Assess the patient to determine the extent of the obstruction. When the airway obstruction is mild, the infant can cough and make some sounds. When the airway obstruction is severe, the infant cannot cough or make any sound.	•	•	•	•	•
2. If FBAO is mild, do not interfere. Allow the victim to clear the airway by coughing while you observe for signs of severe FBAO.	•	•	•	•	•
3. If the FBAO is severe (i.e., the victim is unable to make a sound), deliver 5 back blows (slaps) followed by 5 chest thrusts.	•	•	•	•	•
4. If the patient becomes unresponsive, follow the FBAO – UNCONSCIOUS PATIENT LESS THAN 1 YEAR OF AGE protocol.	•	•	•	•	•
5. Transport and perform ongoing assessment.		•	•	•	•

### FBAO -- UNCONSCIOUS PATIENT: ≥ 1 YEAR OF AGE

	A	B	EN	I	P
1. If the patient was previously conscious with an airway obstruction, carefully support the patient to the ground.	•	•	•	•	•
2. Use head-tilt, chin lift or jaw thrust (suspected trauma) to open airway. Look for an object in the patient's mouth. Use a finger sweep only when you can see solid material obstructing the airway.	•	•	•	•	•
3. Assess the patient's breathing.	•	•	•	•	•
4. If respirations are absent, deliver 2 breaths. If chest rise is not detected, reposition the airway, make a better	•	•	•	•	•

# Protocol 9-4

Continued

## FOREIGN BODY ASPIRATION

	A	B	EN	I	P
mask seal and try again.					
5. If unable to deliver rescue breaths, start CPR.	•	•	•	•	•
6. Each time the airway is opened during CPR, look for an object and remove if found with a finger sweep.	•	•	•	•	•
7. If the FBAO is not relieved by BLS maneuvers, attempt direct visualization of the airway via laryngoscopy. If the obstruction is visualized, use forceps to remove the obstruction.			•	•	•
8. If the FBAO is not relieved by BLS maneuvers or laryngoscopy, perform a <i>cricothyrotomy</i> . For children younger than 12, a needle cricothyrotomy with percutaneous transtracheal (jet) ventilation is the surgical airway of choice.					•
9. Transport and perform ongoing assessment.		•	•	•	•

### FBAO -- UNCONSCIOUS PATIENT: ≤ 1 YEAR OF AGE

	A	B	EN	I	P
1. If the patient was previously conscious with an airway obstruction, carefully position the patient for CPR.	•	•	•	•	•
2. Use head-tilt, chin lift or jaw thrust (suspected trauma) to open airway. Look for an object in the patient's mouth. Use a finger sweep only when you can see solid material obstructing the airway.	•	•	•	•	•
3. Assess the patient's breathing.	•	•	•	•	•
4. If respirations are absent, deliver 2 breaths. If chest rise and fall is not detected, reposition the airway, make a better mask seal and try again.	•	•	•	•	•
5. If unable to deliver rescue breaths, start CPR.	•	•	•	•	•
6. Each time the airway is opened during CPR, look for an object and remove if found with a finger sweep.	•	•	•	•	•
7. If the FBAO is not relieved by BLS maneuvers, attempt direct visualization of the airway via laryngoscopy. If the obstruction is visualized, use forceps to remove the obstruction.			•	•	•
8. Transport and perform ongoing assessment.		•	•	•	•

# Protocol

## 9-4

Continued

# FOREIGN BODY ASPIRATION

### PEARLS:

1. Abnormal auscultative sounds are more inspiratory if the foreign body is in the extra-thoracic trachea. If the object is in the intra-thoracic trachea, noises will be symmetric but sound more prominent in the central airways. The sounds are a coarse wheeze (sometimes referred to as an inspiratory stridor) heard with the same intensity over the entire chest.
2. Once the foreign body passes the carina, the breath sounds are usually asymmetric. However, remember that the chest of younger patients transmits sound well, and the stethoscope head is often bigger than the lobes being auscultated. A lack of asymmetry should not dissuade the provider from considering the diagnosis.

# Protocol

## 9-5

**SECTION:** Pediatric General Medical Emergencies

**PROTOCOL TITLE:** Hyperglycemia  
**Medical – Hyperglycemia**

**REVISED:** 06/2013

### OVERVIEW:

Diabetes mellitus is the most common endocrine disorder of childhood, affecting approximately 2 / 1,000 school-age children in the United States. Symptomatic hyperglycemia is defined as a blood glucose level > 300 mg/dl with signs of severe dehydration, altered mental status, and/ or shock. Hyperglycemia is usually the result of an inadequate supply of insulin to meet the body's needs. Most pre-hospital care should be focused around the treatment of severe dehydration and support of vital functions.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>History of diabetes</li> <li>Onset of symptoms</li> <li>Medications</li> </ul>	<ul style="list-style-type: none"> <li>Anxiety, agitation, and / or confusion</li> <li>Dry, red, and / or warm skin</li> <li>Fruity / acetone smell on breath</li> <li>Kussmaul respirations</li> <li>Dry mouth, intensive thirst</li> <li>Abnormal/ hostile behavior</li> <li>Tachycardia</li> <li>Dizziness / headache</li> </ul>	<ul style="list-style-type: none"> <li>Hypoxia</li> <li>Brain trauma</li> <li>Alcohol intoxication</li> <li>Toxin / substance abuse</li> <li>Medication effect / overdose</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Assess for signs of trauma. Provide spinal immobilization as necessary.	•	•	•	•	•
4. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
5. For altered mental status, perform rapid glucose determination.	•	•	•	•	•
6. If glucose > 300 mg / dL, start an IV of normal saline.			•	•	•
7. For signs and symptoms of hypovolemic shock or dehydration, follow the <i>Pediatric Shock protocol</i> .	•	•	•	•	•

**HYPERGLYCEMIA**

# Protocol 9-5

Continued

## HYPERGLYCEMIA

	A	B	EN	I	P
8. If glucose level is > 300 mg / dL, and no signs of shock are noted, administer maintenance Normal Saline infusion: <ul style="list-style-type: none"><li>• 4.0 ml / kg for first 1 - 10 kg of weight.</li><li>• Add 2.0 ml / kg for next 11 - 20 kg of weight.</li><li>• Add 1.0 ml / kg, for every kg of weight, &gt; 20 kg.</li><li>• Multiply total amount x 2= total hourly hyperglycemic maintenance amount.</li></ul>				•	•
9. Place on cardiac monitor and obtain / interpret <u>12 lead ECG</u> per assessment.				•	•
10. Transport and perform ongoing assessment as indicated.	•	•	•	•	

### PEARLS:

1. Know your specific agency's glucometer parameters for a "HI" and "LO" reading.
2. It is estimated that 2 - 8% of all hospital admissions are for the treatment of DKA, while mortality for DKA is between 2 - 10%. Published mortality rates for HHS vary, but the trend is that the older the patient and higher the osmolarity, the greater the risk of death.

# Protocol

## 9-6

**SECTION:** Pediatric General Medical Emergencies

**PROTOCOL TITLE:** Hypoglycemia  
**Medical - Hypoglycemia/Diabetic Emergency**

**REVISED:** 06/2013

### OVERVIEW:

Symptomatic hypoglycemia is defined as a blood glucose level < 60 mg / dL with signs of altered mental status and / or unconsciousness. The many signs and symptoms that are associated with hypoglycemia can be divided into two broad categories: adrenergic and neurologic. The adrenergic stimulation is due to the increased epinephrine levels and the neurologic due to central nervous system dysfunction from the decreased glucose levels.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>History of diabetes</li> <li>Onset of symptoms</li> <li>Medications</li> <li>Fever or recent infection</li> <li>Alcohol consumption</li> <li>Last meal</li> </ul>	<ul style="list-style-type: none"> <li>Anxiety, agitation, and / or confusion</li> <li>Cool, clammy skin</li> <li>Diaphoresis</li> <li>Seizure</li> <li>Decreased visual acuity, blindness</li> <li>Abnormal/ hostile behavior</li> <li>Tachycardia</li> <li>Hypertension</li> <li>Dizziness, headache, weakness</li> </ul>	<ul style="list-style-type: none"> <li>Hypoxia</li> <li>Seizure</li> <li>Stroke</li> <li>Brain trauma</li> <li>Alcohol intoxication</li> <li>Toxin/ substance abuse</li> <li>Medication effect / overdose</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Assess for signs of trauma. Provide spinal immobilization as necessary.	•	•	•	•	•
4. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
5. For altered mental status, perform rapid glucose determination.	•	•	•	•	•
6. If glucose < 60 mg / dL or clinical signs and symptoms indicate hypoglycemia:					
a. If the patient can protect airway, give Oral Glucose 15 grams. Repeat in 15 minutes if necessary.		•	•	•	•
7. If glucose < 60 mg / dL or clinical signs and symptoms indicate hypoglycemia and oral glucose is contraindicated: Establish an IV of normal saline at KVO			•	•	•

**HYPOGLYCEMIA**

# Protocol 9-6

Continued

## HYPOGLYCEMIA

	A	B	EN	I	P
a. If the patient is < 30 days old, administer <u>DEXTROSE 10%</u> (2 cc / kg) via IV or IO.			•	•	•
b. If the patient is > 30 days old, but < 8 years old, administer <u>DEXTROSE 25%</u> (2 cc / kg) via IV or IO.			•	•	•
c. If the patient is > 8 years old, administer <u>DEXTROSE 50%</u> (0.5 mg / kg, max 25 mg) via IV or IO.			•	•	•
d. If unable to establish an IV, alternatively administer <u>GLUCAGON</u> <ul style="list-style-type: none"> <li>• Under 20 kg: 0.5 mg IM</li> <li>• &gt;20 kg 1 mg IM</li> </ul>			•	•	•
8. For signs and symptoms of hypovolemic shock or dehydration, follow the <u>Pediatric Shock protocol</u> .	•	•	•	•	•
9. Place on cardiac monitor per patient assessment.				•	•
10. Transport and perform ongoing assessment as indicated.	•	•	•	•	•

Procedure for making Dextrose 25% and 10%	
Dextrose 25%	Dextrose 10%
In 50 ml syringe, mix 25 ml of Dextrose 50% with 25 ml Normal Saline. Mixture will yield 50 ml of Dextrose 25%	In 50 ml syringe, mix 10 ml of Dextrose 50% with 40 ml Normal Saline. Mixture will yield 50 ml of Dextrose 10%

Age	Pre-Term	Term	3 months	6 months	1 year	3 years	6 years	8 years
Weight (lb / kg)		6.6 lb 3 kg	13.2 lb 6 kg	17.6 lb 8 kg	22 lb 10 kg	30.8 lb 14 kg	44 lb 20 kg	55 lb 25 kg
Glucagon 0.1 mg / kg		0.3 mg	0.6 mg	0.8 mg	1.0 mg	1.0 mg	1.0 mg	1.0 mg
Dextrose 10% 2.0 ml / kg	3.0 ml	6.0 ml						
Dextrose 25% 2.0 ml / kg			12.0 ml (3 gm)	16.0 ml (4 gm)	20.0 ml (5 gm)	28.0 ml (7 gm)	40.0 ml (10 gm)	50.0 ml (12.5 gm)

# Protocol 9-6

Continued

## **PEARLS:**

1. Hypoglycemia is the most common metabolic problem in neonates.
2. Use aseptic techniques to draw blood from finger. Allow alcohol to dry completely prior to puncturing finger for blood glucose level. Alcohol may cause inaccurate readings. Do not blow on or fan site to dry faster.
3. Blood glucose levels should be taken from extremity opposite IV and medication administration for most accurate reading.
4. After puncturing finger, use only moderate pressure to obtain blood. Excessive pressure may cause rupture of cells causing inaccurate results.
5. Know your specific agency's glucometer parameters for a "HI" and "LO" reading.
6. When administering IV fluids, a minimum amount should be delivered as large amounts may lower blood glucose level and impede original goal of administering Dextrose.
7. Patients who are consuming aspirin, acetaminophen, anti-psychotic drugs, beta-blockers, oral diabetic medications, or antibiotics such as sulfa-based, tetracycline, and amoxicillin that experience a hypoglycemic episode are at a greater risk for relapse. These patients should be strongly encouraged to accept transport.
8. An inadequate amount of glucose for heat production, combined with profound diaphoresis, may place a hypoglycemic patient at greater risk for hypothermia. Keep patient warm as needed.
9. Glucagon causes a breakdown of stored glycogen to glucose. Glucagon may not work if glycogen stores are previously depleted due to liver dysfunction, alcoholism, or malnutrition. Effects of Glucagon may take up to 30 minutes.
10. Any patient that has had a hypoglycemic episode without a clear reason should be transported for further evaluation.

**HYPOGLYCEMIA**

# Protocol

## 9-6

Continued

# HYPOGLYCEMIA

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# Protocol

## 9-7

**SECTION:** Pediatric General Medical Emergencies

**PROTOCOL TITLE:** Nausea and Vomiting  
**Medical - Nausea/Vomiting**

**REVISED:** 06/2013

### OVERVIEW:

The pre-hospital provider should be very careful to insure that patients who present with vague complaints such as nausea and vomiting are thoroughly evaluated. The patient's symptoms and recent history must determine the most appropriate care. Frequently, treatment of an underlying cause and limiting movement may resolve or greatly reduce these complaints. However, persistent nausea and vomiting of unknown etiology may respond well to pharmaceutical therapy. All patients presenting with nausea and vomiting should be screened for potential life-threats initially. Anti-emetic treatment should occur only as a secondary priority.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Age</li> <li>• Time of last meal</li> <li>• Last bowel movement, emesis</li> <li>• Improvement, worsening with food or activity</li> <li>• Duration of signs and symptoms</li> <li>• Other sick contacts</li> <li>• Past medical, surgical history</li> <li>• Medications</li> <li>• Menstrual history (pregnancy)</li> <li>• Travel history</li> <li>• Recent trauma</li> </ul>	<ul style="list-style-type: none"> <li>• Pain</li> <li>• Character of pain (constant, intermittent, sharp, dull, etc.)</li> <li>• Distention</li> <li>• Constipation</li> <li>• Diarrhea</li> <li>• Anorexia</li> <li>• Radiation</li> <li>• Associated symptoms (helpful to localize source)</li> <li>• Fever, headache, blurred vision, weakness, malaise, myalgias, cough, dysuria, mental status changes, rash</li> </ul>	<ul style="list-style-type: none"> <li>• CNS (increased pressure, headache, lesions, trauma, hemorrhage, vestibular)</li> <li>• Drugs (NSAID's, antibiotics, narcotics, chemotherapy)</li> <li>• GI or renal disorders</li> <li>• Gynecological disease (ovarian cyst, PID)</li> <li>• Infections (pneumonia, influenza)</li> <li>• Electrolyte abnormalities</li> <li>• Food or toxin induced</li> <li>• Medications, substance abuse</li> <li>• Pregnancy</li> <li>• Psychologic</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
4. Allow the patient to lie in a comfortable position.	•	•	•	•	•
5. Establish an IV of normal saline per patient assessment.			•	•	•
6. Assess for signs of shock. If shock is suspected, follow the <u>Pediatric Shock protocol</u> .	•	•	•	•	•

# NAUSEA AND VOMITING

# Protocol

## 9-7

Continued

# NAUSEA AND VOMITING

	A	B	EN	I	P
7. For severe nausea or vomiting, if available, give <b>ONDANSETRON (ZOFTRAN)</b> . <ul style="list-style-type: none"> <li>• *If only IV formulation is available, administer 0.1 mg / kg IV / IM up to 4 mg over 2 to 5 minutes.*</li> </ul>				•	•
8. May repeat Ondansetron PO or IV dosing after 10 minutes if needed.				•	•
9. Perform ongoing assessment as indicated and transport.	•	•	•	•	

Age	Term	6 months	1 year	3 years	6 years	8 years	10 years	12 years	14 years
Weight (lb / kg)	6.6 lb 3 kg	17.6 lb 8 kg	22 lb 10 kg	30.8 lb 14 kg	44 lb 20 kg	55 lb 25 kg	75 lb 34 kg	88 lb 40 kg	110 lb 50 kg
Ondansetron (IV) 0.1 mg / kg			1.0 mg	1.5 mg	2.0 mg	2.5 mg	3.5 mg	4.0 mg	4.0 mg

### PEARLS:

1. Nausea and vomiting has many subtle, sometimes life threatening causes. Do not minimize its importance as a symptom.
2. Ondansetron may not be as effective for vertigo and labyrinthitis related nausea and vomiting.
3. For nausea and vomiting associated with dehydration, fluid replenishment may be sufficient in improving patient comfort and reduce the need for medication administration.
4. Ensuring that you have reasonably addressed possible causes, will help minimize the potential that you are overlooking a life-threat and / or concern that should receive priority over anti-emetic treatment.
5. In cases of toxic ingestion, including alcohol, poisons, and drug overdoses, vomiting is an internal protective mechanism and should not be prevented with pharmacological therapy in the pre-hospital environment. Care should be given to prevent aspiration.
6. Ondansetron is also safe and effective for nausea and vomiting in trauma patients and can be used in conjunction with pain management.
7. Proper documentation should include the mental status and vital signs before and after medication administration.

# Protocol 9-8

**SECTION:** Pediatric General Medical Emergencies

**PROTOCOL TITLE:** Pain Management  
**General - Pain Control**

**REVISED:** 06/2013

## OVERVIEW:

The practice of pre-hospital emergency medicine requires expertise in a wide variety of pharmacological and non-pharmacological techniques to treat acute pain resulting from a myriad of injuries and illness. One of the most essential missions for all healthcare providers should be the relief and / or prevention of pain and suffering. Approaches to pain relief must be designed to be safe and effective in the organized chaos of the pre-hospital environment. The degree of pain and the hemodynamic status of the patient will determine the rapidity of care.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Age</li> <li>• Location</li> <li>• Duration</li> <li>• Severity (1-10)</li> <li>• Past medical history</li> <li>• Medications</li> <li>• Drug allergies</li> </ul>	<ul style="list-style-type: none"> <li>• Severity (pain scale)</li> <li>• Quality (sharp, dull, etc)</li> <li>• Radiation</li> <li>• Relation to movement, respiration</li> <li>• Increased with palpation of area</li> </ul>	<ul style="list-style-type: none"> <li>• Musculoskeletal</li> <li>• Visceral (abdominal)</li> <li>• Cardiac</li> <li>• Pleural, respiratory</li> <li>• Neurogenic</li> <li>• Renal (colic)</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
3. Determine and document patient's pain score assessment.	•	•	•	•	•
4. Place patient on cardiac monitor per patient assessment.			•	•	•
5. Establish IV of normal saline per patient assessment.			•	•	•
6. If significant pain, administer FENTANYL 2 mcg / kg INTRANASAL (max first dose of 50 mcg) half dose in each nostril. May consider additional dose of up to 100mcg after 5 minutes if pain persists –OR– <u>FENTANYL</u> 1 mcg / kg IV, or IM (max single dose of 50 mcg). Sickle cell patients may be given higher doses up to 100 mcg IV, or IM. <i>*** There are no documented cases of chest rigidity with the administration of Fentanyl INTRANASALLY ***</i>				•	•
7. If Fentanyl unavailable, administer <u>MORPHINE SULPHATE</u> 0.1 mg / kg IV or IM (max single dose of 5.0 mg). Sickle cell patients may be given higher doses up to 10 mg IV or IM.				•	•
8. Repeat the patient's pain score assessment.	•	•	•	•	•

PAIN MANAGEMENT

# Protocol

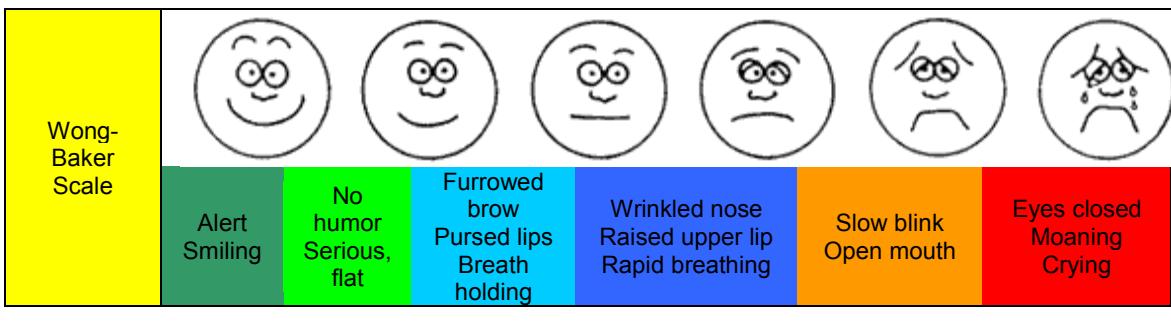
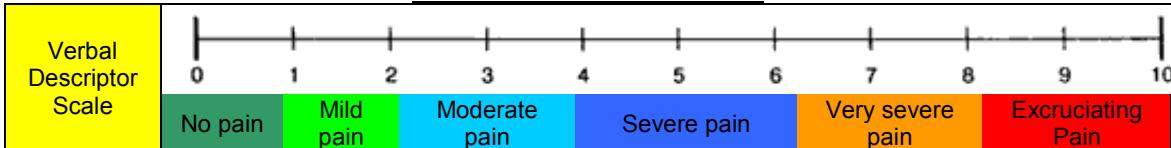
## 9-8

Continued

# PAIN MANAGEMENT

	A	B	EN	I	P
9. If indicated based on pain assessment, repeat pain medication administration after 10 minutes of the previous dose. Maximum total dose of Fentanyl is 200 mcg and Morphine Sulphate is 20 mg for non-sickle cell patients. Sickle cell patients may have up to a total of 400 mcg of Fentanyl or 40mg of Morphine Sulphate.				•	•
10. Transport in position of comfort and reassess as indicated.		•	•	•	•

Universal Pain Assessment Tool



Activity Tolerance Scale	No pain	Can be ignored	Interferes with tasks	Interferes with concentration	Interferes with basic needs	Bed rest required
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Spanish	Nada de dolor	Un poquito dedolor	Un dolor leve	Dolor fuerte	Dolor demasiado fuerte	Un dolor insoportable
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Chart Courtesy of Richmond Ambulance Authority

Age	Term	6 month	1 year	3 years	6 years	8 years	10 years	12 years	14 years
Weight (lb / kg)	6.6 lb 3 kg	17.6 lb 8 kg	22 lb 10 kg	30.8 lb 14 kg	44 lb 20 kg	55 lb 25 kg	75 lb 34 kg	88 lb 40 kg	110 lb 50 kg
Fentanyl IM	3 mcg	8 mcg	10 mcg	14 mcg	20 mcg	25 mcg	34 mcg	40 mcg	50 mcg
Fentanyl IN	6mcg	16mcg	20mcg	28mcg	40mcg	50mcg	50mcg	50mcg	50mcg
Morphine Sulfate 0.1 mg / kg			1.0 mg	1.4 mg	2.0 mg	2.5 mg	3.5 mg	4.0 mg	5.0 mg

# Protocol 9-8

Continued

## PAIN MANAGEMENT

### PEARLS:

1. Pain severity (0 - 10) is a vital sign that should be recorded before and after IV or IM medication administration and upon arrival at destination.
2. Contraindications to opiate administration include hypotension, head injury, and respiratory depression.
3. All patients should have drug allergies ascertained prior to administration of pain medication.
4. Patients receiving narcotic analgesics should be administered oxygen.
5. Narcotic analgesia was historically contraindicated in the pre-hospital setting for abdominal pain of unknown etiology. It was thought that analgesia would hinder the ER physician or surgeon's evaluation. Recent studies have demonstrated opiate administration may alter the physical examination findings, but these changes result in no significant increase in management errors.<sup>1</sup>
6. Fentanyl is contraindicated for patients who have taken MAOIs within past 14 days, and used with caution in patients with head injuries, increased ICP, COPD, and liver or kidney dysfunction.

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<sup>1</sup> JAMA. 2006; 296(14):1764-74 (ISSN: 1538-3598)

Ranji SR; Goldman LE; Simel DL; Shojania KG

# Protocol 9-8

Continued

## PAIN MANAGEMENT

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# Protocol 9-9

**SECTION:** Pediatric General Medical Emergencies

**PROTOCOL TITLE:** Poisoning/ Overdose  
**Medical - Overdose/Poisoning/Toxic Ingestion**

**REVISED:** 06/2013

## OVERVIEW:

Ingestion and overdose are among the most common pediatric “accidents.” The substance usually is a medication prescribed for family members or for the child. Other commonly ingested poisons include cleaning chemicals, plants and anything that fits in a child’s mouth. Primary manifestations may be a depressed mental status and / or respiratory and cardiovascular compromise. Contact Medical Control for patient care orders. Contact Poison Control (804-828-1222 or 800-222-1222) for advice. **Do not confuse Poison Control with Medical Control.**

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Use or suspected use of a potentially toxic substance</li> <li>• Substance ingested, route, and quantity used</li> <li>• Time of use</li> <li>• Reason (suicidal, accidental, criminal)</li> <li>• Available medications in home</li> </ul>	<ul style="list-style-type: none"> <li>• Mental status changes</li> <li>• Hypotension / hypertension</li> <li>• Hypothermia / hyperthermia</li> <li>• Decreased respiratory rate</li> <li>• Tachycardia, other dysrhythmias</li> <li>• Seizures</li> </ul>	<ul style="list-style-type: none"> <li>• Acetaminophen (Tylenol)</li> <li>• Depressants</li> <li>• Stimulants</li> <li>• Anticholinergic</li> <li>• Cardiac medications</li> <li>• Solvents, alcohols</li> <li>• Cleaning agents</li> <li>• Insecticides</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
4. Establish an IV of normal saline per patient assessment.			•	•	•
5. If child is over 20kg and respiratory effort remains diminished and opiate administration is suspected, give <u>NARCAN</u> INTRANASAL max 2mg -OR- <u>NARCAN</u> 0.1 mg / kg slow IVP/IM max 2mg.			•	•	•
6. Place patient on cardiac monitor and monitor pulse oximetry.				•	•
7. Transport and perform ongoing assessment as indicated.		•	•	•	•

Age	Pre-Term	Term	3 mos.	6 mos.	1 year	3 years	6 years	8 years
Weight (lb / kg)	3.3 lb 1.5 kg	6.6 lb 3 kg	13.2 lb 6 kg	17.6 lb 8 kg	22 lb 10 kg	30.8 lb 14 kg	44 lb 20 kg	55 lb 25 kg
Narcan IV 0.1 mg / kg	0.15 mg	0.3 mg	0.6 mg	0.8 mg	1.0 mg	1.4 mg	2.0 mg	2.0 mg

**POISONING / OVERDOSE**

# Protocol 9-9

Continued

## POISONING / OVERDOSE

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# Protocol 9-10

**SECTION:** Pediatric General Medical Emergencies

**PROTOCOL TITLE: Respiratory Distress/Asthma**

**Medical - Respiratory Distress / Asthma / COPD / Croup / Reactive Airway**

**REVISED:** 06/2013

## OVERVIEW:

Respiratory distress is characterized by a clinically recognizable increase in work of breathing while respiratory failure is characterized by ineffective respirations with a decreased level of consciousness. Acute respiratory emergencies in the pediatric patient are common. When not properly treated, respiratory distress can result in significant morbidity and mortality. One of the common causes of respiratory distress is asthma. The treatment of patients in severe asthmaticus must be prompt and efficient. Decisive intervention is mandatory to insure the best outcome. Appearance of the child reflects the adequacy of oxygenation and ventilation. An increased effort to breathe may indicate an airway obstruction or lack of oxygenation. Decreased breathing effort may indicate impending respiratory failure.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Time of onset</li> <li>• Possibility of foreign body</li> <li>• Medical history</li> <li>• Medications</li> <li>• Fever or respiratory infection</li> <li>• Other sick siblings</li> <li>• History of trauma</li> </ul>	<ul style="list-style-type: none"> <li>• Wheezing or stridor</li> <li>• Respiratory retractions</li> <li>• See-saw respirations</li> <li>• Diaphoresis</li> <li>• Tripod position</li> <li>• Increased heart rate</li> <li>• Altered LOC</li> <li>• Anxious appearance</li> </ul>	<ul style="list-style-type: none"> <li>• Asthma</li> <li>• Aspiration</li> <li>• Foreign body</li> <li>• Infection</li> <li>• Pneumonia, croup, epiglottitis</li> <li>• Congenital heart disease</li> <li>• Medication or toxin</li> <li>• Trauma</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen to maintain $\text{SPO}_2$ 94 - 99%. Support respirations as necessary with a BVM.	•	•	•	•	•
4. Place patient in a position of comfort, typically sitting upright.	•	•	•	•	•
5. Monitor Capnography, if available.			•	•	•
6. Assist patient with prescribed METERED DOSE INHALER (MDI). If no dosing schedule is prescribed, repeat in 5 to 10 minutes as needed.		•	•	•	•

# RESPIRATORY DISTRESS/ASTHMA

# Protocol 9-10

Continued

## RESPIRATORY DISTRESS/ASTHMA

	A	B	EN	I	P
7. If in critical respiratory distress, provide BVM ventilation with patient's spontaneous efforts. If patient becomes unresponsive, perform BVM ventilation with an airway adjunct. If BVM ventilation is inadequate, secure airway with an <u>alternative airway</u> or endotracheal tube [P only].		•	•	•	•
<b>For patients in respiratory distress:</b>					
8. Give <u>ALBUTEROL</u> 2.5 to 5.0 mg and <u>IPRATROPIUM</u> 0.5 mg via small volume nebulizer.	O M D	•	•	•	•
a. Greater than or equal to 4 years of age – nebulizer with mouthpiece or facemask.		•	•	•	•
b. Repeat Albuterol every 10 minutes up to 4 treatments if respiratory distress persists and no contraindications develop. Note: Ipratropium bromide is only administered with the 1 <sup>st</sup> treatment.		•	•	•	•
9. Start an IV of normal saline.		•	•	•	•
10. If older than 3 years old and can swallow pills, administer <u>PREDNISONE</u> 1 – 2 mg / kg up to 60 mg PO.			•	•	•
11. Administer <u>CPAP</u> with 5 - 10 cm H <sub>2</sub> O PEEP for moderate to severe dyspnea.	•	•	•	•	•
12. In the asthmatic patient, for severe respiratory distress that is non-responsive to standard medications, consider administration of <u>MAGNESIUM SULFATE</u> 40 mg / kg IV over 20 minutes (max dose of 2 grams).			•	•	•
13. In the asthmatic patient, for severe respiratory distress that is non-responsive to standard medications, consult Medical Control to consider administration of <u>EPINEPHRINE</u> 1:1,000 0.01 mg / kg up to 0.3 mg IM.			MC	MC	
14. Place on cardiac monitor and obtain <u>12 lead ECG</u> per assessment.			•	•	•
15. Transport and perform ongoing assessment as indicated.	•	•	•	•	•

Age	Term	6 mos.	1 year	3 years	6 years	8 years	10 years	12 years	14 years
Weight (lb / kg)	6.6 lb 3 kg	17.6 lb 8 kg	22 lb 10 kg	30.8 lb 14 kg	44 lb 20 kg	55 lb 20 kg	75 lb 34 kg	88 lb 40 kg	110 lb 50 kg
Prednisone 1 – 2 mg / kg				20.0 mg	20.0 mg	20.0 mg	40.0 mg	40.0 mg	60.0 mg
Magnesium Sulfate 40 – 45 mg / kg						800 mg	1.5 gm	1.5 gm	2.0 gm

# Protocol 9-10

Continued

Epinephrine 1:1,000 (1 mg / ml) 0.01 mg / kg	0.03 mg	0.08 mg	0.1 mg	0.14 mg	0.2 mg	0.25 mg	0.3 mg	0.3 mg	0.3 mg
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## PEARLS:

1. The most important component of respiratory distress is airway control.
2. Any pediatric patient presenting with substernal and intercostal retractions is in immediate need of treatment and transport. Do not delay on scene with treatments that can be completed enroute.
3. Intramuscular epinephrine administration assists with bronchodilation throughout lung tissue. In children < 8 years of age, it should be administered in the lateral thigh for optimal drug delivery. In children > 8 years of age, the deltoid can be used.
4. With repeated nebulized treatments, patients will become tachycardic. Benefits of further treatments should be weighed against the risks of tachycardia. Don't hesitate to call medical control for concerns or questions.

# RESPIRATORY DISTRESS/ASTHMA

# Protocol 9-10

Continued

## RESPIRATORY DISTRESS/ASTHMA

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# Protocol 9-11

**SECTION:** Pediatric General Medical Emergencies

**PROTOCOL TITLE:** Respiratory Distress–Croup/Epiglottitis  
**Medical - Respiratory Distress / Asthma / COPD / Croup / Reactive Airway**

**REVISED:** 06/2013

## OVERVIEW:

Croup (or laryngotracheobronchitis) is an acute viral infection of the upper airway, leading to swelling and the classical symptoms of a "barking" cough, stridor, and hoarseness. It may produce mild, moderate, or severe symptoms, which often worsen at night. It is often treated with a single dose of oral steroids; occasionally epinephrine is used in more severe cases. Epiglottitis is swelling of the epiglottis, which leads to breathing problems. Swelling of the epiglottis is usually caused by the bacteria *Haemophilus influenza* (H. influenza), although it may be caused by other bacteria or viruses. Upper respiratory infections can lead to epiglottitis. Medicines or diseases that weaken the immune system can make adults more prone to epiglottitis. Epiglottitis is most common in children between 2 and 6 years old. Respiratory Syncytial Virus (RSV) is a very common virus that leads to mild, cold-like symptoms in adults and older healthy children. It can be more serious in young babies, especially to those in certain high-risk groups. RSV is the most common germ that causes lung and airway infections in infants and young children. Most infants have had this infection by two years of age. Outbreaks of RSV infections typically begin in the fall and run into the spring.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Time of onset</li> <li>• Possibility of foreign body</li> <li>• Medical history</li> <li>• Medications</li> <li>• Fever or respiratory infection</li> <li>• Other sick siblings</li> <li>• History of trauma</li> </ul>	<ul style="list-style-type: none"> <li>• Wheezing or stridor</li> <li>• Respiratory retractions</li> <li>• See-saw respirations</li> <li>• Diaphoresis</li> <li>• Tripod position</li> <li>• Increased heart rate</li> <li>• Altered LOC</li> <li>• Anxious appearance</li> </ul>	<ul style="list-style-type: none"> <li>• Asthma</li> <li>• Aspiration</li> <li>• Foreign body</li> <li>• Infection</li> <li>• Pneumonia</li> <li>• Congenital heart disease</li> <li>• Trauma</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%. Support respirations as necessary with a BVM.	•	•	•	•	•
4. Place patient in a position of comfort, typically sitting upright.	•	•	•	•	•
5. May administer a Normal Saline nebulizer (5 mL).		<b>OMD</b>	•	•	•
6. <u>ALBUTEROL</u> nebulizer may be given.		<b>OMD</b>	•	•	•
7. Transport in position of comfort.		•	•	•	•

**CROUP / EPIGLOTTITIS**

# Protocol 9-11

Continued

## CROUP / EPIGLOTTITIS

### **PEARLS:**

1. The most important component of respiratory distress is airway control.
2. Any pediatric patient presenting with substernal and intercostal retractions is in immediate need of treatment and transport. Do not delay on scene with treatments that can be completed enroute.

# Protocol 9-12

**SECTION:** Pediatric General Medical Emergencies

**PROTOCOL TITLE:** Seizure  
**Medical - Seizure**

**REVISED:** 06/2013

## OVERVIEW:

A seizure is a period of altered neurologic function caused by abnormal neuronal electrical discharges. Generalized seizures begin with an abrupt loss of consciousness. If motor activity is present, it symmetrically involves all four extremities. Episodes that develop over minutes to hours are less likely to be seizures; most seizures only last 1 - 2 minutes. Patients with seizure disorders tend to have stereotype, or similar, seizures with each episode and are less likely to have inconsistent or highly variable attacks. True seizures are usually not provoked by emotional stress. Most seizures are followed by a postictal state of lethargy and confusion.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Reported, witnessed</li> <li>Seizure activity description</li> <li>Previous seizure history</li> <li>Medic alert tag information</li> <li>Seizure medications</li> <li>History of trauma</li> <li>History of diabetes mellitus</li> <li>History of pregnancy</li> </ul>	<ul style="list-style-type: none"> <li>Decreased mental status</li> <li>Sleepiness</li> <li>Incontinence</li> <li>Observed seizure activity</li> <li>Evidence of trauma</li> </ul>	<ul style="list-style-type: none"> <li>CNS (head) trauma</li> <li>Tumor</li> <li>Metabolic, hepatic, renal failure</li> <li>Diabetic</li> <li>Hypoxia</li> <li>Electrolyte abnormality</li> <li>Drugs, medications, non-compliance</li> <li>Infection, fever, meningitis</li> <li>Alcohol withdrawal</li> <li>Hyperthermia</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
a. Suction the oro- and nasopharynx as necessary.	•	•	•	•	•
b. Place a nasopharyngeal airway as necessary (avoid in head trauma).	•	•	•	•	•
3. Administer oxygen to maintain $\text{SPO}_2$ 94 - 99%. Support respirations as necessary with a BVM.	•	•	•	•	•
4. Do not restrain the patient. Let the seizure take its course but protect patient from injury.	•	•	•	•	•
5. Perform rapid glucose determination. If glucose less than 60 mg / dL or clinical signs and symptoms indicate hypoglycemia, refer to the <u><a href="#">Hypoglycemia protocol</a></u> .	•	•	•	•	•

SEIZURE

# Protocol 9-12

Continued

## SEIZURES

	A	B	EN	I	P
6. If the seizure persists and the rapid glucose determination is greater than 60 mg / dL, give <u>MIDAZOLAM</u> 0.2 mg / kg INTRANASAL (max single dose 5 mg) –OR- give <u>MIDAZOLAM</u> 0.1 mg / kg IV / IM (max single dose 10 mg)				•	•
a. Repeat dose in 5 minutes if seizure persists.				•	•
b. If Midazolam is unavailable, administer, <u>DIAZEPAM</u> 0.25 mg / kg up to 5 mg slow IV push, titrated to effect. Diazepam may also be administered Per Rectum (PR) in pediatric patients.				•	•
7. Establish an IV of normal saline at KVO.			•	•	•
8. Place patient on cardiac monitor (sometime life-threatening dysrhythmias can cause seizure-like activity).				•	•
9. Consider placing the patient in the recovery position during the postictal period.	•	•	•	•	•
10. Transport and perform ongoing assessment as indicated.		•	•	•	•

TYPES OF SEIZURES		
<u>Generalized</u>	<u>Simple Partial</u>	<u>Complex Partial</u>
<ul style="list-style-type: none"> <li>• Absence (Petit-Mal)</li> <li>• Atonic (Drop Attack)</li> <li>• Myoclonic (Brief bilateral jerking)</li> <li>• Tonic-Clonic (Grand-Mal)</li> </ul>	<ul style="list-style-type: none"> <li>• Focal / Local: Localized twitching of hand, arm, leg, face, or eyes. Patient may be conscious or unconscious</li> </ul>	<ul style="list-style-type: none"> <li>• Temporal Lobe</li> <li>• Psychomotor</li> </ul>

Age	Pre-Term	Term	3 month	6 month	1 year	3 years	6 years	8 years
Weight (lb / kg)	3.3 lb 1.5 kg	6.6 lb 3 kg	13.2 lb 6 kg	17.6 lb 8 kg	22 lb 10 kg	30.8 lb 14 kg	44 lb 20 kg	55 lb 25 kg
Midazolam IV	0.15 mg	0.3mg	0.6mg	0.8 mg	0.1mg	1.4mg	2mg	2.5mg
Midazolam IN <sup>*1/2</sup> dose per nostril	0.3 mg	0.6mg	1.2mg	1.6mg	2mg	2.8mg	4mg	5mg
Diazepam IV (5.0 mg / ml) 0.3 mg/kg	0.1 ml	0.2 ml	0.4 ml	0.5 ml	0.6 ml	0.84 ml	1.2 ml	1.5 ml

# Protocol 9-12

Continued

Diazepam PR (5.0 mg / ml) 0.5 mg / kg	0.15 ml	0.3 ml	0.6 ml	0.8 ml	1.0 ml	1.4 ml	2.0 ml	2.0 ml
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## PEARLS:

1. Respirations during an active seizure should be considered ineffective and airway maintenance should occur per assessment.
2. Status epilepticus is defined as two or more consecutive seizures without a period of consciousness or recovery. This is a true emergency requiring rapid airway support, treatment, and transport.
3. Grand Mal seizures are generalized in nature and associated with loss of consciousness, incontinence, and possibly tongue trauma.
4. Focal seizures affect only a specific part of the body and are not usually associated with loss of consciousness.
5. Jacksonian seizures are seizures, which start as focal in nature and become generalized.
6. Petit Mal seizures may be localized to a single muscle group or may not involve visible seizure activity at all. Always examine pupils for nystagmus, which would alert provider to continued seizure activity.
7. Be prepared for airway problems and continued seizures.
8. Investigate possibility of trauma and substance abuse.
9. Be prepared to assist ventilations as dosages of benzodiazepines are increased.

SEIZURE

# Protocol 9-12

Continued

## SEIZURES

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# Protocol 9-13

**SECTION:** Pediatric General Medical Emergencies

**PROTOCOL TITLE:** Shock  
**Medical - Hypotension/Shock (Non-trauma)**

**REVISED:** 06/2013

## OVERVIEW:

Shock is defined as a state of inadequate tissue perfusion. This may result in acidosis, derangements of cellular metabolism, potential end-organ damage, and death. Early in the shock process, patients are able to compensate for decreased perfusion by increased stimulation of the sympathetic nervous system, leading to tachycardia and tachypnea. Later, compensatory mechanisms fail, causing a decreased mental status, hypotension, and death. Early cellular injury may be reversible if definitive therapy is delivered promptly.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Blood loss (vaginal or gastrointestinal)</li> <li>Fluid loss (vomiting, diarrhea)</li> <li>Fever</li> <li>Infection</li> <li>Medications</li> <li>Allergic Reaction</li> <li>Pregnancy, ectopic</li> <li>Trauma</li> </ul>	<ul style="list-style-type: none"> <li>Restlessness, confusion</li> <li>Weakness, dizziness</li> <li>Weak, rapid pulse</li> <li>Pale, cool, clammy skin</li> <li>Delayed capillary refill</li> <li>Hypotension</li> <li>Coffee-ground emesis</li> <li>Tarry stools</li> </ul>	<ul style="list-style-type: none"> <li>Hypovolemic</li> <li>Cardiogenic</li> <li>Septic</li> <li>Neurogenic</li> <li>Anaphylactic</li> <li>Ectopic pregnancy</li> <li>Dysrhythmia</li> <li>Pulmonary embolus</li> <li>Tension pneumothorax</li> <li>Medication effect / overdose</li> <li>Vaso-vagal</li> <li>Trauma</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•
3. Assess for signs of shock including, but not limited to: <ul style="list-style-type: none"> <li>Restlessness, altered mental status, hypoperfusion (cool, pale, moist skin), tachypnea (rapid breathing), rapid, weak pulse, orthostatic hypotension (blood pressure suddenly drops on standing up), nausea and thirst.</li> </ul>	•	•	•	•	•
4. Administer oxygen to maintain $\text{SPO}_2$ 94 - 99%. Support respirations as necessary with a BVM.	•	•	•	•	•
5. Transport as soon as possible.		•	•	•	•
6. Control external bleeding with direct pressure, then <u>tourniquet</u> if direct pressure is inadequate.	•	•	•	•	•
7. Establish a large bore IV or IO of Normal Saline. If time permits, establish second access. <ul style="list-style-type: none"> <li>Do not delay transport to establish vascular access</li> </ul>			•	•	•

SHOCK

# Protocol 9-13

Continued

# SHOCK

	A	B	EN	I	P
8. Maintain systolic BP appropriate for patient: a. Birth to 1 month - 60 mmHg b. 1 month to 1 year - > 70 mmHg c. Greater than 1 year - $70 + [2 \times \text{Age (years)}]$			•	•	•
9. Give a 20 mL / kg bolus. If no improvement after first 20 mL / kg bolus, may repeat once. While administering a fluid bolus, frequently reassess perfusion for improvement. If perfusion improves, slow the IV to KVO and monitor closely. If patient develops fluid overload respiratory distress (dyspnea, crackles, rhonchi, decreasing SpO <sub>2</sub> ), slow the IV to KVO.			•	•	•
10. Place the patient on the cardiac monitor.				•	•
11. Transport and perform ongoing assessment as indicated.	•	•	•	•	•

Classes of Shock			
Hypovolemic	Distributive	Cardiogenic	Obstructive
Caused by hemorrhage, burns, or dehydration.	Maldistribution of blood, caused by poor vasomotor tone in neurogenic shock, sepsis, anaphylaxis, severe hypoxia, or metabolic shock.	Caused by necrosis of the myocardial tissue, or by arrhythmias.	Caused by impairment of cardiac filling, found in pulmonary embolism, tension pneumothorax, or cardiac Tamponade.

## PEARLS:

1. GI bleeding may be a less obvious cause of hypovolemic shock if it has been gradual. Ask patient about possible melena, hematemesis, and hematochezia.
2. Ectopic pregnancy may be a less obvious cause of hypovolemic shock. Consider this diagnosis in all female patients of child-bearing age if there is a complaint of abdominal or pelvic pain.

# Protocol 9-14

**SECTION:** Pediatric General Medical Emergencies

**PROTOCOL TITLE: Unconscious / Syncope / AMS  
*Medical - Altered Mental Status***

**REVISED:** 06/2013

## OVERVIEW:

Although each of these presentations has unique considerations, prehospital treatment is similar. The unconscious patient is one of the most difficult patient-management problems in pre-hospital care. Causes range from benign problems to potentially life-threatening cardiopulmonary or central nervous system disorders. In the usual clinical approach to a patient, the provider first obtains a history, performs a physical examination, and then administers treatment. However, this sequence must be altered for patients that are unconscious or with an altered level of consciousness. Simple syncope may be the result of a wide variety of medical problems, although the major cause of syncope is a lack of oxygenated blood to the brain. In this situation it is quickly remedied when the patient collapses, improving circulation to the brain. Altered LOC is such a major variance from normal neurological function that immediate supportive efforts may be required. Efforts should be made to obtain as much of an HPI as possible from family members or bystanders.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Cardiac history, stroke, seizures</li> <li>• Occult blood loss (GI, ectopic)</li> <li>• Females (LMP, vaginal bleeding)</li> <li>• Fluid loss (nausea, vomiting, diarrhea)</li> <li>• Past medical history</li> <li>• Recent trauma</li> <li>• Complaint prior to event</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of consciousness with recovery</li> <li>• Lightheadedness, dizziness</li> <li>• Palpitations, slow or rapid pulse</li> <li>• Pulse irregularity</li> <li>• Decreased blood pressure</li> </ul>	<ul style="list-style-type: none"> <li>• Vaso-vagal</li> <li>• Orthostatic hypotension</li> <li>• Cardiac syncope / dysrhythmia</li> <li>• Micturition</li> <li>• Psychiatric</li> <li>• Hypoglycemia</li> <li>• Seizure</li> <li>• Shock</li> <li>• GI Bleed</li> <li>• Ectopic Pregnancy</li> <li>• Toxicological (ETOH)</li> <li>• Medication effect (hypertension)</li> </ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Maintain patient in a supine position and assess for C-spine precautions.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%	•	•	•	•	•
4. Assess blood glucose level. Refer to <u>Pediatric Hypoglycemia Protocol</u> .	•	•	•	•	•
5. Establish IV of Normal Saline. Keep at KVO rate unless hypotensive. If hypotensive, refer to <u>Pediatric Shock protocol</u> .			•	•	•

# UNCONSCIOUS / SYNCOPES / AMS

# Protocol 9-14

Continued

## UNCONSCIOUS / SYNCOPES / AMS

	A	B	EN	I	P
6. If unconsciousness is unknown, consider <u>NARCAN</u> 0.1 mg / kg slow IVP, max dose of 2 mg.			•	•	•
7. Transport and reassess as needed.		•	•	•	•

Age	Pre-Term	Term	3 months	6 months	1 year	3 years	6 years	8 years
Weight (lb / kg)	3.3 lb 1.5 kg	6.6 lb 3 kg	13.2 lb 6 kg	17.6 lb 8 kg	22 lb 10 kg	30.8 lb 14 kg	44 lb 20 kg	55 lb 25 kg
Narcan IV 0.1 mg/kg	0.15 ml	0.3 ml	0.6 ml	0.8 ml	1.0 ml	1.4 ml	2.0 ml	2.0 ml

### PEARLS:

1. Assess for signs and symptoms of trauma if questionable or suspected fall with syncope.
2. Consider dysrhythmias, GI bleed, ectopic pregnancy, and seizure as possible causes of syncope.

# Section 10

**SECTION:** Pediatric Trauma Emergencies

**REVISED:** 06/2013

Section 10: Pediatric Trauma Emergencies		
1.	<b>Abdominal Trauma</b> <i>Injury - Abdomen</i>	Protocol 10 - 1
2.	<b>Burns</b> <i>Injury-Burns-Thermal</i>	Protocol 10 - 2
3.	<b>Electrical Injuries</b> <i>Injury - Electrical Injuries</i>	Protocol 10 - 3
4.	<b>Head Injury</b> <i>Injury-Head</i>	Protocol 10 - 4

# Section 10

Continued

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# Protocol 10-1

**SECTION:** Pediatric Trauma Emergencies

**PROTOCOL TITLE:** Abdominal Trauma  
**Injury – Abdomen**

**REVISED:** 06/2013

## OVERVIEW:

Blunt and penetrating traumas are major causes of morbidity and mortality in the United States. Pediatric abdominal anatomy differs from adults in several unique ways. There is significantly less protection due to thinner muscle walls and less fat. Ribs protecting the thoracic abdomen have increased flexibility more easily allowing the ribs to injure the abdominal organs. Solid organs within the pediatric abdomen have a larger surface area thus a greater area is exposed for potential injury. The organ attachments are also more elastic, increasing the chances of tearing and shearing injuries. Lastly, the bladder extends to the umbilicus in the pediatric patient, increasing its chance for injury. When performing a focused abdominal assessment, be organized, efficient, and thorough. Initial abdominal examinations only identify injury about 65% of the time; secondary exams are needed when there is a high index of suspicion for abdominal trauma. A proper abdominal examination involves exposing the entire abdomen from the nipple line to the groin and using a standard examination sequence of inspection, auscultation, percussion, and palpation.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>• Time of injury</li> <li>• Mechanism: blunt vs penetrating</li> <li>• Loss of consciousness</li> <li>• Damage to structure, vehicle</li> <li>• Location in structure or vehicle</li> <li>• Speed, details of MVC</li> <li>• Restraints, protective devices</li> <li>• Medical history</li> <li>• Medications</li> <li>• Evidence of multi-system trauma</li> </ul>	<ul style="list-style-type: none"> <li>• Pain, swelling, bleeding</li> <li>• Deformity, lesions</li> <li>• Altered mental status, unconsciousness</li> <li>• Respiratory distress, failure</li> <li>• Hypotension, shock</li> <li>• Arrest</li> <li>• Significant mechanism of injury</li> </ul>	<ul style="list-style-type: none"> <li>• Intra-abdominal bleeding</li> <li>• Pelvis fracture</li> <li>• Abuse</li> </ul>

	A	B	EN	I	P
1. Maintain scene and provider safety.	•	•	•	•	•
2. Perform general patient management.	•	•	•	•	•
3. Administer supplemental oxygen to maintain $SPO_2$ 94 - 99%. If need to assist ventilations with BVM, maintain C-spine precautions.	•	•	•	•	•
4. Identify mechanism of injury.	•	•	•	•	•

# ABDOMINAL TRAUMA

# Protocol 10-1

Continued

## ABDOMINAL TRAUMA

	A	B	EN	I	P
5. Establish large bore IV's of normal saline. Titrate to an appropriate systolic blood pressure: a. Birth to 1 month - 60 mmHg b. 1 month to 1 year - > 70 mmHg c. Greater than 1 year - $70 + [2 \times \text{Age (years)}]$				•	•
6. Treat pain if indicated. Refer to <u>Pediatric Pain Management protocol</u> .				•	•
7. Consider <u>ONDANSETRON (ZOFTRAN)</u> 0.1mg / kg slow IVP over 2 – 5 minutes, max 4.0 mg per dose as needed per <u>Pediatric Nausea and vomiting protocol</u> .				•	•
8. Transport to the appropriate hospital per <u>Trauma Triage Scheme</u> and reassess as indicated.		•	•	•	•

### Impaled objects

Stabilize impaled objects in place with bulky dressings.

### Severe hemorrhage from open penetrating injury

Control bleeding with well-aimed direct pressure directly on the bleeding source. Once controlled apply dry, sterile dressing.

### Evisceration with protruding abdominal contents

Loosely wrap any protruding abdominal contents with a sterile dressing moistened with Normal Saline and cover in entirety with an occlusive dressing over top.

#### PEARLS:

1. The amount of external bleeding is not an indicator of the potential severity of internal bleeding associated with an underlying trauma.
2. Abdominal eviscerations are a surgical emergency. The protruding organ requires careful cleaning and evaluation prior to reinsertion. Do not attempt to reinsert the organs in the pre-hospital setting.
3. Impaled objects in the abdomen often tamponade internal hemorrhage, and removing them may trigger significant internal bleeding. Remember that any bump against the object moves the distal end in the organ and worsens damage.

# Protocol 10-2

**SECTION:** Pediatric Trauma Emergencies

**PROTOCOL TITLE:** Burns

**Injury-Burns-Thermal**

**REVISED:** 06/2013

## OVERVIEW:

Burns are a devastating form of trauma associated with high mortality rates, lengthy rehabilitation, cosmetic disfigurement, and permanent physical disabilities. Thermal, chemical, electrical, (nuclear) radiation or solar sources may cause burns. Burns can affect more than just the skin. Burns are classified by degree, 1° (superficial) some reddening to skin, 2° (partial thickness) has blistering and deep reddening to the skin, and 3° (full thickness) causes damage to all skin layers and is either charred / black or white / leathery with little or no pain at the site. The patient's palm equals 1% of body surface area when determining the area affected. Scald injuries are more common in younger children while flame injuries are more common in older children and account for the most fatalities. Smoke inhalation is the most common cause of death in the first hour after a burn injury. Children who have burn injuries are at a greater risk than adults for shock and hypothermia because of their proportionately large body surface.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> <li>Type of exposure (heat, gas, chemical)</li> <li>Inhalation injury</li> <li>Time of injury</li> <li>Past medical history</li> <li>Medications</li> <li>Other trauma</li> </ul>	<ul style="list-style-type: none"> <li>Burns, pain, swelling</li> <li>Dizziness</li> <li>Loss of consciousness</li> <li>Hypotension/ shock</li> <li>Airway compromise, distress</li> <li>Singed facial or nasal hair</li> <li>Hoarseness, wheezing</li> </ul>	<ul style="list-style-type: none"> <li>Superficial (1°), red and painful</li> <li>Partial thickness (2°), blistering</li> <li>Full thickness (3°), painless and charred leathery skin</li> <li>Chemical, Thermal, Radiation</li> </ul>

	A	B	EN	I	P
1. Stop the burning process:	•	•	•	•	•
a. Thermal burns: Lavage the burned area with sterile water or saline to cool skin. Do not attempt to wipe off semisolids (grease, tar, wax, etc.) Do not apply ice. Dry the body when the burn area is greater than or equal to 10% TBSA to prevent hypothermia.	•	•	•	•	•
b. Dry chemical burns: Brush off dry powder, then lavage with copious amounts of tepid water (sterile, if possible) for 20 minutes. Continue en route to the hospital.	•	•	•	•	•
c. Liquid chemical burns: Lavage the burned area with copious amounts of tepid water (sterile, if possible) for 20 minutes. Continue en route to the hospital.	•	•	•	•	•
2. Support life-threatening problems.	•	•	•	•	•

**BURNS**

# Protocol 10-2

Continued

## BURNS

	A	B	EN	I	P
3. Perform general patient management.	•	•	•	•	•
4. Administer oxygen, via non-rebreather mask, at 10 - 15 L / min. as necessary. Use humidified oxygen if suspected inhalation injury and when available.	•	•	•	•	•
5. If the patient is in critical respiratory distress, consider early placement of an advanced airway. * <u>Endotracheal Intubation / cricothyrotomy</u> are reserved as <i>Paramedic only</i> .		•	•	•	•
6. Remove clothing from around burned area, but do not remove/peel off skin or tissue. Remove and secure all jewelry and tight fitting clothing.	•	•	•	•	•
7. Assess the extent of the burn using <u>the rule of nines</u> and the degree of burn severity.	•	•	•	•	•
8. Cover the burned area with a clean, dry dressing. Wet dressing may be used if the burned TBSA is less than 10%.	•	•	•	•	•
9. If a partial or full thickness burn involves more than 20% TBSA, establish an IV of normal saline. Infuse the fluid amounts listed in the PARKLAND FORMULA FLUID GUIDE. If the patient develops signs and symptoms of fluid overload respiratory distress (dyspnea, crackles, rhonchi, decreasing SpO <sub>2</sub> ), slow the IV to KVO.			•	•	•
10. For pain control, refer to the <u>Pediatric Pain Management protocol</u> .				•	•
11. Perform ongoing assessment as indicated and transport major burns to Level 1 Burn Center. Transport minor burns to appropriate facility.		•	•	•	•

### Parkland Formula for Fluid Resuscitation

(2 - 4 ml x Patient weight in KG) X BSA = 24 hour fluid requirement

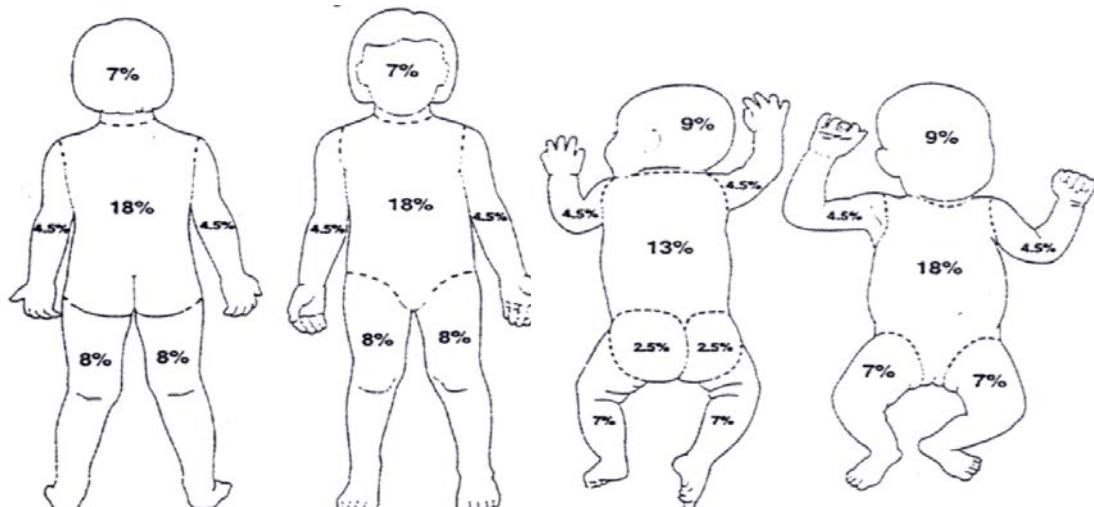
Administer  $\frac{1}{2}$  of 24 hour requirement over **first 8 hours**.

\*\*Normal Saline or Lactated Ringers are fluids of choice in burn patients.\*\*

Do not administer the entire first 8 hours IV fluid bolus during the initial resuscitation. Excessive fluid resuscitation can lead to compartment syndromes.

# Protocol 10-2

Continued



Pictures courtesy of: my.firefighternation.com

# BURNS

## PEARLS:

1. Remove patient's clothing as appropriate. Remove rings, bracelets and other constricting items in areas of burn, if possible.
2. Critical burns: burns over  $> 25\%$  TBSA;  $2^\circ$  burns  $> 10\%$  TBSA;  $2^\circ$  and  $3^\circ$  burns to the face, eyes, hands, or feet; electrical burns; respiratory burns; deep chemical burns; burns with extremes of age or chronic disease; and burns with associated major traumatic injury. These patients should be transferred directly to a Burn Center.
3. Have a high index of suspicion and a low intubation threshold when treating burn patients with possible airway involvement. Early intubation is recommended in significant inhalation injuries.
4. Circumferential burns to extremities are dangerous due to potential vascular compromise secondary to soft tissue swelling.
5. Burn patients are prone to hypothermia – never cool burns that involve  $> 15\%$  TBSA.
6. Never overlook the possibility of multi-system trauma.
7. Burns are extremely painful. Strongly consider pain management medications as needed.
8. Assess for potential child abuse and follow appropriate reporting mechanism as needed.
9. Keep the child warm and protect from hypothermia. Be cautious with cool dressings.

# Protocol 10-2

Continued

**BURNS**

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# Protocol 10-3

**SECTION:** Pediatric Trauma Emergencies

**PROTOCOL TITLE:** Electrical Injuries

**Injury - Electrical Injuries**

**REVISED:** 06/2013

## OVERVIEW:

The vast majority of electrical injuries are caused by generated electricity, such as that encountered in power lines and household outlets. Relative to the external damage caused by electrical injuries, internal damage is often more severe, and can include damage to muscles, blood vessels, organs, and nerves. Damaged muscle releases myoglobin and potassium, which can precipitate in the kidneys and cause acute renal failure.

Electrical current as low as 20 mA can cause respiratory arrest and as little as 50 mA can cause ventricular fibrillation. Although long-bone fractures and spinal injuries can occur due to falls after electrocution, they can additionally occur due to severe tetanic muscle spasms with high amplitude electrocutions. Before treating any patient with an electrical injury, ensure your personal safety. Do not touch the patient, if the patient is still in contact with the electrical source.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"><li>• Lightning or electrical exposure</li><li>• Single or multiple victims</li><li>• Trauma secondary to fall from high wire or MVC into line</li><li>• Duration of exposure</li><li>• Voltage and current (AC / DC)</li></ul>	<ul style="list-style-type: none"><li>• Burns</li><li>• Pain</li><li>• Entry and exit wounds</li><li>• Hypotension and shock</li><li>• Cardiac and / or respiratory arrest</li></ul>	<ul style="list-style-type: none"><li>• Cardiac arrest</li><li>• Respiratory arrest</li><li>• Seizure</li><li>• Burns</li><li>• Multisystem trauma</li></ul>

	A	B	EN	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%. Consider supporting respirations with a BVM.	•	•	•	•	•
4. Determine extent of any burn injuries. Refer to the <u>Pediatric Burns protocol</u> . Avoid initiating IVs in areas of burn unless absolutely necessary.		•	•	•	•
5. Place patient on cardiac monitor; obtain / interpret <u>12 Lead ECG</u> . Refer to the appropriate <u>Pediatric Cardiac Care protocol</u> for dysrhythmias.				•	•

**ELECTRICAL INJURIES**

# Protocol 10-3

Continued

## ELECTRICAL INJURIES

	A	B	EN	I	P
6. Establish an IV of normal saline to titrate an appropriate BP: a. Birth to 1 month - $> 60 \text{ mmHg}$ b. 1 month to 1 year - $> 70 \text{ mmHg}$ c. Greater than 1 year - $70 + [2 \times \text{Age (years)}]$				•	•
7. Consider administration of pain management per <i>Pediatric Pain Management protocol</i> .				•	•
8. Transport to an appropriate facility and perform ongoing assessment as indicated.	•	•	•	•	•

### PEARLS:

1. Ventricular fibrillation and asystole are the common presenting dysrhythmias associated with electrical injuries.
2. Injuries are often hidden. The most severe injuries will occur internally in the muscles, vessels, organs, and nerves.
3. Do not overlook other trauma (i.e., falls).
4. Lightning is a massive DC shock most often leading to asystole as a dysrhythmia.
5. In lightning injuries, most of the current will travel over the body surface producing flash burns over the body that appears as freckles.

# Protocol 10-4

**SECTION:** Pediatric Trauma Emergencies

**PROTOCOL TITLE:** Head Injury  
**Injury-Head**

**REVISED:** 06/2013

## OVERVIEW:

Brain injury and its accompanying pathologic processes continue to be the leading cause of mortality associated with trauma. Whether the injury is due to a blunt or penetrating mechanism, bleeding or swelling of the brain and surrounding tissue may lead to an increase in pressure within the cranial cavity, otherwise known as intracranial pressure, (ICP). If pressure within the skull is not controlled, neurologic changes may produce signs and symptoms ranging from headache to coma with loss of protective reflexes. Blunt force trauma may result in scalp injury, skull fracture, and meningeal and brain tissue injury. Penetrating trauma may produce focal or diffuse injury, depending on the velocity of the penetrating object. Although the pre-hospital provider cannot reverse the brain tissue damage from the initial / primary brain injury that has already occurred, they can play a major role in preventing or limiting the processes that exacerbate and lead to a secondary brain injury. The pre-hospital provider's goal is to focus on reversing any hypoxia, hypotension, hypercarbia, acidosis, or increasing intracranial pressure.

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"><li>• Time of injury</li><li>• Mechanism: blunt vs penetrating</li><li>• Loss of consciousness</li><li>• Bleeding</li><li>• Past medical history</li><li>• Medications</li><li>• Evidence of multi-system trauma</li></ul>	<ul style="list-style-type: none"><li>• Pain, swelling, bleeding</li><li>• Altered mental status, unconsciousness</li><li>• Respiratory distress, failure</li><li>• Vomiting</li><li>• Seizure</li><li>• Major traumatic mechanism of injury</li></ul>	<ul style="list-style-type: none"><li>• Skull fracture</li><li>• Brain injury (concussion, contusion, hemorrhage, or laceration)</li><li>• Epidural hematoma</li><li>• Subdural hematoma</li><li>• Subarachnoid hemorrhage</li><li>• Spinal injury</li><li>• Abuse</li></ul>

	A	B	EN	I	P
1. Perform general patient management and baseline GCS.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation. Obtain mechanism or injury.	•	•	•	•	•
3. Administer oxygen to maintain <u>SPO<sub>2</sub></u> 94 - 99%. Consider supporting respirations with a BVM. If signs of hypoventilation are present, ventilate with BVM at an age appropriate rate. Monitor <u>capnography</u> if BVM or intubated/alternative airway. Attempt to maintain between 35 - 45 Torr.	•	•	•	•	•

HEAD INJURY

# Protocol 10-4

Continued

## HEAD INJURY

	A	B	EN	I	P
4. Consider immobilize patient using full spinal precautions based on MOI. Avoid excessive compression around the neck by cervical collar. Assess and document PMS in all extremities before and after immobilization.		•	•	•	•
5. Place patient on cardiac monitor.				•	•
6. Establish an IV of normal saline, if indicated, to maintain an appropriate systolic BP: a. Birth to 1 month – 60 mmHg b. 1 month to 1 year – > 70 mmHg c. Greater than 1 year - 70 + [2 x Age (years)]				•	•
7. Obtain a blood glucose sample.		•	•	•	•
8. If patient is exhibiting signs of shock, refer to <i>Pediatric Shock protocol</i> .		•	•	•	•
9. Transport per <i>Trauma Triage Scheme</i> and perform ongoing assessment as indicated.		•	•	•	•

### PEARLS:

1. Hyperventilation is not recommended with head-injury patients.
2. One of the most important indicators of worsening head injury is a change in LOC and / or GCS.
3. Increased ICP may cause hypertension and bradycardia (Cushing's response).
4. Hypotension usually indicates injury or shock unrelated to the head injury and should be treated aggressively.
5. A decrease of two (2) or more in the patient's GCS should be considered due to a severe head injury until proven otherwise.
6. Supine positioning may also increase ICP transiently. The patient may benefit from a reverse Trendelenburg position; however, it may reduce cerebral blood flow, especially if the head is elevated greater than 30°. If the patient is immobilized to a backboard, slightly elevate (15° or less) the head end of the board.
7. Recognize that "normal" blood pressure is not as important as "normal for the patient" when assessing maintenance of adequate cerebral blood flow and adequate cerebral perfusion.

# Protocol 10-4

Continued

Glasgow Coma Scale Modified for Pediatric Patients	
Eye Opening Response	<1 year
4	Spontaneous
3	To shout
2	To pain
1	None
Verbal Response	0 to 2 years
5	Babbles, coos appropriately
4	Cries but inconsolably
3	Persistent crying or screaming in pain
2	Grunts or moans to pain
1	None
Motor Response	<1 year
6	Spontaneous
5	Localizes pain
4	Withdraws to pain
3	Abnormal flexion to pain (decerebrate)
2	Abnormal extension to pain (decordicate)
1	None

**HEAD INJURY**

# Protocol 10-4

Continued

## HEAD INJURY

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# Section

# 11

**SECTION:** Clinical Procedures

**REVISED:** 05/2012

# CLINICAL PROCEDURES

1.	<u>12-Lead ECG Acquisition</u>	Protocol 11 - 1
2.	<u>Capnography</u>	Protocol 11 - 2
3.	<u>Pulse Oximetry</u>	Protocol 11 - 3
4.	<u>Needle Thoracentesis</u>	Protocol 11 - 4
5.	<u>Oral Intubation</u>	Protocol 11 - 5
6.	<u>Nasal Intubation</u>	Protocol 11 - 6
7.	<u>Supraglottic Airway</u>	Protocol 11 - 7
8.	<u>Surgical Cricothyrotomy</u>	Protocol 11 - 8
9.	<u>Oro-gastric (OG) Tube</u>	Protocol 11 - 9
10.	<u>Tourniquet</u>	Protocol 11 - 10
11.	<u>IO</u>	Protocol 11 - 11
12.	<u>Continuous Positive Airway Pressure (CPAP)</u>	Protocol 11 - 12
13.	<u>Synchronized Cardioversion</u>	Protocol 11 - 13
14.	<u>External (Transcutaneous) Cardiac Pacing</u>	Protocol 11 - 14
15.	<u>Mechanical CPR Devices</u>	Protocol 11 - 15
16.	<u>Patient Restraint</u>	Protocol 11 - 16

# Section 11

Continued

## CLINICAL PROCEDURES

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# Protocol 11-1

**SECTION:** Clinical Procedures

**PROTOCOL TITLE:** 12-Lead ECG Acquisition

**REVISED:** 05/2012

## OVERVIEW:

The 12-lead ECG analysis is useful in the diagnosis and treatment of patients with acute myocardial infarction (AMI). 12-lead ECG analysis is also useful in the interpretation and documentation of other transient cardiac arrhythmias that may occur. When used in the pre-hospital setting, the 12-lead analysis results can be of assistance in diagnosis and treatment decisions once the patient has arrived in the hospital emergency department.

## PROTOCOL FOR MANAGEMENT:

### Electrode Placement

1. Proper skin preparation and use of proper electrodes is essential for good signal quality. If necessary, prepare the patient's skin for electrode application by shaving excess hair at electrode site, cleaning oily skin with an alcohol pad, or using benzoine tincture for excessive diaphoresis.
2. When acquiring a 12-Lead ECG, place the patient in a supine or semi-fowlers position. Discuss the need to hold still. American Heart Association (AHA) recommends placing the electrodes anywhere along the wrists and ankles. Conversely, when it is difficult for the patient to remain motionless due to shivering, muscle tremors, or ambulance movement place limb electrodes on patient's thorax for better results, per International Electrotechnical Commission (IEC) recommendation.
3. Placement of the electrodes used to perform a 12-Lead ECG requires proper knowledge of anatomy and precise application for an accurate analysis. Proper placement is as follows:

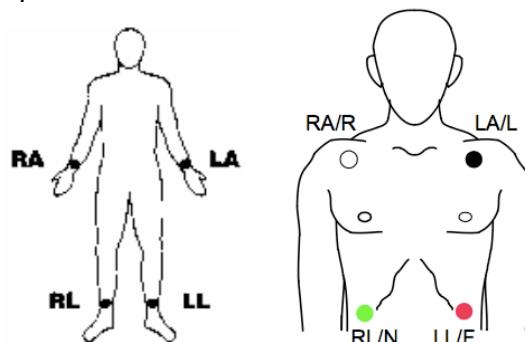
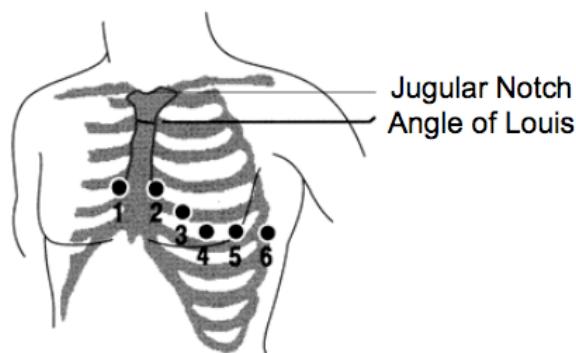


Photo courtesy of nottingham.ac.uk

- V1:** Fourth intercostal space, right sternal margin.
- V2:** Fourth intercostal space, left sternal margin.
- V3:** Fifth rib, midway between leads V2 and V4.
- V4:** Fifth intercostal space, mid-clavicular line.
- V5:** Left anterior axillary line, at the horizontal level of V4.
- V6:** Left mid-axillary line, at the horizontal level as V4 and V5



# 12-LEAD ECG ACQUISITION

# Protocol 11-1

Continued

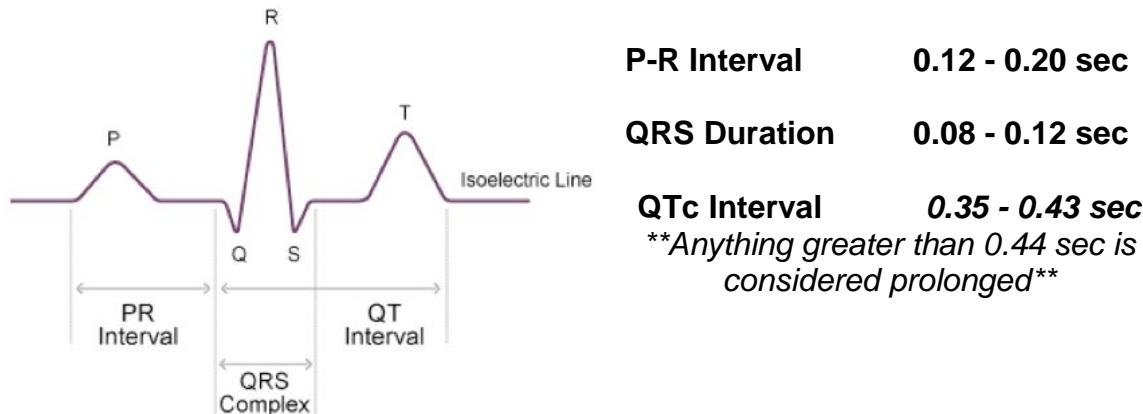
## 12-LEAD ECG ACQUISITION

Locating the V1 position (fourth intercostal space) is critically important because it is the reference point for locating the placement of the remaining V-leads. To locate the V1 position:

1. Place your finger on top of the jugular notch (see above diagram).
2. Move your finger slowly downward approximately 1.5 inches (3.8 centimeters) until you feel a slight horizontal ridge or elevation. This is the “Angle of Louis,” where the manubrium joins the body of the sternum.
3. Locate the second intercostal space on the patient’s right, lateral to and just below the “Angle of Louis.”
4. Move your finger down two more intercostal spaces to the fourth intercostal space which is the V1 position.

**When placing electrodes on female patients, ALWAYS place leads V3 - V6 under the breast rather than on the breast**

### Normal ECG Parameters



# Protocol 11-1

Continued

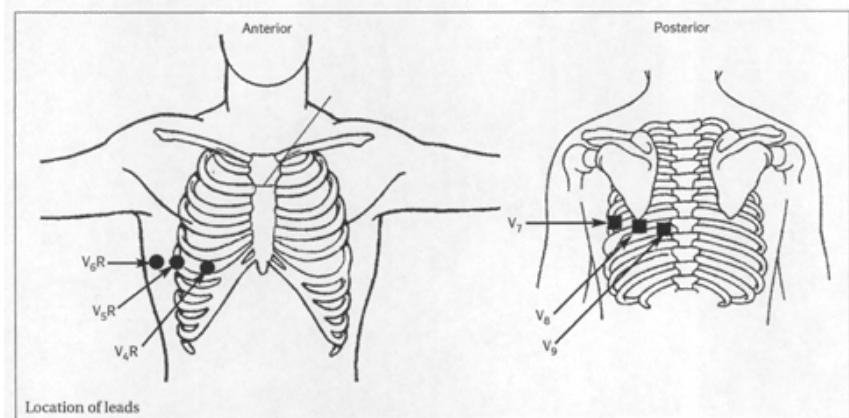
## 12-LEAD ECG ACQUISITION

### Right-Sided and Posterior 12-Lead Electrode Placement

Right ventricular infarct may complicate up to 40-50% of all inferior AMIs and 13% of all anterior AMIs. When assessing a patient presenting with AMI it is important to ascertain whether it involves the right ventricle as this may alter your treatment or the receiving facilities treatment upon your arrival. It is recommended, although not mandatory, that a right-sided and / or posterior 12-Lead ECG be obtained if ST elevation is noted in Leads II, III, AVL, AVF, or V1. **Time is muscle and transport should not be delayed to obtain a right-sided or posterior 12-Lead ECGs.**

Two ways to obtain a right-sided 12-Lead ECG are noted below, the first being a “quick look” and the second being a full right sided ECG.

Posterior Lead Placement



### Modified Lead V4R

Basically, this is lead V4 moved to the right side of the chest (mid-clavicular line, fifth inter-costal space).

When Lead V4R shows at least 1 mm of ST segment elevation in the presence of inferior STEMI, it's a highly sensitive marker for right ventricular involvement.

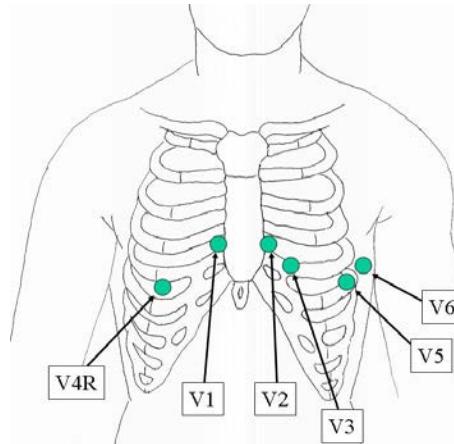
When printed out, this ECG should be marked as V4R for clarification.

# Protocol 11-1

Continued

## 12-LEAD ECG ACQUISITION

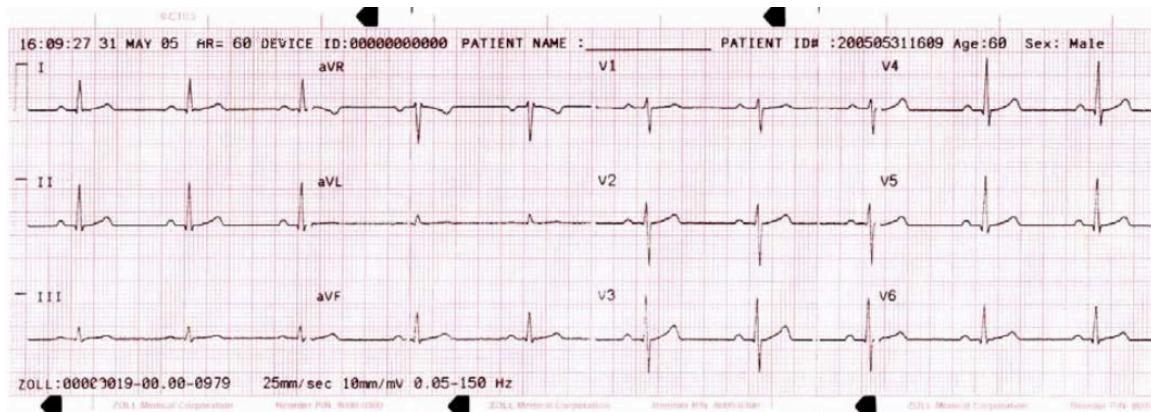
- V4R – Fifth inter-costal space at the left right mid-clavicular line (Lead V3).  
V5R – Right anterior axillary line, horizontal line from V4R (Lead V2).  
V6R – Right mid-axillary line, horizontal line from V5R (Lead V1).  
V7 – Left posterior axillary line, horizontal line from V6R (Lead V5).  
V8 – Left mid-scapular line, horizontal line from V7 (Lead V5).  
V9 – Left para-spinal line, horizontal line from V8 (Lead V6).



### Reviewing the 12-Lead ECG Printout Results-Example

The ECG data can be viewed in three different ways:

<b>ECG Strip</b>	The unit displays a 12-lead strip with 10 seconds of ECG data, in four staggered 2.5 second segments.
<b>Interpretation</b>	The unit displays the results of interpretation of the ECG recording by the 12-lead program.
<b>Measurements</b>	The unit displays measurements based on all 12-leads.



# Protocol 11-1

Continued

The global measurements include heart rate, PR interval, QRS duration, QT, and the QTc.

Measurement	Description
Heart Rate	Frequency is shown in beats per minute. Normal adult range is 60 - 100.
PR Interval	This time interval is between the beginning of the P wave and the beginning of the QRS complex. It is sometimes referred to as PQ duration. Smaller values indicate premature excitation of the ventricles and larger values indicate conduction defects in the atrioventricular (AV) node.
QRS Duration	Duration of the QRS complex in milliseconds. Larger values indicate ventricular conduction defects.
QT, QTc Duration	Time in milliseconds from the beginning of the QRS complex to the end of T wave. The QTc value is the QT corrected for heart rate to estimate the value it would have been if the heart rate were 60 beats per minute. Abnormal values can be due to an electrolyte imbalances or drugs. A short QT may be due to hyperkalemia and long QT due to hypocalcemia, or quinidine-like drugs (procainamide, amiodarone).
QRS axis	This is the axis of the QRS complex. Smaller than -30 is called left axis deviation; larger than 90 is a right axis deviation. Deviations can be due to conduction blocks or hypertrophy

## 12-LEAD ECG ACQUISITION

# Protocol 11-1

Continued

## 12-LEAD ECG ACQUISITION

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# Protocol 11-2

**SECTION:** Clinical Procedures

**PROTOCOL TITLE:** Capnography

**REVISED:** 05/2012

## OVERVIEW:

Capnography (PETCO<sub>2</sub> monitoring) is a non-invasive method of measuring CO<sub>2</sub> in exhaled gases. By tracking the carbon dioxide in a patient's exhaled breath, capnography enables paramedics to objectively evaluate a patient's ventilatory status (and indirectly circulatory and metabolic status), while utilizing clinical judgment to assess and treat their patients. Capnography is to be used as an additional tool to compliment sound clinical skills and patient assessment and is to be used on all intubated patients.

**Capnography is an absolute requirement in all patients that have been intubated or had a supra-glottic airway placed, or had a cricothyrotomy performed.  
100% compliance is the goal.**

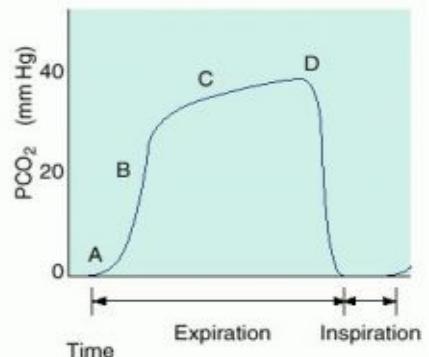
## PROTOCOL FOR MANAGEMENT:

1. Ensure all airway management equipment in working order and attached appropriately.
2. Attach capnography sensor to the endotracheal tube, or airway device, ventilate patient several times, and check monitor for distinct waveform and numerical value.
3. If no waveform is present, suspect esophageal intubation. Remove tube and continue in airway algorithm.
4. Once tube placement is verified, record the time, waveform, and CO<sub>2</sub> reading. Be sure to note these times on your ePCR.
5. Provide ventilatory assistance to maintain CO<sub>2</sub> readings at 35 - 45 Torr (4.6% to 5.9%).
6. End tidal CO<sub>2</sub> monitoring is considered a vital sign and should be documented as such with serial vital signs (blood pressure, heart rate, respiratory rate, SPO<sub>2</sub>,) at least every 5 minutes.

The capnogram waveform begins before exhalation and ends with inspiration. Breathing out comes before breathing in.

Photo courtesy of medical-dictionary.thefreedictionary.com

- A→B is post inspiration / dead space exhalation  
B is the start of alveolar exhalation  
B→C is the exhalation upstroke where dead space gas mixes with lung gas  
C→D is the continuation of exhalation, or the plateau (all the gas is alveolar now, rich in CO<sub>2</sub>)  
D is the end-tidal value (the peak concentration)  
D→A is the inspiration washout.



# CAPNOGRAPHY

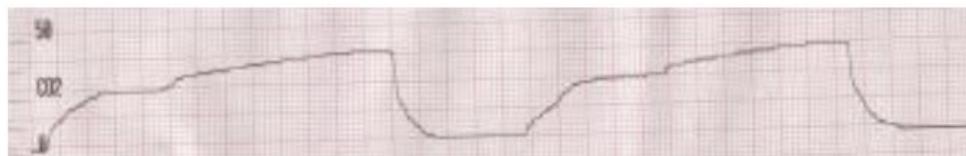
# Protocol 11-2

Continued

## CAPNOGRAPHY

### PEARLS:

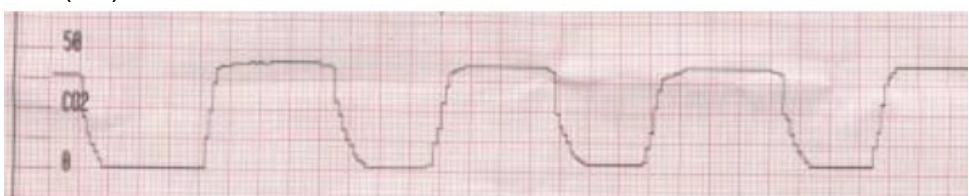
1. Sensor and readings not affected by administering drugs down ET tube.
2. Water, secretions, or vomitus accumulating in sensor can cause inaccurate readings.
3. The sensor is easily damaged and should be replaced if inaccurate readings occur.
4. An increasing end-tidal CO<sub>2</sub> may be the first sign of return of spontaneous circulation (ROSC) because readings within the normal values may indicate organ perfusion. If you see the CO<sub>2</sub> value "shoot up", stop CPR and check for pulses. End tidal will often overshoot baseline values when circulation is restored due to carbon dioxide washout from the tissues.
5. Capnography should be used in patients that have been orally / nasally intubated, had a dual lumen / supraglottic airway inserted or had a surgical cricothyrotomy performed.
6. Causes of increased ETCO<sub>2</sub>:
  - Leak in vent circuit
  - Increased metabolic rate
  - Sodium Bicarbonate
  - Administration
  - Hypoventilation
  - COPD
  - Rebreathing
  - Seizures
  - Muscular paralysis
7. Causes of decreased ETCO<sub>2</sub>:
  - Hypothermia
  - Hypotension
  - Pulmonary hypoperfusion
  - Cardiac arrest
  - Ventilatory disconnect
  - Esophageal intubation
  - Hyperventilation
  - Complete airway obstruction
  - Leak around ET cuff
  - Hemorrhage
  - Poor sampling
  - Pulmonary embolism
8. While capnography is a direct measurement of ventilation in the lungs, it also indirectly measures metabolism and circulation. For example, an increased metabolism will increase the production of carbon dioxide increasing the ETCO<sub>2</sub>. A decrease in cardiac output will lower the delivery of carbon dioxide to the lungs decreasing the ETCO<sub>2</sub>.
9. Bronchospasm and obstructive lung disease will produce a characteristic "shark fin" wave form, as the patient has to struggle to exhale, creating a sloping "B-C" upstroke. The shape is caused by uneven alveolar emptying.



# Protocol 11-2

Continued

10. It has been suggested that in wheezing patients with HF (because the alveoli are still, for the most part, emptying equally), the wave form should be upright. This can help assist your clinical judgment when attempting to differentiate between obstructive airway wheezing such as COPD and the "cardiac asthma" of heart failure (HF).



## CAPNOGRAPHY

# Protocol 11-2

Continued

## CAPNOGRAPHY

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# Protocol 11-3

**SECTION:** Clinical Procedures

**PROTOCOL TITLE:** Pulse Oximetry

**REVISED:** 05/2012

## OVERVIEW:

Assessment and maintenance of a patent airway is an important skill required of every pre-hospital provider. Pulse Oximetry (Pulse Ox, SpO<sub>2</sub>) is a non-invasive method of measuring the oxygen saturation of arterial blood, thus providing an evaluation of ventilatory status. Oxygen saturation is only part of the picture. The assessment of the ventilatory status remains one of clinical judgment. The principle behind pulse oximetry is relatively basic. A probe is applied to the patient and a beam of light is passed through the tissues to a photo-detector on the other half of the probe. The photo-detector senses the amount of light absorbed by the oxyhemoglobin molecules in the arterial blood as it passes through the tissues beneath the probe. This information is transmitted to the processing unit of the oximeter, and the percentage of oxygen saturation is displayed.

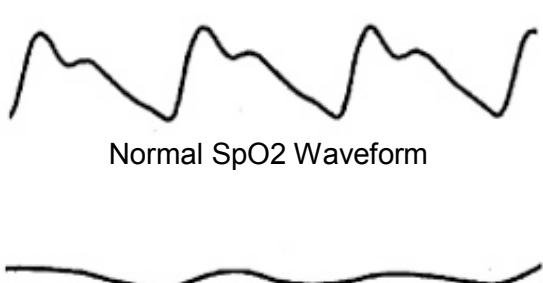


Reusable Pulse Oximeter

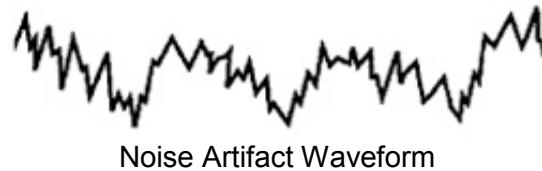


Pediatric Disposable Pulse Oximeter

## Pulse Oximetry Waveforms Recognition



Normal SpO<sub>2</sub> Waveform



Noise Artifact Waveform



Low Perfusion Waveform



Motion Artifact Waveform

Photo courtesy of biomedsearch.com

**\*\*Make sure the SPO<sub>2</sub> sensor is correctly positioned to achieve the optimum wave form\*\***

PULSE OXIMETRY

# Protocol 11-3

Continued

## PULSE OXIMETRY

### PEARLS:

1. ALWAYS TREAT THE PATIENT NOT THE PULSE OXIMETER. Never withhold oxygen from a patient in respiratory distress regardless of the SpO<sub>2</sub> reading.
2. A SpO<sub>2</sub> reading and corresponding HR on the monitor should be confirmed with manual pulse check and visualization of proper SpO<sub>2</sub> waveform on monitor.
3. Patients found with possible carbon monoxide poisoning will have an inaccurately high SpO<sub>2</sub> reading due to the binding of carbon monoxide with hemoglobin. Carbon monoxide has a binding affinity for hemoglobin 240 times greater than that of oxygen, causing decreased oxygen delivery to the tissue.
4. Remember that the pulse oximeter only measures arterial oxygen saturation. It does not measure the actual PaO<sub>2</sub>, nor does it measure the PCO<sub>2</sub> or the pH. It also does not assess ventilation. A patient with COPD who has a normal hypoxic drive may have an excellent PaO<sub>2</sub> when given 100% oxygen, but will soon hypoventilate and have dangerously high CO<sub>2</sub> levels while maintaining a high PO<sub>2</sub>.
5. Pulse oximetry is considered the “fourth vital sign” and should be assessed and documented when available for use.
6. The device must sense a pulse to calculate the oxygen saturation. States of decreased cardiac output, such as: bradycardia, tachycardia, hypotension, and cardiac arrest will greatly limit the probes ability to sense the pulse. Episodes of vasoconstriction, such as shock or hypothermia will also have a similar effect.

# Protocol 11-4

**SECTION:** Clinical Procedures

**PROTOCOL TITLE:** Needle Thoracentesis

**REVISED:** 05/2012

## OVERVIEW:

A needle decompression is a life saving procedure used to relieve a tension pneumothorax. A tension pneumothorax is usually the result of blunt or penetrating trauma to the chest but may also be spontaneous. A simple pneumothorax develops into a tension pneumothorax as the pressure in the pleural space exceeds the outside atmospheric pressure. This increase of pressure within the pleural space further collapses the lung on the involved side and forces the mediastinum to the unaffected side decreasing the blood flow to the heart and placing pressure on the unaffected lung.

## INDICATIONS:

1. Any patient exhibiting signs/ symptoms of respiratory distress due to blunt force or penetrating chest trauma that also has a complaint of:
  - a. Increasing respiratory distress **and**
  - b. Decreasing or absent breath sounds unilaterally or bilaterally with respirations **and**
  - c. Decreased SpO<sub>2</sub> despite oxygen therapy **and**
  - d. Increasing tachycardia
2. Any trauma arrest involving chest trauma that resuscitation is being attempted should have bilateral needle decompression performed as soon as possible to eliminate hemo / pneumothorax as a cause of traumatic arrest.
3. Consider in the setting of refractory pulseless electrical activity (PEA).

## PROTOCOL FOR MANAGEMENT:

1. Prepare all equipment for needle thoracentesis:
  - a. Over 8 years old: 14g x 3.75" angiocath with 10 ml syringe attached.
  - b. Under 8 years old: 18g x 1.25" angiocath with 10 ml syringe attached.
  - c. ½" silk tape torn into 5" length to use to stabilize catheter.
2. Once all equipment is prepared, needle thoracentesis should be performed.
  - a. Locate proper insertion site, 2<sup>nd</sup> inter-costal space at the mid-clavicular line of the affected side of the chest.
  - b. Prep insertion site with betadine using aseptic technique, if available.
  - c. Insert angiocath with syringe attached into second inter-costal space just over 3<sup>rd</sup> rib to avoid inter-costal nerves and vessels located on the inferior portion of the rib border.
  - d. Advance the catheter 1 - 2 inches (3/4 - 1 inch in patients less than 8 years old) through the chest wall while pulling back gently on plunger of syringe. Tension should be felt on the plunger until the needle enters the pleural space. A "pop" or "give" may also be felt. Once needle has entered pleural space, do not advance needle any further.
  - e. Advance catheter while withdrawing the needle until the catheter is flush with the skin.
3. Listen for a gush or "*hiss*" of air, which confirms placement and diagnosis.  
Note: This may not always be heard due to severity of injury or missed due to surrounding noise.
4. Dispose of needle properly and **never reinsert into the catheter**.
5. Secure catheter by wrapping strip of tape around hub and taping to chest.

NEEDLE THORACENTESIS

# Protocol 11-4

Continued

## NEEDLE THORACENTESIS

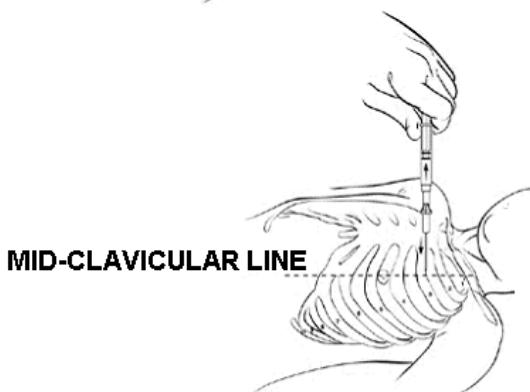
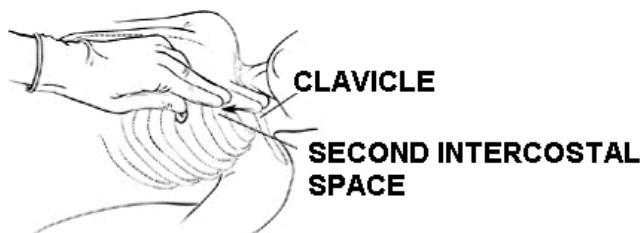


Photo courtesy of brooksidepress.org

### PEARLS:

1. Catheter may become occluded after initial decompression. Full procedure may need to be repeated if occlusion occurs. If additional procedures are necessary, placement of these catheters should be near the original site.
2. A partially filled syringe of saline (i.e., 5 mL in a 10 mL syringe) may be applied to the catheter when available as a visual aide to confirm placement. If air is present, bubbles will be seen in the syringe.

6. Reassess lung sounds and document procedure, whether air or blood was expelled, improvement of vital signs, and success/ failure in PPCR.
7. Continue to reassess during transport as tension pneumothorax may reoccur.

### \*\*\*PROGRESSIVE SIGNS AND SYMPTOMS OF TENSION PNEUMOTHORAX\*\*\*

EARLY	PROGRESSIVE	LATE
<ul style="list-style-type: none"><li>• Unilaterally decreased or absent breath sounds</li><li>• Continued increased dyspnea and tachypnea despite treatment</li><li>• Increasing heart rate with decreasing SpO<sub>2</sub></li></ul>	<ul style="list-style-type: none"><li>• Increasing tachypnea and dyspnea</li><li>• Tachycardia and subcutaneous emphysema</li><li>• Increasing difficulty ventilating an intubated patient</li></ul>	<ul style="list-style-type: none"><li>• Jugular vein distention</li><li>• Tracheal deviation</li><li>• Tympany</li><li>• Signs of acute hypoxia</li><li>• Narrowing pulse pressure</li></ul>

# Protocol 11-5

## ORAL INTUBATION

**SECTION:** Clinical Procedures

**PROTOCOL TITLE:** Oral Intubation

**REVISED:** 05/2012

### OVERVIEW:

Advanced airway procedures and competency are the cornerstones of paramedicine. True competency involves knowing not only how to control the airway, but when to control the airway, and selecting the best method to do so.

**Only one (1) attempt at oral intubation should be attempted.  
If unsuccessful, an alternative airway device should be inserted without delay.**

### INDICATIONS:

#### Absolute:

1. Hypoxia or obtunded patients
2. Respiratory Arrest
3. Cardiac Arrest

#### Strongly Consider With:

1. Any patient with a decreased level of consciousness with compromised ability to manage their airway
2. Airway burns or edema
3. HF, acute asthma, COPD, or other respiratory failure
4. with diminished respiratory drive
5. Suspected intracranial hemorrhage or closed head injury
6. Patients who fail to respond to positive pressure ventilation
7. GCS < 8 without reversible causes

### CONTRAINDICATIONS:

1. An intact gag reflex
2. Patients that have a tracheostomy or stoma

### PROTOCOL FOR MANAGEMENT:

1. Patient should be pre-oxygenated with appropriately sized Bag Valve Mask at a rate of 12 - 20 breaths per minute with an appropriately sized oropharyngeal airway in place. The patient's SpO<sub>2</sub> should be raised as much as possible with manual ventilations prior to intubation attempt.
2. Patient airway should be assessed and documented for ability / difficulty of oral intubation via Mallampati classification and prepare for possible use of rescue airway device. Once visualization of the lower airway has been obtained, assessment of difficulty can again be made using the Cormack & LeHane classification. The higher the classification, the more difficult the intubation.

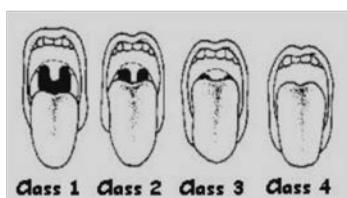


Photo Courtesy of thorax.bmjjournals.com

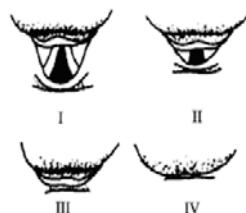


Photo Courtesy of nda.ox.ac.uk

# Protocol 11-5

Continued

## ORAL INTUBATION

3. Prepare all equipment for intubation:
  - a. Appropriately sized Macintosh or Miller (provider choice) intubation blade and handle
  - b. Appropriately sized ET Tube with stylet and 10 ml syringe attached
  - c. Pre-inflate cuff of tube to ensure no leaks, then deflate, leaving syringe attached
  - d. Bend tube and stylet into a crescent or “hockey stick” shape and ensure that the stylet is at least one (1) centimeter proximal to the end of the tube
  - e. Have immediately available a second ET tube, one (1) size smaller for unanticipated smaller trachea
  - f. Adult or pediatric tube holder
  - g. Capnography sensor connected to monitor
  - h. Suction setup turned on and within reach for use with vomited gastric secretions
  - i. An alternative airway device should be within reach and ready for use in case of failed intubation
  - j. All appropriate BSI / PPE should be worn to include eye protection, mask, and gloves
4. Once the determination has been made by the provider that the patient has been sufficiently pre- oxygenated, the OPA should be removed and an intubation attempt should be made:
  - a. Position the patient’s head in the “sniffing position” (unless C-spine injury is suspected)
  - b. Insert the intubation blade into the mouth, lifting the tongue and sweeping it to the left. Suction, as necessary, to create a clear field of view of the lower airway
  - c. Insert the laryngoscope blade into the pharynx and visualize the glottic opening and epiglottis by properly seating the blade in the correct position:
    - Macintosh blade should be inserted until the tip is seated in the vallecula
    - Miller blade should be inserted until covering the epiglottis
  - d. When maneuvering airway with blade, do not use teeth as a fulcrum, as this may cause breakage of teeth, increased intubation difficulty, and / or possible airway obstruction.
  - e. Lift the laryngoscope upward and forward, without changing the angle of the blade, to expose the vocal cords. Do not lift using prying motion.
  - f. Once vocal cords are visualized, do not change position of blade. Insert ET tube into the pharynx and between the vocal cords, anterior to the arytenoid cartilages, until the wide black mark on the distal end of the tube has passed through the vocal cords, approximately 1 inch in the adult and 5 - 10 mm in the child.
  - g. Without releasing tube, remove laryngoscope blade. Inflate ET tube cuff with 5 - 10 cc of air via attached syringe.
  - h. Attach capnography sensor, ventilate patient several times, and check monitor for distinct waveform and numerical value. If no waveform is

# Protocol 11-5

Continued

## ORAL INTUBATION

present, check equipment as outlined in Capnography Clinical Procedure. If capnography is working but no waveform is present, remove ET tube, and immediately insert an alternative airway device.

- i. If capnography waveform is present, continue placement confirmation:
  - Observe chest rise upon ventilation
  - Auscultate for bilateral lung sounds
  - Auscultate abdomen for absent epigastric sounds
  - Note condensation in the tube with passive exhalation
- \*\*\*Continually assess the placement of the ET tube\*\*\***
- j. If breath sounds are not heard equally, deflate cuff and adjust tube for possible left or right main-stem intubation by pulling tube out one (1) centimeter. Inflate cuff and reassess lung sounds. In trauma patients, also assess for possible pneumothorax.
- k. Once lung sounds confirmed, document centimeter mark at teeth (depth), and secure ET tube with tube holder and reassess lung sounds and capnography readings.
- l. Reassess the tube placement after all movement of patient or change in capnography readings.

# Protocol 11-5

Continued

## ORAL INTUBATION

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# Protocol 11-6

**SECTION:** Clinical Procedures

**PROTOCOL TITLE:** Nasal Intubation

**REVISED:** 05/2012

## **OVERVIEW:**

Advanced airway procedures and competency are the cornerstones of paramedicine. True competency involves knowing not only how to control the airway, but when to control the airway, and selecting the best method to do so. While orotracheal intubation is the gold standard of securing the airway, it is not the only means available to advanced life support providers. Nasal intubation, if not done correctly may cause hemorrhaging from the nasal passages leading to an uncontrolled airway and aspiration.

## **INDICATIONS:**

1. Respiratory failure with decreasing level of consciousness, signs of hypoxia, or deep coma.
2. Respiratory failure trismus.
3. Trauma patients without significant mid-facial trauma or mid-face instability.

## **CONTRAINDICATIONS:**

1. Patient has mid-face instability or frontal lobe head trauma or suspected basilar skull fracture.
2. The patient is apneic and / or in cardiac arrest.
3. The patient is known or is suspected to have increased intracranial pressure (ICP).
4. Diabetic emergency or suspected narcotic overdose **unless** patient has not responded to treatment per protocol **and** the airway is not maintainable with BLS adjuncts.
5. There is a known ingestion of a caustic substance.

## **PROTOCOL FOR MANAGEMENT:**

1. Explain procedure to patient, if appropriate.
2. Patient should be pre-oxygenated, if tolerated, with an appropriately sized Bag Valve Mask at a rate of 12 - 20 breaths per minute. The patient's SpO<sub>2</sub> should be raised as much as possible with manual ventilations prior to intubation attempt.
3. Visually inspect each nare for foreign bodies or large polyps. Insert an appropriately sized nasopharyngeal airway (NPA), lubricated with a water based lubricant (KY Jelly), into the patient's larger nare, usually the right nare.
4. Prepare all equipment for intubation:
  - a. Appropriately sized, non-styletted, ET tube with 10 cc syringe attached
  - b. Pre-inflate cuff of tube to ensure no leaks, then deflate, leaving syringe attached
  - c. Starting at the distal tip of tube, bevel out, curl tightly around gloved finger and hold to assist in forming curvature of tube
  - d. 1/2" silk tape torn into two 4" strips to secure tube upon successful intubation
  - e. Capnography sensor connected to monitor

# Protocol 11-6

Continued

## NASAL INTUBATION

- f. Suction setup turned on and within reach for use with vomited gastric secretions
- g. One (1) 15 mL bottle of Neo-Synephrine (if available)
- h. One (1) 5.0 mL uro-jet of Lidocaine 2% Jelly (if available)
- i. All appropriate BSI / PPE should be worn, to include eye protection, mask, and gloves
5. Place patient in position of comfort.
6. Once the determination has been made by the provider that the patient has been sufficiently pre-oxygenated, the NPA should be removed and an intubation attempt should be made.
7. Remove the NPA and apply two (2) full “squirts” of Neo-Synephrine (if available) in nare determined to be used for intubation ensuring to coat full length of nare.
8. Insert Lidocaine uro-jet (if available) tip in nare determined to be used for intubation, pushing tip into nose to rear of nare and pulling out while injecting jelly solution.
9. Check that capnography sensor is working properly; attach to end of ET tube.
10. Insert the ET tube on a flat plane, bevel up, into nare, advancing tube gently, but firmly, into nasal pharynx.
11. If resistance is met, cephalad traction or rotation of tube may facilitate passage of tube past superior turbinate/ sphenoid sinus in rear of nose. Use only gentle, firm pressure to advance the tube. DO NOT FORCE TUBE IF RESISTANCE IS MET.
12. Once tube has passed superior turbinate, continue advancing tube into lower airway until reaching the glottic opening (patient will gag), pull tube back slightly until gagging stops.
13. Hold tube in place and listen to patient respirations through end of tube, watching capnography waveform on monitor.
14. While listening to air movement through the tube, advance tube into trachea when sound is loudest (inspiration). Continue to watch capnography waveform during insertion, as it should not change.
15. If no waveform is present, pull tube back to glottic opening and attempt again. If intubation is unsuccessful a second time, remove tube and continue BLS airway interventions.
16. If capnography waveform is present, inflate tube cuff with 5 - 10cc of, attach BVM and ventilate patient. Attempt to ventilate with patient's spontaneous respirations.
17. Continue placement confirmation:
  - Observe chest rise upon ventilation
  - Auscultate for bilateral lung sounds
  - Auscultate abdomen for absent epigastric sounds
  - Note condensation in the tube with passive exhalation
18. If breath sounds are not heard equally, adjust tube for possible left or right main-stem intubation by pulling tube out one (1) centimeter. Reassess lung sounds. In trauma patients, also assess for possible pneumothorax.

# Protocol 11-6

Continued

19. Once lung sounds confirmed, secure ET tube with strips of tape and reassess lung sounds and capnography readings.
20. Reassess the tube placement after all movement of patient or change in capnography readings.

## NASAL INTUBATION

# Protocol 11-6

Continued

## NASAL INTUBATION

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# Protocol 11-7

**SECTION:** Clinical Procedures

**PROTOCOL TITLE:** Supraglottic Airway

**REVISED:** 05/2012

## OVERVIEW:

Supraglottic airways such as the King LTS-D and LMA Supreme are designed for use as a primary or alternate airway device utilized for airway control in the unconscious patient when oral intubation attempts have failed or are unfeasible. ODEMSA does not advocate for one particular device over another

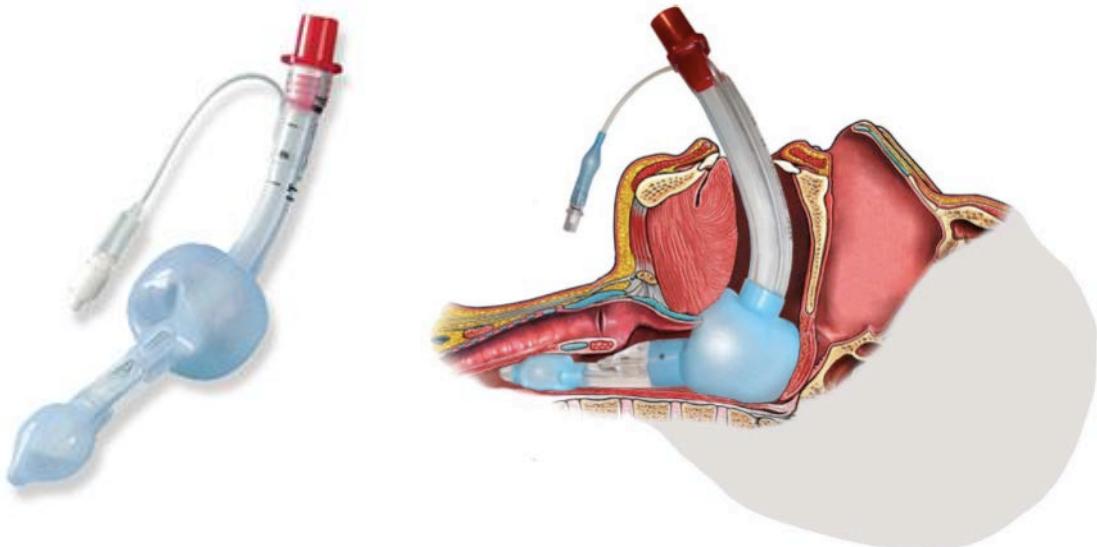
## King LTD / LTSD

### INDICATIONS:

1. Can be used as the primary airway for cardiac arrest.
2. Any patient requiring intubation when oral ET intubation has failed or insertion of oral ET intubation is unfeasible.

### CONTRAINdications:

1. Patient has an intact gag reflex.
2. Patient is less than three (3) feet tall.
3. Patient has a known or suspected underlying esophageal and / or laryngeal disease.
4. Significant damage to the cricoid cartilage or larynx (fractured larynx) is noted upon exam.
5. Transection of the patient's trachea is noted upon exam.
6. Patient has known or suspected foreign body airway obstruction.
7. There is significant damage noted to the maxillofacial region
8. There is a known ingestion of a caustic substance.



# Protocol 11-7

Continued

## SUPRAGLOTTIC AIRWAY

### APPROPRIATE SIZING OF KING LT-D and LTS-D:

Size	Connector Color	Patient Criteria	
2	(Green)	35 - 45 inches	12 - 25 kg
2.5	(Orange)	41 - 51 inches	25 - 35 kg
3	(Yellow)	4 - 5 feet	N/A
4	(Red)	5 - 6 feet	N/A
5	(Purple)	> 6 feet	N/A

Information courtesy of [www.kingsystems.com](http://www.kingsystems.com)

### PROTOCOL FOR MANAGEMENT:

1. Gently bend the distal portion of the King LTS-D airway to aid in insertion.
2. Lubricate the distal portion of the tube with a water-based lubricant (KY Jelly) to aid insertion.
3. Using the thumb and forefinger of your non-dominant hand, grasp the tongue and jaw and gently lift the jaw in an anterior and distal motion, unless contraindicated by C-spine precautions or patient position. Using a lateral approach, introduce the tip into the corner of the mouth.
4. Insert the tube following the natural curve of the oropharynx until the proximal end of the King LTS-D airway lies flush with the patient's teeth. **DO NOT FORCE THE TUBE INTO PLACE.**
5. Using the large syringe provided, inflate the cuff of the King LTS-D airway with the appropriate volume:

Size	Connector Color	Patient Criteria
2	(Green)	25 - 35 ml
2.5	(Orange)	30 - 40 ml
3	(Yellow)	45 - 60 ml
4	(Red)	60 - 80 ml
5	(Purple)	70 - 90 ml

Information courtesy of [www.kingsystems.com](http://www.kingsystems.com)

6. Attach the Bag Valve Mask to the King LTS-D airway and evaluate compliance. While bagging patient, gently withdraw the tube until ventilation becomes easy and free-flowing.
7. Attach capnography sensor, ventilate patient several times, and check monitor for distinct waveform and numerical value. If no waveform is present, check equipment as outlined in *Capnography Clinical Procedure*. If capnography is working but no waveform is present, remove King LTS-D, oxygenate patient with bag valve mask, and reattempt insertion.
8. Continue placement confirmation:
  - Observe chest rise upon ventilation
  - Auscultate for bilateral lung sounds
  - Auscultate abdomen for absent epigastric sounds
  - Note condensation in the tube with passive exhalation
9. If successful tube placement cannot be confirmed, remove the tube and ventilate using basic airway skills.
10. Secure the King LTS-D airway with a tube holder device and reassess placement.

## LMA Supreme

### INDICATIONS:

1. Can be used as the primary airway for cardiac arrest.
2. Any patient requiring intubation when oral ET intubation has failed or insertion of oral ET intubation is unfeasible.

### CONTRAINDICATIONS:

1. Patient has an intact gag reflex.
2. Patients with inadequate mouth opening to permit insertion.
3. Patient has a known or suspected underlying esophageal and/ or laryngeal disease.
4. Patients who have ingested caustic substances.
5. There is a known ingestion of a caustic substance.



### PROTOCOL FOR MANAGEMENT:

1. Lubricate the posterior surface of the mask and airway tube just prior to insertion.
2. Stand behind or besides the patient's head.
3. Place the head in the neutral or slight "sniffing" position (Sniffing = extension of head & flexion of neck).
4. Hold the device as shown in the illustration above.
5. Slide inwards using a slightly diagonal approach (direct the tip away from the midline).
6. Continue to slide inwards rotating the hand in a circular motion so that the device follows the curvature behind the tongue.
7. Resistance should be felt when the distal end of the device meets the upper esophageal sphincter. The device is now fully inserted.
8. Secure the device.

# Protocol 11-7

Continued

## SUPRAGLOTTIC AIRWAY

9. Attach capnography sensor, ventilate patient several times, and check monitor for distinct waveform and numerical value. If no waveform is present, check equipment as outlined in Capnography Clinical Procedure. If capnography is working but no waveform is present, remove LMA Supreme, oxygenate patient with bag valve mask, and reattempt insertion.
10. Continue placement confirmation:
  - Observe chest rise upon ventilation
  - Auscultate for bilateral lung sounds
  - Auscultate abdomen for absent epigastric sounds
11. If successful tube placement cannot be confirmed, remove the tube and ventilate using basic airway skills.

# Protocol 11-8

**SECTION:** Clinical Procedures

**PROTOCOL TITLE:** Surgical Cricothyrotomy

**REVISED:** 05/2012

## **OVERVIEW:**

Advanced airway procedures and competency are the cornerstones of paramedicine. True competency involves knowing not only how to control the airway, but when to control the airway, and selecting the best method to do so. A surgical cricothyrotomy should be performed only as a last resort when an airway cannot be definitively secured via oral / nasal intubation or rescue airway device insertion AND the airway cannot be maintained with BLS adjuncts or procedures.

## **INDICATIONS:**

1. Total airway obstruction not relieved by any other means.
2. Airway compromise from injuries that make oral or nasal intubation impractical.
3. No alternative airway device / maneuver is successful.
4. The patient cannot be oxygenated or ventilated by any other means.

## **CONTRAINDICATIONS:**

1. Patient less than 8 years old (If less than 8 years old, refer to *Needle Cricothyrotomy Clinical Procedure*).
2. Airway able to be maintained via BLS airway management procedures.

## **COMPLICATIONS:**

- Bleeding
- Incorrect or unsuccessful tube placement
- Pneumothorax and / or pneumomediastinum
- Tracheal perforation
- Vocal cord injury
- Aspiration
- Subcutaneous emphysema
- Esophageal and / or tracheal perforation
- Infection leading to cellulitis and / or sepsis
- Phrenic nerve and / or brachial plexus injury

## **PROTOCOL FOR MANAGEMENT:**

1. Prepare all equipment for surgical cricothyrotomy:
  - a. All appropriate BSI should be worn to include eye protection, mask, and gloves
  - b. Adult bag valve mask (BVM) connected to 100% oxygen
  - c. Appropriately sized ET tube. Shorten ET tube length by cutting tube just ABOVE point at which cuff inflation line attaches to tube. Remove BVM hub from discarded portion and attach to shortened tube
  - d. Attach 10 cc syringe to ET tube and pre-inflate cuff of tube to ensure no leaks, then deflate, leaving syringe attached
  - e.  $\frac{1}{2}$ " silk tape, torn into two 8" strips to secure tube upon successful cricothyrotomy
  - f. Connect capnography sensor to monitor
  - g. Check that capnography sensor is working properly and attach to end of shortened ET tube
  - h. Suction setup, turned on, and within reach

# SURGICAL CRICOTHYROTOMY

# Protocol 11-8

Continued

## SURGICAL CRICOHYROTOMY

- i. Sterile scalpel (# 10 preferred)
  - j. Antiseptic solution
  - k. Several 4 x 4s, opened
2. Once all equipment is prepared, a surgical cricothyrotomy attempt should be made.
    - a. Identify the cricothyroid membrane, located subcutaneously between the thyroid cartilage (Adam's apple) superiorly and the cricoid cartilage inferiorly
    - b. Cleanse the intended site of procedure with antiseptic solution
    - c. Stabilize the site by placing thumb and index finger of non-dominant hand on either side of the trachea, stretching the skin across the cricoid membrane
    - d. While stabilizing the trachea, use your dominant hand to make a 3 - 4 cm vertical incision through the skin, midline over the cricoid membrane. The skin will spread as the incision is made
    - e. Bleeding will occur, use 4 x 4s as needed to maintain clear visual field
    - f. After visual identification of the cricoid membrane, make a 1 cm horizontal incision by puncturing the cricoid membrane with the scalpel
    - g. Remove scalpel while continuing to hold traction. Turn scalpel over, insert handle into trachea and rotate to enlarge opening. NEVER enlarge incision with scalpel blade
    - h. Remove scalpel and insert "hook" or hemostat into tracheal opening to keep insertion site patent. As a last resort, use the index finger of your non-dominant hand, inserting the tip of the finger into the site just enough to keep tracheal incision open. If opening is lost, it can be extremely difficult to relocate definitively, possibly causing false passage of the tube along the outside of the trachea
    - i. Insert shortened ET tube into trachea via incision site. ET tube should only be inserted until the tube cuff can no longer be visualized
    - j. Inflate cuff with 8 - 10 cc of air, ventilate patient with BVM, and check monitor for distinct capnography waveform and numerical value
    - k. If no capnography waveform is present, check equipment (capnography working correctly, no kinks, attached securely) and recheck for proper placement (possible false passage in tracheal lining)
    - l. If capnography waveform is present, continue placement confirmation:
      - Observe chest rise upon ventilation
      - Auscultate for bilateral breath sounds
      - Auscultate abdomen for absent epigastric sounds
      - Note condensation in the tube with expirations
    - m. If breath sounds are not heard equally, adjust tube for possible left or right main-stem intubation by pulling tube out one (1) centimeter. Reassess lung sounds. In trauma patients, also assess for possible pneumothorax

# Protocol 11-8

Continued

- n. Once lung sounds have been confirmed, secure ET tube with  $\frac{1}{2}$ " strips of tape crossed around tube and taped to neck. Reassess lung sounds and capnography readings
- o. Reassess tube placement after all movement of patient or change in capnography readings

## **PEARLS:**

- 1. Make incision as small as possible to avoid extensive hemorrhage.
- 2. If an appropriately sized tracheostomy tube is available, and provider is familiar with placement, use in place of modified ET tube. Once tracheostomy tube is inserted, remove obturator, attach capnography, and continue procedure as outlined above. Secure tube with included tie strap.

# SURGICAL CRICOHYROTOMY

# Protocol 11-8

Continued

## SURGICAL CRICOHYROTOMY

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# Protocol 11-9

**SECTION:** Clinical Procedures

**PROTOCOL TITLE:** Orogastic Tube

**REVISED:** 05/2012

## **OVERVIEW:**

An oral gastric tube is used to decompress the stomach of air and / or gastric contents after intubation.

## **INDICATIONS:**

Decompression of air and suctioning of gastric contents of a cardiac or respiratory arrest patient after endotracheal intubation, King LTS-D, or other appropriate alternate airway device, has been performed and placement verified.

## **CONTRAINDICATIONS:**

1. Known or suspected esophageal varices
2. Esophageal stricture
3. Esophagectomy or partial gastrectomy
4. Gastric bypass
5. Penetrating neck trauma

## **PROTOCOL FOR MANAGEMENT:**

1. Estimate the length of the tube needed to reach the stomach by measuring the tube from the corner of the mouth to the earlobe and down to the xiphoid process. Mark the length with tape.
2. Lubricate the OG tube (16F) with water-soluble lubricant (KY Jelly).
3. Insert the tube through the oropharynx until the marked depth is reached.
4. If the tube coils in the posterior pharynx, direct laryngoscopy can be utilized to place the tube in the esophagus.
5. Verify placement. Using a 60 ml catheter tip syringe, instill 30 ml of air into the tube while auscultating over the epigastrum for sound of rushing air.
6. Aspirate for gastric contents and assess for cloudy, green, tan, brown, bloody, or off-white colored contents consistent with gastric contents.
7. Secure tube with tape and leave the blue air vent open to atmosphere.
8. Attach the tube to continual low suction (approximately 60 mmHg) using onboard suction.
9. If suction is not readily available, connect the empty 60 ml syringe to the tube while keeping the blue air vent open to atmosphere. This will allow the sump function of the tube to continue working until suction can be applied and will also prevent gastric contents from leaking from the tube.
10. If you cannot place the OG tube quickly (no more than 2 attempts), forego the procedure. DO NOT DELAY TRANSPORT.

OROGASTRIC TUBE

# Protocol 11-9

Continued

## OROGASTRIC TUBE

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# Protocol 11-10

**SECTION:** Clinical Procedures

**PROTOCOL TITLE:** Tourniquet

**REVISED:** 05/2012

## OVERVIEW:

If external bleeding from an extremity cannot be controlled by pressure, application of a tourniquet is the next step in hemorrhage control. Tourniquets that are narrow and band-like are more likely to result in damage to arteries and superficial nerves and should be avoided. Wider tourniquets are more effective at controlling bleeding, and they control hemorrhage at a lower pressure. A tourniquet should be applied just proximal to the hemorrhage, regardless of location on extremity. Other devices are available, including commercial devices for use in place of the manual tourniquet.

***\*\*\*The application of a tourniquet increases the risk of loss of limb\*\*\****

## INDICATIONS:

Extremity hemorrhage that cannot be controlled with basic or pressure bandaging

## CONTRAINDICATIONS:

1. Any hemorrhage that can be controlled by a basic or pressure bandage.

## PROTOCOL FOR MANAGEMENT:

The technique for application of a manual tourniquet is as follows:



1. Fold a cravat into a width of about four (4) inches (10 cm) and wrap cravat twice around the affected extremity.



3. Place a metal or plastic rod on top of the knot, and tie a second knot securing the rod in place.



5. Tie the ends of the rod in place and reassess for pulse and bleeding.



2. Tighten the bandage manually and tie a knot securing it in place.



4. Twist the rod until bleeding has stopped and the distal pulse is eliminated.



6. Place a piece of 2" tape above the tourniquet and record the time of application on the tape.

Photos courtesy of Richmond Ambulance Authority

TOURNIQUET

# Protocol 11-10

Continued

## TOURNIQUE

### **PEARLS:**

1. The tourniquet should be placed around a solid piece of bone, if possible, proximal to the uncontrolled hemorrhage. Placing the tourniquet over a solid piece of bones will aid in the tourniquet's ability to tamponade the hemorrhage.
2. The tourniquet should be placed as close proximally to the wound as possible to minimize further extremity damage.
3. The tourniquet must be marked with the time of application. Do not write on the actual tourniquet.
4. Consider Pain Management Protocol in conjunction with the application of a tourniquet. Be vigilant of the patient's hemodynamic status.

# Protocol 11-11

**SECTION:** Clinical Procedures

**PROTOCOL TITLE:** Intraosseous Access

**REVISED:** 05/2012

## **OVERVIEW:**

Intraosseous vascular infusion is a method of gaining access to the circulatory system by using a specialized trocar that is placed into the cavity of a long bone. Within the bone marrow, is a network of venous sinusoids that drain into the venous system, thereby accepting fluids or medications infused through an intraosseous access site. Although an IO can be used to infuse any fluid or medication, a drawback to its use may include slower than normal infusion rates due to anatomy of the IO space. To improve the infusion flow, a pressure bag should be used with all fluids administered via IO. Proper BSI precautions and aseptic technique should be used at all times.

## **INDICATIONS:**

1. Intravenous fluids or medications are needed and a peripheral IV cannot be established in one (1) attempt or ninety (90) seconds **AND** the patient exhibits one or more of the following:
  - a. An altered mental status (GCS of 8 or less)
  - b. Respiratory compromise ( $\text{SpO}_2$  80% after appropriate therapy, respiratory rate < 10 or > 40 per minute)
  - c. Hemodynamic instability (Systolic BP of < 90 mmHg)
2. Intraosseous access may be considered PRIOR to peripheral IV attempts in the following situations:
  - a. Cardiac arrest (medical or trauma)
  - b. Profound hypovolemia with altered mental status
  - c. Patient in extremis, with immediate need for delivery of medications, and / or fluids.

## **CONTRAINDICATIONS:**

1. Suspected narcotic overdose and / or hypoglycemia.
2. Fracture of the bone selected for IO insertion.
3. Excessive tissue at insertion site or inability to locate anatomical landmarks.
4. Previous significant orthopedic procedures in area selected for IO insertion (IO within 24 hours, knee replacement, and surgically implanted hardware). Look for scars.
5. Signs of infection in area selected for IO insertion (redness, skin lesions).
6. Osteogenesis imperfecta (severe congenital bone degenerative disorders if known).

## **PROTOCOL FOR MANAGEMENT:**

1. Assemble and prepare all equipment:
  - a. IO device
  - b. Cleansing agent
  - c. Syringe for aspiration and flushing
  - d. Fluid and administration tubing
  - e. Materials to secure site
2. Prepare and position the patient.
3. Select a site for insertion of the intraosseous access device. The site should be readily accessible and should be a site approved for use by the device manufacturer and agency operational medical director.

# INTRAOSEOUS ACCESS

# Protocol 11-11

Continued

## INTRASSEOUS ACCESS

4. Once the proper area of insertion has been located, clean the site and the immediate surrounding area with betadine, or other acceptable cleansing agent, allowing a large sterile field to work in.
5. Stabilize the site with non-dominant hand, making sure hands and fingers are out of the path of the insertion.
6. Insert the device, according to manufacturer's instructions for use.
7. Aspirate the site with a syringe, as directed by the device manufacturer, to ensure accurate placement. Upon aspiration, a small volume of blood or marrow indicated correct medullary placement of the trocar.
8. Flush the site with a small volume of saline (10 – 20 mL). If the patient is alert, you may administer 0.5 mg / kg to a max dosage of 20 - 40mg of lidocaine (or as otherwise approved by the agency medical director) through the IO site for control of pain associated with infusion pressure within the bone cavity.
9. Secure site according to device manufacturer's recommendations.
10. Infuse fluid at the appropriate rate. A pressure bag may be necessary to obtain an adequate flow rate.

# Protocol 11-12

**SECTION:** Clinical Procedures

**PROTOCOL TITLE:** Continuous Positive Airway Pressure (CPAP)

**REVISED:** 05/2012

## **OVERVIEW:**

Continuous Positive Airway Pressure (CPAP) has been shown to rapidly improve vital signs and gas exchange, reduce the work of breathing, decrease the sense of dyspnea, and decrease the need for endotracheal intubation in patients who suffer from shortness of breath from asthma, chronic obstructive pulmonary disease (COPD), pulmonary edema, heart failure (HF), and pneumonia. In patients with HF, CPAP improves hemodynamics by reducing left ventricular pre-load and after-load.

## **INDICATIONS:**

1. Any patient experiencing dyspnea or hypoxemia secondary to asthma, COPD, pulmonary edema, HF, pneumonia, or inhalation injury secondary to CO / CN exposure **and:**
  - a. Is awake and able to follow commands
  - b. Is > 12 years old and is able to fit the CPAP mask to their face properly
  - c. Has the ability to maintain an open airway
  - d. Has a systolic BP > 90 mmHg
  - e. Exhibits two or more of the following:
    - Has a spontaneous respiratory rate > 25 breaths per minute
    - SpO<sub>2</sub> < 94% at any time
    - Use of accessory muscle usage during respiration

## **CONTRAINDICATIONS:**

1. Patient < 12 years old.
2. Patient suspected of having a pneumothorax or has suffered trauma to the chest.
3. Respiratory or cardiac arrest.
4. Patient has a tracheostomy.
5. Patient has agonal respirations.
6. Patient showing signs of shock associated with cardiac insufficiency.
7. Unconsciousness.
8. Persistent nausea / vomiting.
9. Facial anomalies / stroke / obtundation / facial trauma.
10. Patient has active vomiting, upper GI bleeding or a history of recent gastric surgery.

## **PROTOCOL FOR MANAGEMENT:**

1. Prepare all equipment for CPAP initiation and application:
  - a. Connect CPAP to portable/ ambulance oxygen supply
  - b. Connect CPAP mask to airflow hose and airflow hose to CPAP machine
  - c. Connect capnography sensor to monitor
  - d. Do not delay CPAP application to setup in-line nebulizer attachment
  - e. Assure airflow is present and machine is working properly by placing hand over mask opening and checking pressure
  - f. If not previously initiated, place patient on continuous pulse oximetry and cardiac monitoring (if provider's certification allows)
2. Once all equipment is prepared, CPAP should be supplied to patient:

CPAP

# Protocol 11-12

Continued

## CPAP

- a. Explain the procedure to the patient
- b. Place mask to patient face assuring proper fit and seal over mouth and nose
- c. Refer to manufacturer's instructions for set up of your specific device
- d. Hold mask in place and secure with provided straps. Mask / seal should be tight but not uncomfortable for patient. Check for air leaks, mask / straps may need to be adjusted for proper fit
- e. If patient present with wheezing, setup nebulizer medications per protocol and apply as inline treatment
- f. Monitor and document the patient's respiratory response to treatment
- g. Check monitor for distinct capnography waveform and numerical value. If no waveform is present, check equipment as outlined in *Capnography Clinical Procedure*
- h. Vital signs should be checked and documented every 5 minutes while on CPAP
- i. All medications per applicable medical treatment protocol should be given in conjunction with CPAP use. CPAP does not replace medication use
- j. Continue to coach patient as needed to keep mask in place, readjust as needed
- k. Notify intended receiving hospital as soon as possible of patient status and CPAP application so a CPAP device can be brought to Emergency Department prior to patient arrival
- l. If respiratory status deteriorates, remove CPAP, assist patient spontaneous respirations with Bag Valve Mask, and prepare for nasal / oral intubation

### PEARLS:

1. CPAP therapy needs to be continuous and should not be removed once applied unless patient cannot tolerate mask, patient respiratory drive declines, or patient begins to vomit.
2. Upon arrival at hospital, advocate for patient to remain on CPAP and do not remove CPAP until hospital equivalent respiratory therapy is ready to be placed on patient.
3. Watch patient for gastric distention, which may result in vomiting.
4. Procedure may be performed on patient with a valid Pre-Hospital Do Not Resuscitate order.
5. Due to changes in pre-load and after-load of the heart during CPAP therapy, a complete set of vital signs must be obtained every five minutes.
6. Due to existing high intra-thoracic pressures present with these types of patients it is imperative that the lowest possible pressures be used during treatment to prevent possible development of a pneumothorax from lung over inflation.

# Protocol 11-13

**SECTION:** Clinical Procedures

**PROTOCOL TITLE:** Synchronized Cardioversion

**REVISED:** 05/2012

## **OVERVIEW:**

Synchronized electrical cardioversion uses a therapeutic dose of electric current to the heart, at a specific moment in the cardiac cycle to treat hemodynamically significant supraventricular (or narrow complex) tachycardias, including: atrial fibrillation and atrial flutter. It is also used in the emergent treatment of wide complex tachycardias, including ventricular tachycardia, when a pulse is present.

## **INDICATIONS:**

Synchronized cardioversion is indicated for any type of unstable tachycardia with serious signs and symptoms directly related to the tachycardia.

## **CONTRAINDICATIONS:**

1. Asystole
2. Ventricular Fibrillation
3. Polymorphic Ventricular Tachycardia (Torsades de Pointes)

## **PROTOCOL FOR MANAGEMENT:**

1. Remove all clothing covering the patient's chest and dry if necessary. If the patient has excessive chest hair, shave hair to ensure proper adhesion.
2. Attach 4 - Lead ECG electrodes for monitoring during cardioversion.
3. Connect the multi function pacing / defibrillation pads to the monitor multi-function cable (if not already connected).
4. Open the pad packaging and apply one edge of the pad securely to the patient. Roll the pad smoothly from that edge to the other being careful not to trap any air pockets between the gel and skin. Poor adherence and / or air under the multi-function pads can lead to the possibility of arcing and skin burns.
5. If it is not possible to place the back multi-function pad on the patient's back, place it on the standard apex position of the apex-sternum configuration. Effective defibrillation will result, but pacing with the device is usually less effective.
6. If possible initiate IV / IO assess patient and consider sedation with **Midazolam** 0.1 mg / kg slow IVP, maximum single dose 5.0 mg.
7. Prepare for cardioversion to pulseless arrhythmias; prepare for resuscitation / CPR.
8. Turn the monitor on and select the lead you wish to view.
9. Ready the monitor for defibrillation, and then select the desired energy level.
10. Press the SYNC key. The selected energy level is displayed on the monitor. Refer to the *Cardiac Care Protocols* for appropriate energy settings as well as specific manufacturer settings/recommendations.
11. A SYNC marker should be displayed above each detected R-wave to indicate where discharge will occur.
12. Press the CHARGE button and wait for the SHOCK button to enable.
13. Press and hold SHOCK until energy is delivered to the patient. The discharge will occur with the next marked R-wave. (**NOTE: MONITORS AUTOMATICALLY DEFAULT BACK TO DEFIBRILLATION MODE, FOLLOWING EACH SYNCHRONIZED SHOCK.**)

# SYNCHRONIZED CARDIOVERSION

# Protocol 11-13

Continued

## SYNCHRONIZED CARDIOVERSION

14. If additional countershocks are necessary, re-adjust the energy level as necessary, press SYNC, and repeat steps 10 - 13. Note: SYNC should be displayed prior to pressing the CHARGE button.
15. If it is necessary to disarm the charged defibrillator, changing the selected energy level should discharge internally all stored energy by the defibrillator.

### AHA<sup>®</sup> Recommended Energy Settings For Synchronized Cardioversion

#### Doses/Details

##### Synchronized Cardioversion

Initial recommended doses:

- Narrow regular: 50-100 J
- Narrow irregular: 120-200 J biphasic or 200 J monophasic
- Wide regular: 100 J
- Wide irregular: defibrillation dose (NOT synchronized)

##### Adenosine IV Dose:

First dose: 6 mg rapid IV push; follow with NS flush.

Second dose: 12 mg if required.

# Protocol 11-14

**SECTION:** Clinical Procedures

**PROTOCOL TITLE:** Transcutaneous Pacing

**REVISED:** 05/2012

## **OVERVIEW:**

Non-invasive external transcutaneous cardiac pacing is basically providing an electrical signal to make the heart beat when the body's conduction system fails. The body's anatomical pacemaker, the sino-atrial node, provides the heart's "intrinsic" rhythm. When this internal pacemaker fails or is compromised and the body becomes hemodynamically unstable, transcutaneous pacing is the appropriate therapy. It is accomplished by delivering pulses of electric current through the patient's chest, which stimulates the heart to contract.

## **INDICATIONS:**

1. Mobitz Type II second-degree AV block
2. Third-degree AV block
3. Hemodynamically unstable bradycardia with signs and symptoms of low perfusion or shock.

## **CONTRAINDICATIONS:**

None in the presence of indications above

## **PROTOCOL FOR MANAGEMENT:**

1. Remove all clothing covering the patient's chest and dry if necessary. If the patient has excessive chest hair, shave hair to ensure proper adhesion.
2. Attach 4 - Lead ECG electrodes for monitoring during pacing. Adjust the ECG size and lead for a convenient waveform display. Verify proper R-wave detection according to the specific indication given by your device.
3. Connect the multi function pacing / defibrillation pads to the monitor multi-function cable (if not already connected).
4. Open the pad packaging and apply one edge of the pad securely to the patient. Roll the pad smoothly from that edge to the other being careful not to trap any air pockets between the gel and skin. Poor adherence and / or air under the multi-function pads can lead to the possibility of arcing and skin burns.
5. Apply the multi-function pads in the apex/ lateral position of the anterior-lateral configuration. *Be sure to check your specific manufacturer's recommendations for pad placement*
6. Turn on the pacing function on your device.
7. Set the PACER RATE to a value 10 - 20 ppm higher than the patient's intrinsic rate. If no intrinsic rate exists, use 100 ppm. The pacer rate increments or decrements by a value of 2 ppm on the display when you turn the knob.
8. Increase the PACER OUTPUT (mA) until capture is noted. The output mA value will be displayed on the screen.

# TRANSCUTANEOUS PACING

# Protocol 11-14

Continued

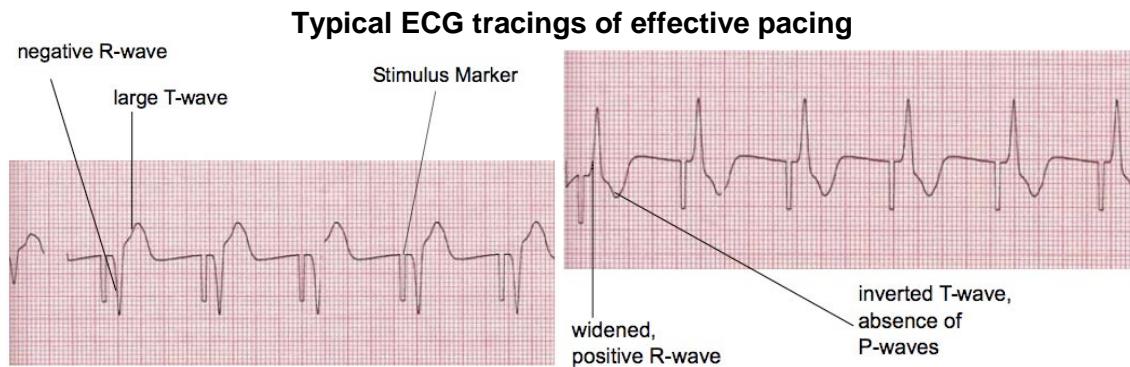
## TRANSCUTANEOUS PACING

### DETERMINE CAPTURE:

Capture refers to the state when the heart is being paced by the monitor rather than the body's own pacemaker mechanism. Capture consists of two parts: electrical and mechanical capture. You MUST verify capture both electrically and mechanically to ensure appropriate circulatory support of the patient.

### ELECTRICAL CAPTURE:

Electrical capture means that the monitor is delivering sufficient electrical current to stimulate the heart as seen on the ECG tracing. The shape and the size of the paced ECG waveforms can vary depending on the patient and the ECG lead configuration. Electrical capture is obtained when: (1) Each stimulus marker is followed by a wide QRS complex, (2) There is no underlying intrinsic rhythm, and (3) An extended and sometimes enlarged T-wave appears.



### MECHANICAL CAPTURE:

Mechanical capture is confirmed when the patient's pulse matches the displayed pace rate. Because pacing stimuli generally causes muscular contractions that can be mistaken for a pulse, you should never take a pulse on the left side of the body to confirm mechanical capture. Pectoral muscle contractions due to pacing also do not indicate mechanical capture. To avoid mistaking muscular response to pacing stimuli for arterial pulsations, use ONLY: (1) Femoral artery, or (2) Right brachial or radial artery for confirming mechanical capture.

Once capture has been confirmed, the optimum therapeutic threshold must be determined. The ideal output current is the lowest value that maintains mechanical capture. This is usually 10% above threshold. Threshold is the minimum current that must be exceeded to begin producing ventricular capture.

### CHECKING UNDERLYING PATIENT RHYTHM

Follow the manufacturer's directions for your specific device to check and determine the patient's underlying rhythm.

### ASYNCHRONOUS PACING

Some devices allow for the delivery of asynchronous pacing. If ECG electrodes are not available or there is some circumstance that prevents or interferes with the surface ECG,

it may be necessary to operate the pacemaker asynchronously. Asynchronous pacing should ONLY be performed in an emergency when NO OTHER ALTERNATIVES EXIST. Follow the manufacturer's instructions for your specific device to deliver asynchronous pacing.

**NOTE:** Pace stimuli is also delivered asynchronously whenever there is an ECG lead off condition. Be aware that there is no ECG activity on the display when pacing by this method; you must use other means of determining capture such as checking the patient's pulse. When pacing asynchronously with an ECG LEAD OFF condition, set the rate and output at the known capture level or high enough (100mA) to presume capture.

### PEDIATRIC PACING

Non-invasive external transcutaneous cardiac pacing of pediatric patients is done in an identical manner to adult pacing. Smaller size pediatric multi-function pads should be used for patients weighing less than 33 lbs / 15 kg. Continuous pacing of neonates can cause skin burns. If it is necessary to pace for more than 30 minutes, periodic inspection of the underlying skin is strongly advised.

### PEARLS:

1. The outcome of prolonged bradycardic or asystolic cardiac arrest is poor, even with non-invasive pacing. Indiscriminate pacing of this rhythm is unwarranted, particularly as a late effort in the resuscitation.
2. Human studies have shown that the average current necessary for external pacing is between 65 - 100 milliamperes.
3. Pulse duration is the time of impulse stimulation. Early non-invasive pacemakers used short-duration (1 - 2 milliseconds) impulses. The action potential (electrical impulse including depolarizing and repolarizing) of cardiac muscle cells is longer than that for skeletal muscle, requiring 20 - 40 milliseconds to reach maximum effect. Studies have found that increasing the duration from 1 to 4 milliseconds resulted in a three-fold reduction in threshold (the current required for stimulation) to produce capture. Increasing the current from 4 to 40 milliseconds further halves the threshold.
4. Transcutaneous pacing may be uncomfortable for the patient. Sedation and pain management should be considered, as needed.
5. Prolonged transcutaneous pacing may cause burns to the skin. If possible, pacing should not be continued more than 30 minutes if at all possible.

# Protocol 11-14

Continued

## TRANSCUTANEOUS PACING

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# Protocol 11-15

**SECTION:** Clinical Procedures

**PROTOCOL TITLE:** Mechanically-Assisted External Chest Compression Device

**REVISED:** 05/2012

## OVERVIEW:

When treating patients in sudden cardiac arrest, consistent, continuous, high-quality chest compressions are critical to survival. Several devices are now available that provide mechanically-assisted external chest compression, allowing for effective, non-invasive cardiac support during cardiac arrest resuscitation. ODEMSEA does not advocate the use of one device over another.

## INDICATIONS:

Medical origin Cardiac Arrest.

## CONTRAINDICATIONS:

Vary based on the specifics parameters of the device. Follow the manufacturer's recommendations for contraindications.

## PROTOCOL FOR MANAGEMENT:

1. After assessing patient's condition, begin manual CPR.
2. Attach defibrillation / pacing pads.
3. Prepare the mechanically-assisted external chest compression device for deployment.
4. Apply mechanically-assisted external chest compression device, according to the manufacturer's recommendations. WHILE APPLYING DEVICE, ATTEMPT TO LIMIT INTERRUPTIONS IN MANUAL CHEST COMPRESSION TO LESS THAN 10 SECONDS.
5. As quickly as possible, engage operation of the device.
6. Ventilate the patient as directed according to manufacturer's recommendations.
7. Every effort should be made to not stop compressions unless absolutely necessary.
8. Positive pressure ventilation can be performed synchronously with any decompression once an advanced airway is in place.
9. To access the patient, or to pause the device for any reason, press the Stop / Cancel or pause button.
10. Defibrillate the patient when indicated, according to the manufacturer's recommendations.
11. Pause compressions to reassess the patient and check for a pulse.

**NOTE:** Any time failure occurs, manual external chest compressions should be resumed IMMEDIATELY, whilst troubleshooting the device.

MECHANICALLY-ASSISTED CPR

# Protocol 11-15

Continued

## MECHANICALLY-ASSISTED CPR

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# Protocol 11-16

**SECTION:** Clinical Procedures

**PROTOCOL TITLE:** Patient Restraint  
**(Proposed: Behavioral/Patient Restraint)**  
**REVISED:** 05/2012

## **OVERVIEW:**

This procedure is to be used when it is determined that the only way to administer proper patient care is through the use of restraints.

## **INDICATIONS:**

1. Safe & controlled access for medical procedures when involuntary patient interference or resistance is reasonably anticipated.
2. Evaluation or treatment of combative persons when illness or trauma is suspected to be the cause of the combativeness.
3. Involuntary treatment of persons without capacity to refuse treatment.

## **CONTRAINDICATIONS:**

1. When any other form of transport without restraint is available.

## **PROTOCOL FOR MANAGEMENT:**

1. Attempt to obtain verbal control of the situation.
2. Determine if restraints will be needed by provider.
3. Try to identify other causes for combativeness.
4. Request Police response for assistance.
5. INFORM Patient that you intend to restrain them and WHY (do not use this technique as a threat).
6. The minimum number of providers needed to restrain a patient is three (3); however five (5) providers are recommended. These five (5) people allow one (1) to control each extremity and one (1) for the patient's head / airway.
7. Apply restraints. ALL restraints used by EMS will be soft restraints. If police restrain the patient with hard restraints, a police officer MUST ride in the ambulance with the patient to the hospital.
8. Soft restraints should be applied so that the circulation of the extremity is not impaired. It is recommended that providers use triangular bandages. Doubled 6-ply roller gauze (3 inch), sheets, and commercial soft restraint are acceptable alternatives. Document physical assessment findings / injuries discovered before restraints were applied.
9. ALL Patients will be transported in the Supine Position.
  - a. Place patient onto stretcher.
  - b. Apply chest belt first. This belt goes under the patient's arms. It should be as high as possible on the patient's chest.
  - c. Apply thigh belt second. This belt should be applied above the patient's knees.
  - d. Apply abdominal / waist strap and shoulder straps.
  - e. Insure that once the belt is tightened, it does not cause respiratory distress and that the patient can still take full inspiratory breaths.
  - f. Apply 4-point restraints last. (Each arm and leg as necessary). The 5-point belt restraints may be enough restraint to control patient.
  - g. It is recommended to restrain the arms above the wrists and the legs above the ankles.
  - h. It is recommended that the dominant arm of the patient be restrained above his head.

PATIENT RESTRAINT

# Protocol 11-16

Continued

## PATIENT RESTRAINT

- i. Tie all restraints to "T-Posts" so that the restraint cannot slide.
10. Once restrained, the patient should remain restrained until arrival at the receiving facility.
11. Circulatory checks should be performed distal to the restraints every 15 minutes.
12. If a patient begins to have a seizure, CUT / RELEASE THE RESTRAINTS IMMEDIATELY.
13. When a patient is restrained, documentation must include the following:
  - a. Evidence of patient's need for restraint.
  - b. That the treatment and necessity of the restraints was in the patient's best interest.
  - c. Type of restraint employed and which extremities were restrained.
  - d. Injuries that occurred during or after the restraint.
  - e. Circulation checks every 15 minutes recorded with patient vital signs.

### PEARLS:

1. There are reversible, medically treatable conditions that can cause violent behavior in patients. Providers should consider these causes (hypoglycemia, hypovolemia, overdoses, psychosis, etc.) when restraining a patient. Refer to the Medical Patient Care Protocols: Altered Mental Status.

# Section

# 12

**SECTION:** Administration

**REVISED:** 05/2012

# ADMINISTRATION

<b>1.</b>	<b>Patient and Scene Management</b>	<b>Protocol 12 - 1</b>
<b>2.</b>	<b>Documentation Compliance</b>	<b>Protocol 12 - 2</b>
<b>3.</b>	<b>Treatment of Minors</b>	<b>Protocol 12 - 3</b>
<b>4.</b>	<b>Patient Destination Policy</b>	<b>Protocol 12 - 4</b>
<b>5.</b>	<b>Hospital Diversion Policy for Emergency Patients</b>	<b>Protocol 12 - 5</b>
<b>6.</b>	<b>Patient Refusal</b>	<b>Protocol 12 - 6</b>
<b>7.</b>	<b>Do Not Resuscitate (DNR) Orders</b>	<b>Protocol 12 - 7</b>
<b>8.</b>	<b>Cease Resuscitation Orders</b>	<b>Protocol 12 - 8</b>
<b>9.</b>	<b>Traumatic Cease Resuscitation</b>	<b>Protocol 12 - 9</b>
<b>10.</b>	<b>Inter-facility Transfers</b>	<b>Protocol 12 - 10</b>
<b>11.</b>	<b>Infection Control - PPE</b>	<b>Protocol 12 - 11</b>
<b>11 b</b>	<b>Infection Control - Exposure</b>	<b>Protocol 12 - 11b</b>
<b>12.</b>	<b>Mass Gatherings</b>	<b>Protocol 12 - 12</b>
<b>13.</b>	<b>MIVT</b>	<b>Protocol 12 - 13</b>

# Section 12

Continued

## ADMINISTRATION

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# Protocol 12-1

**SECTION:** Administration

**PROTOCOL TITLE:** Management

**REVISED:** 05/2012

## **OVERVIEW:**

An orderly management of the emergency scene will improve any level of pre-hospital patient care. Although questions concerning authority (i.e., on-scene physician and response by more than one EMS agency) can arise, they should be settled quickly and quietly.

## **PROTOCOL FOR MANAGEMENT:**

1. Upon arrival at the scene, NIMS (National Incident Management System) shall be utilized and the Incident Commander (or designee) shall have authority for patient care and management at the scene of an emergency.
2. Authority for management of the emergency scene, exclusive of medical control over the patient, will rest with the appropriate on-scene public safety officials (i.e., police, fire, and rescue). It is recommended that scene management be negotiated in advance of emergencies by local agreements and written protocols.
3. If other medical professionals are at the emergency scene offer or provide assistance in patient care, the following will apply:
  - a. Medical professionals who offer their assistance at the scene should be asked to identify themselves and their level of training. The pre-hospital provider should request that the medical professional provide proof of her / his identity if that person wants to continue to assist with patient care after the ambulance has arrived.
  - b. Physicians are the only medical professional who may assume control of the patient's care. Pre-hospital providers should recognize the knowledge and expertise of other medical professionals and use them, if needed, for the best patient care possible. Any bystander claiming to be a physician must show credentials to EMS on scene prior to being allowed to provide patient care. All medical professionals who assist or offer assistance should be treated with courtesy and respect.
  - c. The authority of the pre-hospital provider's procedures rests in these pre-hospital Patient Care Protocols adopted by the EMS agency and the agency Operational Medical Director (OMD).
  - d. A physician at the scene who renders care to the patient prior to arrival of an EMS unit may retain medical authority for the patient if the physician desires. The pre-hospital provider shall advise the physician who wants to supervise or to direct patient care that, in order to do so, the physician MUST accompany the patient to the receiving hospital to maintain continuity of patient care. Documentation of these events will be complete and will include the physician's name.
  - e. If there is a conflict about patient care or treatment protocols, the pre-hospital provider will contact on-line medical control or, if practical, the agency OMD for further instructions. Under no circumstances should this conflict interfere with prudent patient care.

MANAGEMENT

# Protocol 12-1

Continued

4. The levels of pre-hospital EMS certification currently recognized by the Commonwealth of Virginia are:

Core Certifications	Specialty Certifications
a. First Responder / EMR	a. Pediatric Neonatal Critical Care Transport Paramedic
b. Emergency Medical Technician-Basic / EMT	b. Critical Care Emergency Medical Technician – Paramedic
c. Emergency Medical Technician – Enhanced / Advanced EMT	c. Certified Flight Paramedic
d. Emergency Medical Technician – Intermediate	
e. Emergency Medical Technician-Paramedic / Paramedic	

# Protocol 12-2

**SECTION:** Administration

**PROTOCOL TITLE:** Documentation

**REVISED:** 05/2012

## **OVERVIEW:**

Under existing Virginia law, all licensed emergency medical services agencies are required to “*participate in the pre-hospital patient care reporting procedures by making available ... the minimum data set on forms.*” Licensed EMS agencies, pre-hospital providers and the Commonwealth of Virginia are required to keep patient information confidential.

## **PROTOCOL FOR MANAGEMENT:**

1. An electronic patient care report (ePCR) will be completed for each patient encounter. The report must be completed and sent to the appropriate facility within the following 24 hours. ODEMSA, at the request of the region, has developed a MIVT report for documenting patient care to assist the hospital between the time when the patient is delivered to the ED and when the patient care report is received. A copy of the MIVT is included in these protocols.
2. Each ePCR will include documentation of:
  - a. The evaluation and care of the patient during pre-hospital care.
  - b. The patient’s refusal of the evaluation.
  - c. The patient’s encounter to protect the local EMS system and its personnel from undue risk and liability.
3. A patient is defined as any individual that requests evaluation by EMS. If an individual is not legally competent due to age, injury, chronic illness, intoxication, etc., always err on the side of patient safety and assume an implied request for evaluation.
4. All patient encounters, which result in some component of an evaluation, must have an ePCR completed.
5. All patients who refuse any component of the evaluation or treatment, should have a refusal signed and documentation of the refusal noted in the narrative.
6. All patients who are not transported by EMS should have a refusal completed.
7. When utilized effectively, the ePCR allows great detail in documentation by using the pre-loaded information coupled with notes. However, this does not eliminate the need for a narrative to be completed. No ePCR will be considered complete without a written narrative that “paints” an accurate picture of the scene, patient presentation, and all occurrences during the interaction with that patient.
8. When a patient is transported, a copy of the MIVT report should be left at the receiving hospital. Also, some facilities have printing capability and providers can print ePCRs before leaving the facility. It is imperative that reports are completed and uploaded in a timely manner as these reports may influence the patient’s care at the receiving facility and will be placed in the patient’s permanent medical record once received.

DOCUMENTATION

# Protocol 12-2

Continued

**DOCUMENTATION**

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# Protocol 12-3

**SECTION:** Administration

**PROTOCOL TITLE:** Minors

**REVISED:** 05/2012

## **OVERVIEW:**

Pre-hospital providers are called to treat young patients and occasionally, there is no parent or other person responsible for the minor. Minors, in the eyes of the law, are generally considered to be incapable of self-determination; and therefore require parental or guardian consent for treatment / transport. That being said, generally one of three situations present: (1) Emancipated Minor (*Very rare*), (2) A concept of Mature Minor emerges, or (3) the patient is a bona fide Minor.

## **GUIDELINE:**

Whenever delay in providing medical or surgical treatment to a minor may adversely affect such minor's recovery and no person authorized in this section to consent to such treatment for such minor is available within a reasonable time under the circumstances, no liability shall be imposed upon qualified emergency medical services personnel as defined in [S 32.1-111.1](#) at the scene of an accident, fire or other emergency, a licensed health professional, or a licensed hospital by reason of lack of consent to such medical or surgical treatment. However, in the case of a minor 14 years of age or older that is physically capable of giving consent, such consent shall be obtained first.<sup>1</sup>

**In situations where parental involvement is impractical or problematic,  
OR the patient is unconscious and/or lacks mental capacity to consent  
to care, the pre-hospital provider may treat and/or transport.**

**A pregnant minor shall be deemed an adult** for the sole purpose of giving consent for herself and her child to surgical and medical treatment relating to the delivery of her child when such surgical or medical treatment is provided during the delivery of the child or the duration of the hospital admission for such delivery; thereafter, the minor mother of such child shall also be deemed an adult for the purpose of giving consent to surgical and medical treatment for her child.<sup>1</sup>

**Authority of Parents, Guardians or Others:** Parents have the authority to direct or refuse to allow treatment of their children. A court appointed guardian, and any adult person standing *in loco parentis*, also has the same authority. "In loco parentis" is defined as "[I]n the place of a parent; instead of a parent; charged, fictitiously, with a parent's rights, duties, and responsibilities." Black's Law Dictionary, 708 (5<sup>th</sup> ed. 1979). 1987 - 88 Va. Op. Atty. Gen. 617 "Furthermore, I would point out that §54-325.2(6) allows any person standing "in locos parentis" to consent to medical treatment for a minor child. This signifies, in my judgment, an intent to allow any responsible adult person, who acts in the place of a parent, to consent to the treatment of a minor child, particularly in emergency situations." 1983-84 VA. Op. Atty. Gen. 219. Such a person may be a relative, schoolteacher or principle, school bus driver, baby-sitter, neighbor, or other adult person in whose care of the child has been entrusted.<sup>2</sup>

<sup>1</sup> Code of Virginia 54.1-2969

<sup>2</sup> Thomas Jefferson EMS Council – Treatment for Patients Under Age 18

**MINORS**

# Protocol 12-3

Continued

## MINORS

**Persons Subject to Policy Under Age 14:** A person that is under the age of 14 shall be treated and transported unless a parent or guardian or person *in locos parentis* advises otherwise. Do not delay treatment or transport for extended periods simply trying to contact a parent or guardian. If you believe that treatment is necessary, but the parent or guardian or person *in locos parentis* refuses to allow treatment, medical control should be consulted.<sup>2</sup>

**Persons Subject to Policy Aged 14 - 18:** A person between the ages of 14 and 18 may refuse treatment and transport, unless a parent or guardian or person *in locos parentis* advises otherwise. If you believe that treatment is necessary, but the person refuses, an attempt should be made to contact a parent or guardian, and medical control should be consulted. If you believe that treatment is necessary, but the parent or guardian or person *in locos parentis* refuses to allow treatment, medical control should be consulted.<sup>2</sup>

Emancipation is a court ordered decree. The circumstances under which a minor may petition for emancipation are as follows: A minor who has reached his / her sixteenth birthday and is residing in this Commonwealth, AND (i) the minor has entered into a valid marriage, whether or not that marriage has been terminated by dissolution; or (ii) the minor is on active duty with any of the armed forces of the United States of America; or (iii) the minor willingly lives separate and apart from his parents or guardian, with the consent or acquiescence of the parents or guardian, and that the minor is or is capable of supporting himself and competently managing his own financial affairs. If the courts determine that an emancipation order is appropriate and subsequently issues such order, the emancipated minor is legally able to consent to medical, dental, or psychiatric care, without parental consent, knowledge, or liability. Once emancipation has been granted by the courts, DMV issues identification indicating the emancipation degree, that identification should be readily available for your review.

1. In situations where the parent / guardian or emancipated minor possess sufficient mental capacity to formulate decisions regarding medical care / treatment, consent shall be obtained prior to initiating care. Mental capacity means that the individual rendering the consent, is informed and possesses sufficient ability to be able to understand:
  - The general nature of the injury / illness
  - Nature and purpose of proposed treatment
  - Risks and consequences of proposed treatment
  - Probability that treatment will be successful
  - Feasible treatment alternatives and have the ability to make a voluntary choice among the alternatives
  - Prognosis if treatment is not given
2. In situations where the parent / guardian or emancipated minor demonstrates sufficient mental capacity to formulate decisions and subsequently refuses the

# Protocol 12-3

Continued

offer of care; yet in the provider's judgment is in need of medical attention, the provider should first attempt to discern the reasons for the patients' refusal of consent. Often it is something so inconsequential, that reason and common sense often prevail and once you have provided assistance with whatever is the basis of concern (i.e., patient needs to call someone to look after a pet, etc) the patient often consents to treatment / transport. If unable to influence the parent / guardian or patient, contact on-line Medical Control for additional guidance.

## **PEARLS:**

1. *Always act in the best interest of the patient* - EMS providers must strike a balance between abandoning the patient and forcing care.
2. All states allow parental consent for treatment of a minor to be waived in the event of a medical emergency. The circumstances that should be present in order for such an emergency include the patient being incapacitated to the point of being unable to give an informed choice, the circumstances are life-threatening or serious enough that immediate treatment is required, and it would be impossible or imprudent to try to get consent from someone regarding the patient. In these cases, consent of the parent is presumed, since otherwise the minor would suffer avoidable injury.
3. If a minor is injured or ill and no parent contact is possible, the provider should contact on-line Medical Control for additional instructions.
4. Refer to the appropriate Pediatric Protocol sections and consider the following in regard to transport:
  - a. Transport conscious children with a parent unless it interferes with proper patient care.
  - b. In cases of major trauma or cardiopulmonary arrest, exercise judgment in allowing parents to accompany the child in the ambulance.
  - c. Allow the parent to hold and / or touch the child whenever possible and safe to do so.
  - d. Both parent and child will respond best to open and honest dialogue.

**MINORS**

# Protocol 12-3

Continued

**MINORS**

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# Protocol 12-4

**SECTION:** Administration

**PROTOCOL TITLE:** Patient Destination

**REVISED:** 05/2012

## **SCOPE:**

This policy pertains to all licensed EMS Agencies in the Old Dominion EMS Alliance (ODEMSA) region that provide ambulance transportation.

## **PURPOSE:**

To provide for a defined, consistent policy for the destination of ambulance patients consistent with quality patient care and regional medical protocols within the ODEMsa region this includes Planning Districts 13, 14, 15 and 19.

## **POLICY ELEMENTS:**

1. All ambulance patients (resulting from requests for emergency assistance which result in transport) normally will be transported to the closest appropriate hospital emergency department unless otherwise directed by the on-line medical control physician and/or by medical control during a declared diversion. The closest appropriate hospital is defined as the hospital closest to the location of the patient that can provide the level of care needed by the patient. The medical control physician is defined as the attending emergency department physician at the hospital contacted by the ambulance Attendant-in-Charge (AIC) or a person designated by the AIC. Medical Control Hospital is defined as that hospital designated to direct ambulance movements in line with ODEMsa's Hospital Diversion Policy as most recently revised.
2. Stable patients may be transported to the patient's destination of choice if allowed by local EMS agency policies and by available resources.
3. Patients who meet certain criteria as severe trauma patients, as defined in the Old Dominion EMS Alliance Trauma Care System Plan, usually will be transported directly to a Trauma Center unless redirected by the Medical Control Physician in accordance with the Trauma Care System Plan.
4. Individual EMS agencies and/or EMS systems are responsible for determining operational policies related to the most effective ambulance deployment and utilization patterns. This may include policies allowing transport of stable patients to hospitals of the patient's choice.
5. In mass casualty incident (MCI) situations, the current Central Virginia Mass Casualty Incident Plan and its EMS Mutual Aid Response Guide, as most recently revised, will govern patient transportation and hospital destination(s).
6. Other policies and protocols related to patient transport and ambulance-to-hospital communications are defined in the ODEMsa Pre-hospital Patient Care Protocols and the Hospital Diversion Policy as most recently revised.

# Protocol 12-4

Continued

PATIENT DESTINATION

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# Protocol 12-5

**SECTION:** Administration

**PROTOCOL TITLE:** Diversion

**REVISED:** 05/2012

## **PURPOSE:**

To maintain an orderly, systematic and appropriate distribution of emergency patients transported by ambulances during a single or multiple hospital diversion situation within the Old Dominion EMS Alliance (ODEMSA) region.

## **SCOPE:**

This policy pertains to all 19 emergency departments and all licensed EMS agencies providing ground ambulance transportation as defined in Virginia Department of Health regulations.

**NOTE:** *Early contact and notification by the EMS ambulance crew to the receiving facility is essential for optimal patient care. It is highly recommended that the ambulance Attendant in Charge (AIC) use the regional MIVT Report format when providing the receiving facility with pre-arrival information on the patient. Once an EMS unit has marked enroute and a report has been given to the receiving facility, any later change in diversion status of the receiving facility will not affect that ambulance.*

**Refer to ODEMSA's complete Hospital Diversion Policy for further information.**

## **CONTRAINDICATIONS:**

Patients with STEMI, Acute Stroke, Airway Obstruction, Uncontrolled Airway, Uncontrolled Bleeding, who are in Extremis or with CPR in progress, *should be taken immediately to the closest appropriate hospital*, without regard to the hospital's diversion status.

## **DIVERSION OVERRIDE DECISIONS:**

Prehospital EMS providers may overrule diversion if a patient is in extremis, or for significant weather / traffic delays, mechanical problems, etc. An EMS provider who believes an acute decompensation is likely to occur if the patient is diverted to a more distant hospital ALWAYS has the option to take that patient to the closest Emergency Department regardless of the diversion status.

*The Attendant-in-Charge also has the option to ask via radio or phone to speak directly to an Emergency Department physician. Good clinical sense and optimal patient care are the ultimate considerations.*

## **CATEGORIES OF HOSPITAL STATUS:**

- A. **OPEN** - When a hospital has full capacity for receiving its usual patient load.

**DIVERSION**

# Protocol 12-5

Continued

## DIVERSION

- B. **DIVERSION** – When a hospital is unable to handle certain types of patients. Subcategories are listed below.
1. **Adult Medical / Surgical** – includes Minor Trauma.
  2. **Major Trauma** – means the operating rooms and surgeons are completely full. Reference: Trauma Triage Schematic – Appendix E.
  3. **Labor & Delivery (L & D)** – Pre-Term is defined as active labor before 36 weeks.
  4. **Psychiatric** – divided into three areas:
    - a) **Child & Adolescent Psych** – age infant < 18
    - b) **Adult Psych** – age 18 to 64
    - c) **Geriatric Psych** – age 65 and over
  5. **Pediatric** – For the purposes of this Hospital Diversion Policy, pediatric is defined as under the age of 18.
- C. **OUT OF SERVICE** - Critical or catastrophic circumstances result in operational shutdown. Hospital cannot receive any new patients by EMS or any other means.

The primary Medical Control Hospital will be the Virginia Commonwealth University Medical Center, or an identified alternate facility, as specified in the Central Virginia MCI Plan. If VCU cannot handle Medical Control, the identified alternate facilities, in order, are: (1) Chippenham Medical Center and (2) Southside Regional Medical Center.

# Protocol 12-6

**SECTION:** Administrative

**PROTOCOL TITLE:** Patient Refusal

**REVISED:** 05/2012

## **OVERVIEW:**

If a patient (or the person responsible for a minor patient) refuses secondary care and / or ambulance transport to a hospital after pre-hospital providers have been called to the scene, the following procedures should be completed:

## **DEFINITIONS:**

**Adult:** A person at least eighteen (18) years of age.

**Minor:** A person less than eighteen (18) years of age.

**Emancipated Minor:** A person under the age of eighteen (18) is emancipated if any of the following conditions met:

- a. Married or previously married
- b. On active military duty
- c. Has received a declaration of emancipation from the Commonwealth of Virginia

**Mental Capacity:** A person who is alert, oriented, and has the capacity to understand the circumstances surrounding their illness or impairment, and the possible risks associated with refusing treatment and / or transport. The patient's judgment is also not significantly impaired by illness, injury or drugs / alcohol intoxication. Patients who have attempted suicide, verbalized suicidal intent, or if other factors lead pre-hospital care personnel to suspect suicidal intent, should not be regarded as having capacity and may not decline transport to a medical facility.

## **PROTOCOL FOR MANAGEMENT:**

	A	B	EN	I	P
1. Complete an initial assessment and complete set of vital signs of the patient, with particular attention to the patient's neurological status.	•	•	•	•	•
2. Determine the patient's capacity to make a valid judgment concerning the extent of their illness or injury. If the provider has doubts about whether the patient is competent to refuse, the provider should contact on-line medical control.	•	•	•	•	•
3. Clearly explain to the patient and all responsible parties the possible risks and / or overall concerns with regards to refusing care.	•	•	•	•	•
4. Perform appropriate medical care with the consent of the patient.	•	•	•	•	•

# Protocol 12-6

Continued

## PATIENT REFUSAL

	A	B	EN	I	P
5. Complete an ePCR form, clearly documenting the initial assessment findings and the discussions with all involved persons regarding the possible consequences of refusing additional pre-hospital care and/or transportation. A third party should witness the form and discussion. If no such party is available then a second EMS provider should witness this.	•	•	•	•	•
6. After the form has been completed, have the patient or the person responsible for a minor patient sign the refusal form provided on the ePCR form. This procedure should be witnessed by at least one other individual.	•	•	•	•	•
7. Any person who calls for any type of assistance should have a refusal form completed unless, upon evaluation, the caller denies any injury or illness and none is suspected. This includes motor vehicle accidents. Furthermore, a refusal should always be completed if the original caller was the complainant (1 <sup>st</sup> party), as a complaint originally existed prior to EMS arrival.	•	•	•	•	•

### PEARLS:

1. An adult or emancipated minor, who has demonstrated possessing sufficient "mental capacity" for making decisions, has the right to determine the course of their medical care, including the refusal of care. These patients must be advised of the risks and consequences resulting from refusal of medical care.
2. All patients, under the age of 14 years, must have a parent or legal representative to refuse evaluation, treatment, and / or transport for an emergency condition. In Virginia, patients 14 years of age or older can refuse treatment and transport (see protocol for Minors).
3. A patient determined by EMS personnel or On-line Medical Control to lack "mental capacity" may not refuse care against medical advice or be released at scene. Mental illness, drugs, alcohol intoxication, or physical/mental impairment may significantly impair a patient's capacity. Patients who have attempted suicide, verbalized suicidal intent, or if other factors lead EMS personnel to suspect suicidal intent, should generally, not be regarded as having demonstrated sufficient "mental capacity".
4. At no time, should EMS personnel put themselves in danger by attempting to treat and / or transport a patient who refuses care.

# Protocol 12-7

**SECTION:** Administrative

**PROTOCOL TITLE:** DNR

**REVISED:** 05/2012

## OVERVIEW:

Pre-hospital providers may, at times, withhold cardiopulmonary resuscitation (CPR) and advanced cardiac life support (ACLS) due to a patient's pre-determined wishes. For resuscitative efforts to be withheld, a valid state of Virginia Durable Do Not Resuscitate (DDNR) order must be present.

## PROTOCOL FOR MANAGEMENT:

1. The responsible pre-hospital provider should perform routine patient assessment, resuscitation and / or intervention efforts until the DDNR or other alternate form of DNR status is confirmed. Alternate forms of DNR orders include:
  - a. EMS-DNR order (old format) written after July 1, 1999.
  - b. DNR order written for a patient currently admitted to a licensed health care facility. EMS personnel may recognize these orders only while the patient is in the facility. The DNR may appear in different forms including prescription forms, facility DNR forms, and patient records. All DNR formats must contain: Patient name, physician name, DNR determination, and date of issue.
  - c. DNR order written for the purpose of transfer. EMS personnel may recognize these orders during transport. DNR may appear in different forms including: prescription forms, facility DNR forms, and patient records. All DNR formats must contain: Patient name, physician name, DNR determination, and date of issue.

**NOTE:** Many times pre-hospital providers are presented with a Living Will. Living Wills are NOT recognized in the pre-hospital setting due to the fact that it is not a physician ordered DNR and therefore does not fit into the accepted "alternate DNR order."

2. Request the original DDNR form.
3. Determine that the DDNR order is intact and not defaced.
4. The provider should verify the identity of the DDNR patient through the family members or friends at the scene, or with appropriate photo identification (e.g., driver's license).

**STOP Do Not Resuscitate**

Durable Do Not Resuscitate Order  
VIRGINIA DEPARTMENT OF HEALTH

Patient's Full Legal Name \_\_\_\_\_ Date \_\_\_\_\_

Physician's Order

I, the undersigned, state that I have a bona fide physician/patient relationship with the patient named above. I have certified in the patient's medical record that he/she or a person authorized to do so on the patient's behalf has directed that life-prolonging procedures be withheld or withdrawn in the event of cardiac or respiratory arrest.

I further certify (mark check 1 or 2):

1. The patient is CAPABLE of making an informed decision about providing, withholding or withdrawing a specific medical treatment or course of medical treatment. (Signature of patient is required; see reverse.)

2. The patient is INCAPABLE of making an informed decision about providing, withholding or withdrawing a specific medical treatment or course of medical treatment because he/she is unable to understand the nature, extent or probable consequences of proposed medical decision, or to make a rational evaluation of the risks and benefits associated with that decision.

If you checked 2 above, check below in C below:

A. While capable of making an informed decision, the patient has executed a written advance directive which directs that life-prolonging procedures be withheld or withdrawn.

B. While capable of making an informed decision, the patient has executed a written advance directive which appoints a "Person Authorized to Consent on the Patient's Behalf," with authority to direct that life-prolonging procedures be withheld or withdrawn. (Signature of "Person Authorized to Consent on the Patient's Behalf" is required; see reverse.)

C. The patient has not executed a written advance directive (living will or durable power of attorney for health care). (Signature of "Person Authorized to Consent on the Patient's Behalf" is required; see reverse.)

I hereby direct my and all qualified health care personnel, commencing on the effective date noted above, to withhold cardiopulmonary resuscitation (cardiac compression, endotracheal intubation and other advanced resuscitation, artificial ventilation, defibrillation and related procedures) from the patient in the event of the patient's cardiac or respiratory arrest. I hereby direct such personnel to provide the patient other medical interventions, such as intravenous fluids, oxygen or other therapies deemed necessary to provide comfort, care or alleviate pain.

Physician's Printed Name \_\_\_\_\_ Physician's Signature \_\_\_\_\_ Emergency Phone Number \_\_\_\_\_

**Important – Emergency Medical Services Providers cannot honor copies of the Durable Do Not Resuscitate Order. They must have the original yellow form.**

DO NOT RESUSCITATE

# Protocol 12-7

Continued

**DO NOT RESUSCITATE**

5. Once validity is verified, resuscitation efforts may be ceased or withheld. Document all pertinent information on ePCR form including:
  - a. DDNR form number
  - b. Patient name
  - c. Physician name
  - d. Date of issue
  - e. Method of identification

#### **PROHIBITED RESUSCITATION MEASURES WITH DDNR:**

1. Cardiopulmonary Resuscitation (CPR).
2. Endotracheal intubation or other advanced airway management. This does NOT include CPAP.
3. Artificial ventilation.
4. Defibrillation.
5. Cardiac resuscitation medications.

#### **ENCOURAGED COMFORT MEASURES:**

1. Airway (excluding intubation or advanced airway management).
2. Suction.
3. Supplemental oxygen delivery devices including CPAP.
4. Pain medications or intravenous fluids.
5. Bleeding control.
6. Patient positioning.
7. Other therapies deemed necessary to provide comfort care or to alleviate pain.

#### **DDNR ORDERS MAY BE REVOKED BY:**

1. The patient, by destroying the EMS-DDNR form or alternate DNR form or by verbally withdrawing consent to the order.
2. The authorized decision-maker for the patient.

#### **REVISIONS IN THE VIRGINIA DDNR vs. EMS DNR:**

1. DDNR program, adopted by the Virginia State Board of Health, became effective on January 3, 2000. Once issued, the DDNR orders do not expire.
2. DDNR forms may be honored in any facility, program or organization operated or licensed by the State Board of Health or by the Department of Mental Health, Mental Retardation and Substance Abuse Services, or operated, licensed or owned by another state agency.
3. DDNR orders can now be written for anyone, regardless of health condition or age. Inclusion of minors is a significant change in the emergency DDNR order.

# Protocol

# 12-7

Continued

## ALTERNATE FORMS OF DDNR IDENTIFICATION:

1. DDNR bracelets and necklaces are available and can be honored in place of the Virginia Durable DNR Order form by emergency medical services providers. Only approved necklaces or bracelets can be honored. These alternative forms of identification must have the following information:
  - a. Patient's full legal name.
  - b. Durable DNR number from the Virginia DDNR form or a unique to the patient number that the vendor has assigned.
  - c. The words "Virginia Durable Do Not Resuscitate".
  - d. The vendor's 24 hour phone number.
  - e. The physician's name and phone number.
2. MOLST (Medical Orders for Life-Sustaining Treatment) and POLST (Physician Orders for Life-Sustaining Treatment) forms can be honored in place of the Virginia Durable DNR Order form by emergency medical services providers.

## Sample POLST form

FORM SHALL ACCOMPANY PATIENT/RESIDENT WHEN TRANSFERRED OR DISCHARGED	
<b>Physician Orders for Scope of Treatment (POST)</b>	
This is a Physician Order Sheet based on the person's medical condition and wishes. Any section not completed indicates full treatment for that section. When need occurs, <u>DO NOT FOLLOW THESE ORDERS, FOLLOW THESE INSTRUCTIONS</u> .	
Last Name First Middle Initial Address City State Zip Date of Birth (mm/dd/yyyy)      Year 4 SSN      Gender <input type="checkbox"/> M <input type="checkbox"/> F	
<b>Section A</b> <small>Check One Box Only</small>	<b>CARDIOPULMONARY RESUSCITATION (CPR): Person has no pulse and is not breathing.</b> <input type="checkbox"/> Resuscitate (CPR) <input type="checkbox"/> Do Not Attempt Resuscitation (DNR/no CPR) <small>When air is cardiopulmonary arrest, follow orders in B, C, and D.</small>
<b>Section B</b> <small>Check One Box Only</small>	<b>MEDICAL INTERVENTIONS: Person has pulse and/or is breathing.</b> <input type="checkbox"/> Comfort Measures: Treat with dignity and respect. Keep clean, warm and dry. Use sedation by any route, permitting, wound care and other measures to relieve pain and suffering. Use oxygen, suction and manual treatment of airway obstruction as needed for comfort. <b>Do not transfer to hospital for life-sustaining treatment. Transfer only if comfort needs cannot be met in current location.</b> <input type="checkbox"/> Limited Additional Interventions: Includes care described above. Use medical treatment, IV fluids and cardiac monitoring as indicated. Do not use intubation, advanced airway interventions, or mechanical ventilation. <b>Transfer to hospital if indicated. Avoid intensive care.</b> <input type="checkbox"/> Full Treatment: Includes care above. Use intubation, advanced airway interventions, mechanical ventilation, and cardioversion as indicated. <b>Transfer to hospital if indicated. Include intensive care.</b> <small>Other Instructions:</small>
<b>Section C</b> <small>Check One Box Only</small>	<b>ANTIBIOTICS</b> <input type="checkbox"/> No Antibiotics <input type="checkbox"/> Antibiotics <small>Other:</small> _____
<b>Section D</b> <small>Check One Box Only in Each Column</small>	<b>Medically Administered Fluids and Nutrition: Oral fluids and nutrition must be offered if medically feasible.</b> <input type="checkbox"/> No IV fluids (provide other measures to ensure hydration) <input type="checkbox"/> IV fluids for a defined trial period <input type="checkbox"/> IV fluids long-term if indicated <small>Other Instructions:</small>
<b>Section E</b>	<b>Discussed with:</b> <input type="checkbox"/> Patient/Resident <input type="checkbox"/> MPO's representative <input type="checkbox"/> Court-appointed guardian <input type="checkbox"/> Health care surrogate <input type="checkbox"/> Physician <input type="checkbox"/> Other _____ (Specify) <b>The Basis for These Orders Is:</b> (Must be completed) <input type="checkbox"/> Patient's preference <input type="checkbox"/> Patient's best interests (patient's preferences overridden) <input type="checkbox"/> (Other)
Physician Name (Title)      Physician Phone Number      Other Use Only <hr/> Physician Signature (Monogram)      Date	
FORM SHALL ACCOMPANY PATIENT/RESIDENT WHEN TRANSFERRED OR DISCHARGED	

DO NOT RESUSCITATE

# Protocol 12-7

Continued

**DO NOT RESUSCITATE**

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# Protocol 12-8

**SECTION:** Administration

**PROTOCOL TITLE:** Cease Resuscitation  
**(Proposed: Termination of Resuscitation)**  
**REVISED:** 05/2012

## OVERVIEW:

Prehospital termination of resuscitation guidelines have been developed by the Ontario Prehospital Life Support (OPALS) study group. In their BLS prediction rule, EMT-B with defibrillation capabilities could consider patients with the following for termination of resuscitation:

1. No return of spontaneous circulation prior to transport
2. No shock was given
3. The arrest was not witnessed by EMS personnel

In applying the BLS rule 37.4% of the cardiac arrest cases would have been transported. There were a very small number of cases of survival to hospital discharge in patients who the BLS rule would have recommended termination of resuscitation.

The OPALS group developed a more conservative ALS prediction rule in which providers could consider patients with the following for termination of resuscitation:

1. No return of spontaneous circulation prior to transport
2. No shock was given
3. The arrest was not witnessed by EMS personnel
4. The arrest was not witnessed by bystander
5. No bystander CPR

If CPR has been initiated and circumstances arise where the pre-hospital provider believes resuscitative efforts may not be indicated, cease resuscitation orders may be requested via on-line medical control.

## PROTOCOL FOR MANAGEMENT:

1. The provider should confirm that the patient is pulseless and apneic. Prior to contacting medical control, the following criteria should be met:
  - a. No return of spontaneous circulation prior to transport
  - b. No shock was given or indicated
  - c. The arrest was not witnessed by EMS personnel
  - d. The arrest was not witnessed by bystander
  - e. No bystander CPR
  - f. 15 minutes of CPR
  - g. ETCO<sub>2</sub> is less than 10

**NOTE:** *Patients who are hypothermic or who are victims of cold water drownings should receive appropriate resuscitative efforts. Patients with electrical injuries, including those struck by lightning, may initially be tetanic, or stiff, and should receive appropriate resuscitative efforts.*

2. Once all prerequisites have been met, the provider should then contact Medical Control so that the on-line physician can decide to continue or stop resuscitative efforts. Providers should begin contact with Medical Control with the statement: "This is a potential cease-resuscitation call." The provider should review why resuscitative efforts may not be indicated (i.e., end-stage cancer). The provider

CEASE RESUSCITATION

# Protocol 12-8

Continued

## CEASE RESUSCITATION

- then should report interventions and, if directed by on-line Medical Control, stop resuscitative efforts.
3. If a patient is determined to be dead on the scene (DOA) or if the cessation of resuscitative efforts is authorized by on-line Medical Control, law enforcement authorities should be requested to respond if indicated.
  4. Document specific findings, such as signs of death, on the ePCR form. Include name of physician who ordered resuscitation efforts ended and log the time of the order.
  5. Be attentive to the emotional needs of the patient's survivors when dealing with them. If possible, leave survivors in the care of family and / or friends.

# Protocol 12-9

**SECTION:** Administrative

**PROTOCOL TITLE:** Traumatic Cease Resuscitation

**REVISED:** 05/2012

## TRAUMATIC CEASE RESUSCITATION

### **OVERVIEW:**

The primary purpose of a traumatic cease resuscitation protocol is to reduce the likelihood of injuring pre-hospital providers and to prevent injury to the public whom we serve while transporting non-viable patients to receiving facilities. If a trauma patient presents with one or more of the following conditions, then the pre-hospital provider should consider termination of treatment or do not resuscitate. In cases of hypothermia or submersion, follow the appropriate protocol. The conditions are:

- Decapitation.
- 100% full thickness burns without signs / symptoms of life.
- Obvious mortal wounds (i.e., crushing injuries to the head or chest, gunshot wounds to the head or chest with massive tissue destruction or loss) without signs / symptoms of life.
- Blunt or penetrating trauma with no signs of life when first responders arrive.
- Greater than 30 minute transport time to any receiving facility with a pediatric cardiac arrest.

### **PROTOCOL FOR MANAGEMENT - ADULT:**

1. **WHEN IN DOUBT, RESUSCITATE!**
2. The responding pre-hospital provider should perform a routine patient assessment.
3. Once the provider determines that the patient is without life (no pulse, no respirations), the provider will verify the patient's condition with another pre-hospital provider.
4. If both providers agree, they will note the time of death and follow local protocols concerning notification of law enforcement or the medical examiner.
5. At the provider's discretion, the cardiac monitor may be attached for the purpose of printing a rhythm strip to document a non-perfusing rhythm. At no time during the assessment phase should other ALS procedures / treatments be started. DO NOT initiate IV lines, intubate, etc. ALS procedures indicate that a patient needs to be transported to the closest appropriate hospital.

### **PROTOCOL FOR MANAGEMENT - PEDIATRIC:**

1. **WHEN IN DOUBT, RESUSCITATE!**
2. **Almost all pediatric cardiac arrest patients should have the benefit of full resuscitative efforts, including transport.**
3. If the pediatric patient presents with any of the indications for Traumatic Cease Resuscitation **and** the pediatric patient remains in cardiac arrest after initial **BLS** resuscitative efforts, contact the receiving facility and establish on-line medical control for orders to cease resuscitation.
4. Note the time of death and request law enforcement response.

### **SPECIAL CIRCUMSTANCES:**

1. Remember there are several special circumstances (hypothermia, electrocution, etc.) that warrant patient transport. Any patient, who may benefit from advanced life support, should receive such.

# Protocol 12-9

Continued

TRAUMATIC CEASE RESUSCITATION

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# Protocol 12-10

**SECTION:** Administration

**PROTOCOL TITLE:** Interfacility Transfers

**REVISED:** 05/2012

## **INDICATIONS:**

An interfacility transfer is defined as “the movement of a patient, directed by physician orders, from one facility to another, for the purpose of specialty care; after initial and / or stabilizing care has been provided by the transferring facility.

## **PROTOCOL FOR MANAGEMENT:**

1. The interfacility transport should be performed by an appropriately equipped and appropriately staffed ambulance / aircraft.
2. The transferring physician/institution (or designee) will provide the EMS agency, prior to dispatch, a patient report that includes the patient's condition and any special treatment the patient is receiving.
3. The clinical level of care should be maintained throughout transport. Additional staff (RN, Respiratory Therapist, MD, etc.) may be required.
4. The Attendant in Charge (AIC) should request a brief patient report from the health care personnel on scene, and should obtain the pertinent records to go with the patient (i.e., face sheet, transport sheet, lab work, x-rays, etc.)
5. If the patient has a valid Do Not Resuscitate order, a written order (including a Prehospital DNR order) must accompany the patient.
6. Assessment by the AIC should be kept to a minimum and should not delay transport. Also, the AIC will have access to information necessary to provide appropriate care during transport.
7. If the ambulance / aircraft crew arrives and the patient's condition has deteriorated to a life-threatening situation where immediate intervention is necessary, stabilizing effort should be initiated by the transferring hospital staff. EMS should not initiate transfer of a patient who is unstable.
8. An ALS provider may monitor and administer nonstandard medications prescribed by the patient's transferring physician with on-line Medical Control as needed during transfer.
9. The administration of any medications not covered by protocol will be recorded on the Prehospital Patient Care Report, noting the name of the transferring physician, time that Medical Control was contacted, and dosage of the medication and route administered.

# INTERFACILITY TRANSFERS

# Protocol 12-10

Continued

## INTERFACILITY TRANSFERS

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# Protocol 12-11

**SECTION:** Administration

**PROTOCOL TITLE:** Infection Control - PPE

**REVISED:** 05/2012

## **OVERVIEW:**

In order to protect patients, healthcare providers, and their families, pre-hospital providers must be familiar with, and act in accordance with, effective infection control measures for airborne and bloodborne pathogens. Infection control is the responsibility of all members of the EMS system. The ultimate goal is a safe environment for patients and everyone else involved in the healthcare system.

Each agency is responsible for identifying a designated infection control officer. This person shall have been formally trained for this position and shall be knowledgeable in current regulations and laws governing infection control practices.

## **STANDARD PRECAUTIONS:**

1. Standard precautions should be observed with every patient. This includes, but is not limited to, starting IVs, intubation, suctioning, caring for trauma patients, nebulizer treatments, OB emergencies.
2. Body fluids include: blood, saliva, sputum, vomitus or other gastric secretions, urine, feces, cerebrospinal fluids, breast milk, serosanguinous fluid, semen and / or bodily drainage.

## **PROTOCOL FOR MANAGEMENT:**

1. Wear appropriate protective gloves on every patient. Change gloves between patients or if gloves become contaminated or torn.
2. Wash hands after any patient contact, even when gloves have been used.
3. Wear gown if soiling of clothing or of exposed skin with blood or body fluids is likely. Gowns must be impervious to fluids.
4. Wear appropriate mask and eye protection if aerosolization or spattering of body fluids is likely to occur, (e.g., during suctioning, nebulizer treatments, insertion of endotracheal tubes and other invasive procedures); or when a patient displays signs and symptoms suggestive of an infection with an airborne or respiratory route of transmission; or if the provider has been told the patient has an infection with a respiratory component.
5. Use airway adjuncts whenever respiratory assistance is indicated. Adjuncts include pocket masks with one-way valves, shields and Bag-Valve Masks (BVM). BVMs should be the first choice when ventilating a patient.
6. Contaminated equipment:
  - a. Place contaminated disposable equipment in an appropriately marked biohazard bag. Dispose in a location approved for biohazard waste or served by an agency licensed to haul biohazard waste.
  - b. Render non-disposable equipment safe for handling before putting it back in service. Follow manufacturers' recommendations for proper cleaning and decontamination procedures. CDC may also provide information on current decontamination of equipment.
  - c. Use a high-level disinfecting solution on non-disposable equipment, (i.e., laryngoscope blades), before re-using the items.
7. In the field, place linens soiled with body fluids in appropriately marked biohazard bags. In the hospital, ask and determine the appropriate container and place soiled linens in it. Remove linen from biohazard bag before placing in

**INFECTION CONTROL-PPE**

# Protocol 12-11

Continued

## INFECTION CONTROL-PPE

linen container. Always wear appropriate protective gloves when handling soiled linens.

8. Dispose of needles, syringes and sharp items in a rigid, puncture-resistant container, red in color or bearing the universal biohazard symbol. Do not bend or shear needles. Recapping contaminated needles is only permitted by a single-handed method and is **NOT** recommended.
9. Do not leave sharps or any contaminated items in any Drug Box.
10. Place any specimen to be left at the hospital in double-bagged, zip-lock-type bags with the universal biohazard label attached to the outer bag. Attach a specimen label to the outer bag. When in doubt, check with the Charge Nurse.
11. Wipe up body fluid spills promptly. Wear gloves when cleaning up spills. Decontaminate with a disinfectant approved by the Environmental Protection Agency (EPA) and CDC. Dispose of gloves and cleaning items in an appropriately marked biohazard bag.
12. Regularly clean and disinfect the interior of emergency vehicles and any on-board equipment. Follow agency procedures for cleaning and disinfecting solutions in accordance with manufacturers' guidelines and Center for Disease Control (CDC) recommendations.
13. Discard unused articles, medications and equipment **only** when those items have been opened or in some way have been contaminated with blood and / or body fluids.
14. Consult with your designated infection control officer with any actual or potential exposure or any infection control questions

# Protocol 12-11b

**SECTION:** Administration

**PROTOCOL TITLE:** Infection Control - Exposure

**REVISED:** 05/2012

## **OVERVIEW:**

Each agency is responsible for identifying a designated infection control officer. This person shall have been formally trained for this position and shall be knowledgeable in proper procedures and current regulations and laws regarding governing disease transmission.

In 1990, the Ryan White Comprehensive AIDS Resources Emergency Act, Public Law 101 - 381, was enacted into law. Although this law deals primarily with funding for HIV / AIDS programs throughout the country, Subpart B contains key provisions for fire / EMS personnel regarding notification of possible exposure to communicable diseases. This portion of the law, often referred to as the Ryan White Notification Law, requires every emergency response entity in the country to have a designated infection control officer (DICO) to serve as the liaison between emergency responders involved in exposure incidents and medical facilities to which the source patients in the exposures are transported. This covers emergency responders including firefighters, EMTs, paramedics, police officers, and volunteers. The law also outlines the role and responsibilities for this individual, which are extensive and comprehensive. Since this individual is charged with the post-exposure follow-up and deals with infection control issues, the DICO title seemed appropriate.

The law requires medical facilities to provide the disease status of source patients as soon as possible and no later than 48 hours after an exposure has been reported to the facilities by the DICO of the responder involved in the exposure. The law also requires that medical facilities contact the DICO of the transporting entity that delivered a patient suspected for or diagnosed with pulmonary tuberculosis. The law also affords coverage to fire / EMS agencies that were not covered under the Occupational Safety and Health Administration's (OSHA's) Bloodborne Pathogen Standard ([29 CFR 1910.1030](#)).<sup>1</sup>

Blood Borne Pathogens includes but are not limited to:

1. HIV
2. Hepatitis B
3. Hepatitis C
4. Syphilis

Airborne Pathogens include but are not limited to:

1. Tuberculosis
2. Measles (Rubeola)
3. Varicella

# Protocol 12-11b

Continued

## INFECTION CONTROL - EXPOSURE

Other less common pathogens include but are not limited to:

1. Malaria
2. Rabies
3. Neisseria Meningitis
4. Plague
5. Hemorrhagic fevers
6. Diphtheria
7. Rubella
8. SARS

### PROTOCOL FOR MANAGEMENT:

Each agency must develop a comprehensive infection control plan and designate an infection control officer.

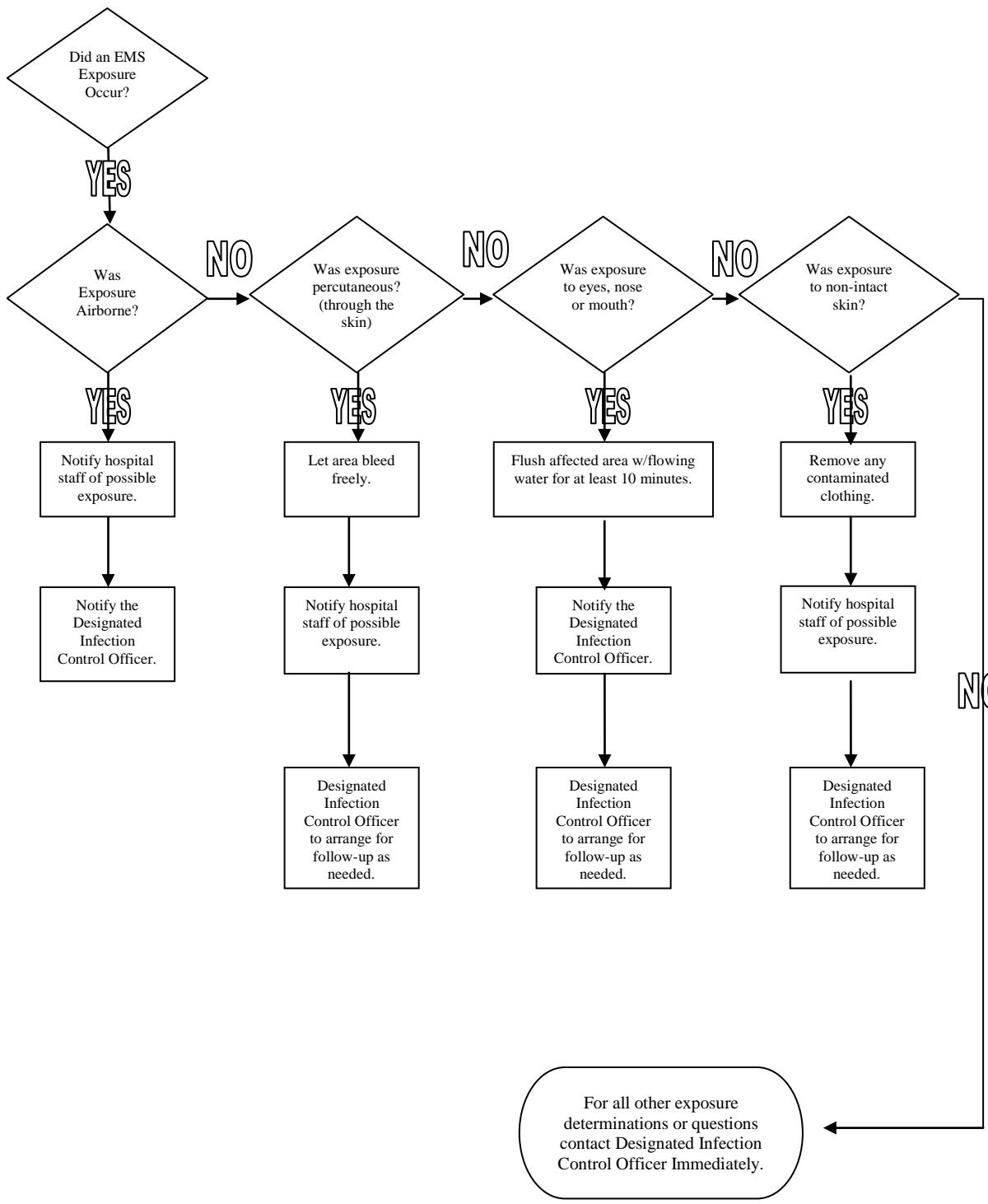
1. Determine if exposure has occurred. Body fluids should have visible blood before exposure should be considered. Routes of exposure include direct injection (needle stick), through non intact skin (cuts and abrasions), and through mucous membranes (eyes and mouth). If the exposure is a sharps injury, let the area bleed freely and wash the area with soap and water or the waterless hand wash solution. If the exposure was a splash to eye, nose, or mouth, flush the area for 10 minutes with water.
2. Consult with / notify your designated infection control officer (DICO) with any exposure or infection control questions.
3. The DICO shall contact the facility to initiate testing required by federal and state rules and regulations.
4. The facility shall notify the DICO or designee with results as required by federal and state rules and regulations.
5. The DICO shall arrange follow up and prophylaxis based on the results as guided by the most recent CDC recommendations.

# Protocol 12-11b

Continued

## INFECTION CONTROL-EXPOSURE

### Initial Action for EMS Provider in Event of Potential Exposure



# Protocol 12-11b

Continued

## INFECTION CONTROL - EXPOSURE

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# Protocol 12-12

**SECTION:** Administration

**PROTOCOL TITLE:** Mass Gathering

**REVISED:** 05/2012

## Patient Care Policy Treat and Release for Minor Injuries At Mass Gathering Events

### I. **Scope:**

This policy and its related protocol are intended for use only in gatherings of large numbers of persons such as races, concerts and rallies, and in those circumstances / situations approved by the EMS Agency's operational medical director (OMD). It is designed to give clear patient care guidelines to EMS providers in the ODEMSA region, and allow them the option of treating patients with minor injuries and / or medical complaints without transporting patients to a medical facility. The OMD must approve the use of this policy for each event before it is implemented.

It is intended for use only when the number of anticipated patients could quickly overwhelm existing EMS or hospital resources to provide appropriate patient care. This policy will apply to any patient that meets the patient profile (below) that requires basic first aid only.

EMS providers are expected to use good clinical judgment and complete documentation. Providers may transport any patient to a medical facility regardless of the patient's chief complaint, presenting symptoms, or clinical assessment according to ODEMSA Prehospital Patient Care Protocols.

Any patient, who asks to be transported to a medical facility, even if the EMS provider feels that the patient could be treated and released under this policy, will be transported.

Any patient, for whom the E911 System has been appropriately activated, may be transported to the hospital for further evaluation.

### II. **Patient Profile** (Those patients who may be treated with this protocol):

- A. Patient history and examination will be reliable:
  - 1. Alert and oriented x 3
  - 2. No suggestion of drug, alcohol or other substance usage/abuse
  - 3. No suggestion of psychological/psychiatric problems
  - 4. No head injury (including loss of consciousness or altered mental status)
  - 5. Patient is able to communicate adequately and to understand what is being communicated to him/her
- B. Injuries sustained where mechanism of injury is very low risk for significant injury.
- C. Patient has no spinal injury, pain, tenderness or deformity on exam, and has a normal sensory/motor exam.

MASS GATHERING

# Protocol 12-12

Continued

## MASS GATHERING

- D. Patient does not exhibit signs of chest pains or shortness of breath.
- E. Patient will have vital signs within age specific normal limits.

### III. General Exclusion Criteria:

- A. Any patient with a pain scale assessment higher than a "5" on a 1 to 10 scale
- B. Any patient who does not meet all requirements in the Patient Profile section
- C. Any patient who requests transportation to a medical facility
- D. Any patient for whom the E911 System has been appropriately activated

### IV. Indications and Treatments:

Minor complaints / injuries may include the following, but are not limited to:

#### 12 - 12A: Minor Wounds

##### Indications:

Any minor injury requiring simple wound disinfection and bandage application:

##### Contraindications:

- a. Any signs or symptoms of infection (redness, swelling, fever, drainage)
- b. Any wound to facial area, unless it is a simple abrasion
- c. Any deep, jagged or gaping wound
- d. Any uncontrolled bleeding from the wound
- e. Any wound exposing subcutaneous tissue / structure

12 - 12A	A	B	EN	I	P
1. Perform a general assessment.	•	•	•	•	•
2. Clean abrasions, simple avulsions and small lacerations not requiring suturing with normal saline.	•	•	•	•	•

\*\*\*Note: ensure that the patient has had Tetanus Toxoid immunization within the last five (5) years. If not current, the patient must be referred within 72 hours from the incident to his/her own physician. \*\*\*

# Protocol 12-12

Continued

## 12 - 12B: Request for over the counter medications for c/o headache or simple muscle type pain

### Indications:

Request for over the counter medications for c/o headache, or simple muscle type pain

### Contraindications:

- a. Any neurological deficits with headache
- b. Any history of allergies to approved medications
- c. Any request for ASA for complaint of chest pain (These patients must be referred to the hospital for further evaluation. ASA may be given under the ALS protocol for chest pain)
- d. Any patient requesting ASA or Ibuprofen with a history of asthma

12 - 12B	A	B	EN	I	P
1. Perform a general patient assessment.	•	•	•	•	•
2. Assess patient for allergies.	•	•	•	•	•
3. Administer Tylenol, Ibuprofen, or ASA as requested by the patient per manufacturer dosage recommendation.	•	•	•	•	•

## 12 - 12C: Soft Tissue Injury without signs or symptoms of a fracture

### Indications:

Soft tissue injury without signs or symptoms of a fracture

### Contraindications:

- a. Any signs or symptoms of a fracture (deformity, excessive swelling, discoloration, any open wounds over the site, or decreased range of motion)
- b. Any neurological deficits (numbness or tingling distally, delayed capillary refill, or decreased pulses distally)
- c. Any severe pain or swelling requiring splinting
- d. Any injury associated with vascular deficits distal to the injury

MASS GATHERING

# Protocol 12-12

Continued

## MASS GATHERING

12 - 12C	A	B	EN	I	P
1. Perform a general assessment.	•	•	•	•	•
2. Elevate the affected area and apply a cold / ice pack.	•	•	•	•	•
3. Provide education on removal of cold pack within 20 minutes of placement.	•	•	•	•	•

### 12 - 12D: Insect Stings

Indications:

Any patient with an insect sting

Contraindications:

- a. Any patient with a history of allergies to insect stings
- b. Any insect sting on the face or neck
- c. Any patient that exhibits signs of respiratory distress, tightness in throat or chest, dizziness, rash, fainting, nausea / vomiting, or difficulty swallowing
- d. Any swelling of the face, lips or eyelids
- e. Hypotension
- f. Presence of hives or other obvious symptoms of a more generalized allergic reaction

12 - 12D	A	B	EN	I	P
1. Perform a general assessment.	•	•	•	•	•
2. Assess patient for previous allergies to bee stings.	•	•	•	•	•
3. Remove the stinger by scraping with a blunt edged object. Do not remove with tweezers as squeezing may release more of the poison into the surrounding tissue.	•	•	•	•	•
4. Wash the area thoroughly with soap and water.	•	•	•	•	•
5. Monitor airway for allergic reaction / swelling.	•	•	•	•	•

NOTE: Stingers NOT removed will continue to release venom into the tissue for a long as 20 minutes.

# Protocol 12-12

Continued

## MASS GATHERING

### 12 - 12E: Tick Bites

Indications:

Any patient with a tick bite

Contraindications:

- a. Any tick that appears to have been embedded for longer than 24 hours
- b. Any signs or symptoms of infection present
- c. If the tick does not appear to have been removed whole and the head remains embedded in the skin, the patient must be sent to a physician or medical facility that day

12 - 12E	A	B	EN	I	P
1. Perform a general assessment.	•	•	•	•	•
2. Remove the tick gently by using tweezers to grasp the tick firmly at its head, next to the patient's skin. Pull firmly and steadily on the tick until it lets go.	•	•	•	•	•
3. Swab the bite with alcohol.	•	•	•	•	•
4. Inspect the tick to ensure that the head has been removed successfully.	•	•	•	•	•
5. Educate patient on signs / symptoms of Lyme Disease (bull's eye rash, fever, headache, joint pain) and Rocky Mountain Spotted Fever (purple to red rash on trunk and extremities, fever and headache).	•	•	•	•	•

### 12 - 12F: Minor Animal Bite

Indications: Minor Animal Bites

Any patient with a minor animal bite

Contraindications:

- a. Any facial involvement
- b. Any wound that will not stop bleeding after 15 minutes of direct pressure
- c. The attacking animal was wild or behaving strangely
- d. Animal immunization status is unknown, or the animal cannot be found

# Protocol 12-12

Continued

## MASS GATHERING

12 - 12F	A	B	EN	I	P
1. Perform a general assessment.	•	•	•	•	•
2. Wash the area of the bite carefully with soap and water.	•	•	•	•	•
3. Apply antibiotic cream and a sterile dressing.	•	•	•	•	•
4. Ensure that the patient has had Tetanus Toxoid immunization within the last five (5) years.	•	•	•	•	•
***NOTE: If not current with Tetanus immunization, the patient must be referred within 72 hours from the incident to his / her own physician.***					
5. Report bite (as required under State and local laws) to either local animal control or the local health department. If possible to do so without endangering anyone, detain or take steps to identify the biting animal. If the animal is deceased, the carcass should be immediately turned over to animal control.	•	•	•	•	•
6. Refer the patient to their primary care physician for follow up treatment because the risk of infection needs to be closely monitored.	•	•	•	•	•

### 12 - 12G: Non-traumatic Nose Bleeds

#### Indications:

Non-traumatic nose bleeds

#### Contraindications:

- Any medical causes ( i.e., hypertension, history of hemophilia)
- Currently on blood thinner medication
- Bleeding uncontrolled for longer than 10 minutes after treatment
- Any nosebleed caused by a direct traumatic injury

12 - 12G	A	B	EN	I	P
1. Perform a general assessment (rule out any medical causes).	•	•	•	•	•
2. Lean the patient slightly forward to avoid swallowing blood.	•	•	•	•	•
3. Apply firm pressure below the bony part of the nose for 10 minutes.	•	•	•	•	•
4. Reassess. If bleeding continues, transport to a medical facility	•	•	•	•	•

# Protocol 12-12

Continued

## 12 - 12H: 1<sup>st</sup> Degree Burns

### Indications:

1<sup>st</sup> degree burns

### Contraindications:

- a. Any 2<sup>nd</sup> or 3<sup>rd</sup> degree burns
- b. Any burns to the face, eyes, mouth, hands, or genital areas
- c. Any burn too large to cover with a bandage
- d. Any burn caused by electricity or an explosion

12 - 12H	A	B	EN	I	P
1. Perform a general assessment.	•	•	•	•	•
2. Run cool water over the burned area or hold a cold compress on the burn. Do NOT use ice.	•	•	•	•	•
3. Cover loosely with a sterile bandage.	•	•	•	•	•
4. Offer extra fluids.	•	•	•	•	•

## 12 - 12I: Eye Irritation / FB on the surface of the eye

### Indications:

Eye irritations

### Contraindications:

- a. Any embedded foreign body
- b. Any eye irritation due to chemical exposure
- c. Any eye irritation due to trauma

12 - 12I	A	B	EN	I	P
1. Perform a general assessment .	•	•	•	•	•
2. Flush the affected eye with sterile saline solution. Flush for up to 15 minutes, checking the eye every five (5) minutes to see if the foreign body has been flushed out.	•	•	•	•	•
3. Encourage the patient not to touch or rub the affected eye.	•	•	•	•	•
4. If the foreign material cannot be removed by flushing, or the eye remains irritated after flushing, transport to a medical facility.	•	•	•	•	•

MASS GATHERING

# Protocol 12-12

Continued

MASS GATHERING

## 12 - 12J: Splinter Removal

### Indications:

Splinter Removal

### Contraindications:

- a. If the splinter is too large or went deeply into the skin
- b. Any signs of infection
- c. If the splinter is unable to be removed

12 - 12J	A	B	EN	I	P
1. Perform a general assessment.	•	•	•	•	•
2. Remove the splinter from the skin by pulling at the same angle that it entered with a pair of tweezers.	•	•	•	•	•
3. Wash with soap and water.	•	•	•	•	•
4. Apply antibiotic ointment and a sterile dressing.	•	•	•	•	•
5. If a splinter is not easily removed, refer the patient to a physician for removal.	•	•	•	•	•

# Protocol 12-12

Continued

## 12 - 12K: Heat Exhaustion / Heat Cramps (heat related illness)

### Indications:

Heat exhaustion / cramps (heat related illness)

### Contraindications:

- a. Heat stroke (a life threatening condition where the body loses the ability to regulate its own temperature). Signs and symptoms include:
  - i. Hot, red, dry skin, but NOT sweaty
  - ii. Confusion, delirium, hallucinations
  - iii. Seizures
  - iv. Syncopal episode
  - v. Frequent uncontrolled vomiting
  - vi. Difficulty breathing
  - vii. Elevated internal body temperature ( $>103^{\circ}$ )
- b. Patients experiencing the above symptoms should be rapidly cooled, an IV of NS established, and transported immediately to the closest emergency department (See ODEMSA protocol Hyperthermia / Heat Stroke)
- c. Any patient with complaint of chest pains or dyspnea
- d. Any patient with a BP  $< 90\text{mmHg}$  systolic
- e. Any patient over the age of 70, or under the age of 13

MASS GATHERING

12 - 12K	A	B	EN	I	P
1. Perform a general assessment.	•	•	•	•	•
2. Place patient in a cool area to rest.	•	•	•	•	•
3. Exam Remove any excess clothing.	•	•	•	•	•
4. Sponge the patient's skin with cool water. Consider the use of fans, if available, to aid in the cooling process.	•	•	•	•	•
5. Apply cold packs to the forehead and / or back of neck. Consider the application of these packs to the axillae and groin to further enhance the cooling effects in severely symptomatic patients.	•	•	•	•	•
6. Provide cold water for drinking.	•	•	•	•	•
7. Initiate IV fluid bolus for patients with persistent symptoms, despite above cooling efforts Bolus with 250 - 500 cc over 10 - 20 minutes.			•	•	•
8. Reevaluate symptoms. Repeat once as needed.	•	•	•	•	•

# Protocol 12-12

Continued

## MASS GATHERING

12 - 12K	A	B	EN	I	P
9. Appropriately document findings. Patients who show significant improvement with cessation of symptoms may be released.	•	•	•	•	•
10. Provide the patient with education related to prevention of future heat related illness and / or symptoms.	•	•	•	•	•
11. Patients will be transported to a medical facility immediately for symptoms that persist after a total of one (1) liter of normal saline.	•	•	•	•	•
12. Patients will be transported to a medical facility immediately for symptoms which persist for more than one (1) hour despite treatment.	•	•	•	•	•

### V. Patient Assessment and Documentation:

- A. Documentation is required for each patient and should be done on a PPCR, ODEMSA Treat and Release for Minor Injuries form, or other locally developed form. This form, when complete, will include:
1. Chief complaint
  2. Vital signs (including pain scale)
  3. Primary assessment with particular attention to the patient's neurological status
  4. Clinical assessment
  5. Treatment rendered
  6. Education of follow up care
- B. Providers' assessment skills should be renewed and reviewed on a regular basis.

### VI. Patient Referrals:

In all cases where patients are treated and released under this policy and protocol, there will be clear documentation and explanation to the patient or responsible party of the absolute need for the patient to be reevaluated by the patient's own physical or medical facility of choice for definitive medical care.

This policy and protocol is not intended to provide definitive care to any patient. Rather, it is intended to provide a mechanism by which basic first aid may be administered acutely, with physician follow up at the patient's earliest convenience.

### VII. Performance Improvement:

It is recommended that participating agency's quality assurance / performance improvement policy stipulate that both during and upon completion of each event where the use of the Treat and Release Patient Care Policy and Protocol has been authorized, the OMD conduct a random review of the charts generated for the appropriateness of documentation, treatment and disposition of the patient.

# Protocol 12-12

Continued

The sample size should be large enough to assure that appropriate care by all providers is being rendered.

## VIII. **Reporting:**

It is recommended that clinical / performance improvement or administrative issues regarding the mass gathering guideline be reported back to the ODEMSA Medical Control Committee for quality assurance and performance improvement purposes.

**MASS GATHERING**

# Protocol 12-12

Continued

## MASS GATHERING

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# Protocol 12-13

**SECTION:** Administration

**PROTOCOL TITLE:** MIVT

**REVISED:** 05/2012

	<b>Hospital Admission Sticker</b> <b>PATIENT FIELD REPORT</b> <small>TO BE TURNED IN TO HOSPITAL WITH PATIENT THIS DOES NOT REPLACE YOUR PPCR/PCR/ELECTRONIC PCR</small>	Your agency logo Inserted Here
DATE: ___/___/___	EMS AGENCY: <u>(Your agency name)</u>	AVPU _____ PUPILS: PERL _____ Dilated _____ Constricted _____
Provider Name: _____	Agency Phone # _____	BASELINE VITALS: Time: _____ BP: _____ Resp: _____
PT NAME: _____	AGE: _____	Pulse: _____ Skin: Hot _____ Warm _____ Cool _____ Cold _____
PT ADDRESS _____	PT PHONE _____	2 <sup>nd</sup> VITALS: Time: _____ BP: _____ Resp: _____ Pulse: _____
SSN: ___ - ___ - ___	RACE: ___ SEX: ___ DOB: ___ / ___ / ___	SKIN: Hot _____ Warm: _____ Cool: _____ Cold: _____
LOCATION OF CALL: _____	Mechanism of Injury / Nature of Illness: _____	
CHIEF COMPLAINT: _____	PAST MEDICAL HISTORY: _____	
ALLERGIES: N.K.A. / PCN / SULFA / ASA / OTHER: _____	OXYGEN: _____ LPM: _____ NC _____ NRB _____ BVM _____	
MEDS: _____	SPO2 _____ END-TIDAL CO2 _____ GLUCOSE _____	
PATIENT EXAM: _____	CARDIAC ARREST: Un-Witnessed _____ Witnessed _____ Start Time _____	
Medication Wasted _____	Total Time without CPR _____ Total Time of CPR _____	
Old Drug Box # _____ New Drug Box # _____ Controlled Substances present: Morphine 10 mg/ml x 2 Yes _____ No _____ Diazepam 10mg/ml x 1 Yes _____ No _____ Pharmacist or Pharmacy Technician signature _____	SHOCKS TIMES #1 _____ #2 _____ #3 _____ #4 _____	
TIMES: On Scene: _____ Enroute to ED _____ Arrival at ED _____	Onset of Chest Pain _____ Onset of Stroke Signs _____	
12 Lead Rhythm if available. (Please Attach) Onset of Symptoms _____		
Initial Rhythm: _____ STEMI ALERT: Yes: _____ No: _____		
GCS Score: Eyes _____ Verbal _____ Motor _____ Total _____		
DOCTOR'S SIGNATURE _____		
<i>See the complete Patient Care Report for further details</i>		

**MIVT**

# Protocol 12-13

Continued

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MIVT

SECTION: Medication Reference

REVISED: 05/2012

# MEDICATION REFERENCE

1.	<u>ODEMSA Drug Box Contents</u>	Medication 13 - 1
2.	<u>Adenosine (Adenocard)</u>	Medication 13 - 2
3.	<u>Albuterol</u>	Medication 13 - 3
4.	<u>Amiodarone (Cordarone)</u>	Medication 13 - 4
5.	<u>Aspirin</u>	Medication 13 - 5
6.	<u>Atropine Sulfate</u>	Medication 13 - 6
7.	<u>Bumetanide (Bumex)</u>	Medication 13 - 7
8.	<u>Calcium Chloride</u>	Medication 13 - 8
9.	<u>Dextrose 50%, 25%, 10%</u>	Medication 13 - 9
10.	<u>Diazepam (Valium)</u>	Medication 13 - 10
11.	<u>Diltiazem (Cardizem)</u>	Medication 13 - 11
12.	<u>Diphenhydramine (Benadryl)</u>	Medication 13 - 12
13.	<u>Dopamine</u>	Medication 13 - 13
14.	<u>Epinephrine 1:1,000 and 1:10,000</u>	Medication 13 - 14
15.	<u>Fentanyl</u>	Medication 13 - 15
16.	<u>Furosemide (Lasix)</u>	Medication 13 - 16
17.	<u>Glucagon</u>	Medication 13 - 17
18.	<u>Ipratropium (Atrovent)</u>	Medication 13 - 18
19.	<u>Lorazepam (Ativan)</u>	Medication 13 - 19
20.	<u>Magnesium Sulfate</u>	Medication 13 - 20
21.	<u>Metoprolol (Lopressor)</u>	Medication 13 - 21
22.	<u>Midazolam (Versed)</u>	Medication 13 - 22
23.	<u>Morphine Sulfate</u>	Medication 13 - 23
24.	<u>Naloxone (Narcan)</u>	Medication 13 - 24
25.	<u>Nitroglycerin</u>	Medication 13 - 25
26.	<u>Ondansetron (Zofran)</u>	Medication 13 - 26
27.	<u>Oxygen</u>	Medication 13 - 27
28.	<u>Prednisone</u>	Medication 13 - 28
29.	<u>Sodium Bicarbonate</u>	Medication 13 - 29
30.	<u>Vasopressin, ADH</u>	Medication 13 - 30
31.	<u>Ziprasidone (Geodon)</u>	Medication 13 - 31

# Medication

# 13

Continued

# MEDICATION REFERENCE

## \*\*\*RSI Medications\*\*\*

32.	<u>Lidocaine</u>	<b>Medication 13 - 32</b>
33.	<u>Etomidate</u>	<b>Medication 13 - 33</b>
34.	<u>Succinylcholine</u>	<b>Medication 13 - 34</b>
35.	<u>Vecuronium Bromide (<i>Norcuron</i>)</u>	<b>Medication 13 - 35</b>

# Medication 13-1

**SECTION:** Medication Reference

**PROTOCOL TITLE:** ODEMSA Drug Kit

**REVISED:** 05/2012

ODEMSA DRUG KIT

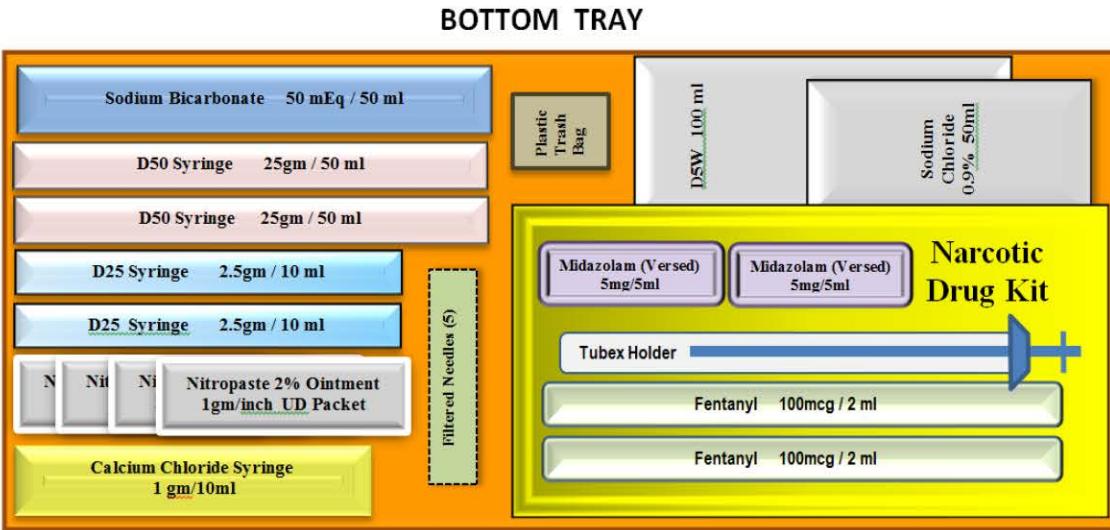
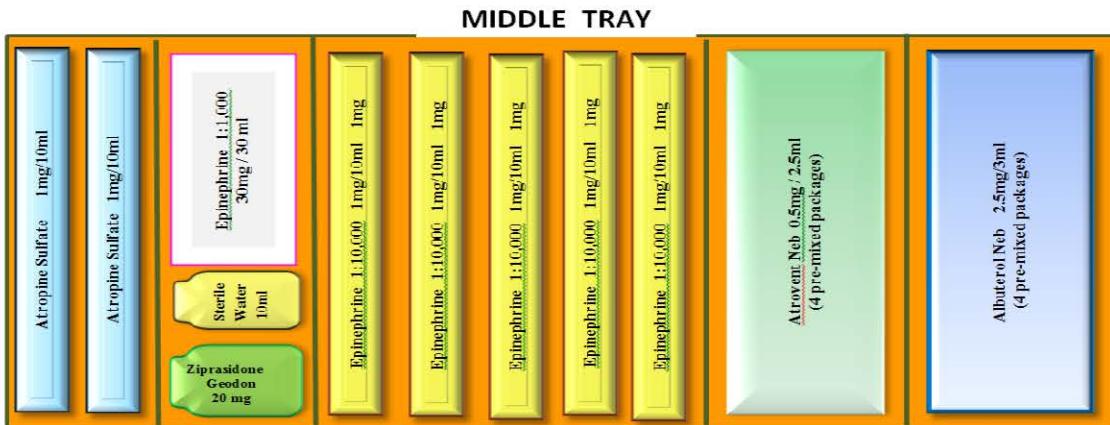
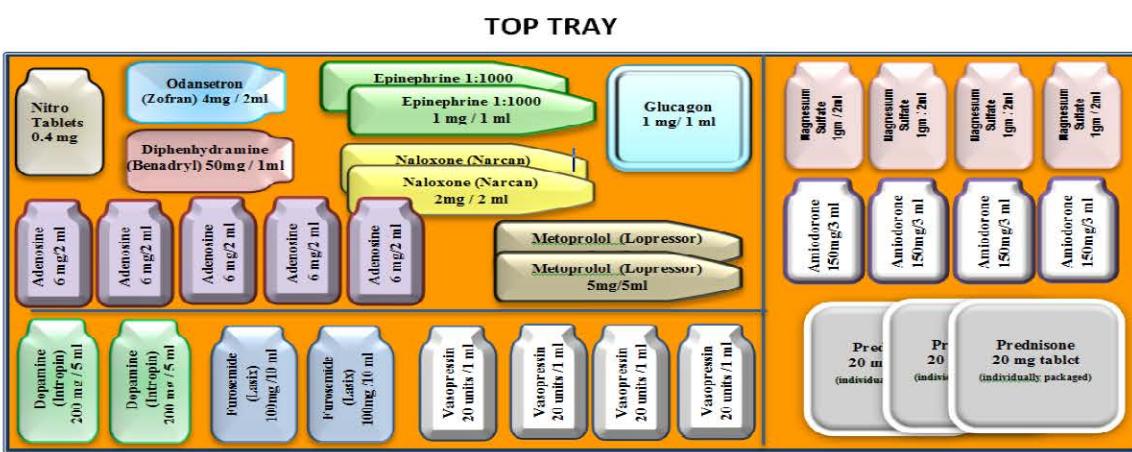
Primary Medications 1 <sup>st</sup> Tier	Concentration	How Supplied	Qty
Adenosine (Adenocard)	3 mg / ml	6 mg / 2 ml	5
Albuterol Nebs	0.83 mg / ml	2.5 mg / 3 ml	4
Amiodarone	50 mg / ml	150 mg / 3 ml	4
Atropine Sulfate	0.1 mg / ml	1 mg / 10 ml	2
Atrovent Nebs	0.2 mg / ml	0.5 mg / 2.5 ml	4
Calcium Chloride	100 mg / ml	1 gm / 10 ml	1
D <sub>25</sub> syringe	250 mg / ml	2.5 gm / 10 ml	2
D <sub>50</sub> syringe	500 mg / ml	25 gm / 50 ml	2
Diphenhydramine (Benadryl)	50 mg / ml	50 mg / 1 ml	1
Dopamine (Intropin)	40 mg / ml	200 mg / 5 ml	2
Epinephrine 1:1,000	1 mg / ml	1 mg / 1 ml	2
Epinephrine 1:1,000	1 mg / ml	30 mg / 30 ml	1
Epinephrine 1:10,000	0.1 mg / ml	1 mg / 10 ml	5
Fentanyl	50 mcg / ml	100 mcg / 2 ml	2
Furosemide (Lasix)	10 mg / ml	100 mg / 10 ml	2
Glucagon	1 mg / ml	1 mg / 1 ml	1
Magnesium Sulfate	500 mg / ml	1 gm / 2 ml	4
Metoprolol (Lopressor)	1 mg / ml	5 mg / 5 ml	2
Midazolam (Versed)	1 mg / ml	5 mg / 5 ml	2
Naloxone (Narcan)	1 mg / ml	2 mg / 2 ml	2
Nitroglycerin Tablets	0.4 mg / tablet	25 tablets	1
Nitropaste UD Packet	1 gm / inch	1 gm	4
Odansetron (Zofran)	2 mg / ml	4 mg / 2 ml	1
Prednisone	20 mg / tablet	20 mg	3
Sodium Bicarbonate	1 mEq / ml	50 mEq / 50 ml	1
Vasopressin	20 units / ml	20 units / 1 ml	4
Ziprasidone (Geodon)	20 mg / ml	20 mg	1

MISC ITEMS	AMOUNT	QTY	ACCESSORIES	QTY
Normal Saline	50 ml	1	Tubex Holder	1
D <sub>5</sub> W	100 ml	1	Plastic Trash Bag (12" X 16")	1
Sterile H <sub>2</sub> O (use with Geodon)	10 ml	1		
Filter Needles		5		

# Medication 13-1

Continued

## ODEMSA DRUG KIT



# Medication 13-2

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Adenosine

**REVISED:** 05/2012

**DRUG NAME:** Adenosine

**TRADE NAME:** Adenocard

**DRUG CLASS:**

1. Supraventricular anti-arrhythmic
2. Endogenous purine nucleoside

**MECHANISM OF ACTION:**

Slows tachycardias associated with the AV node via modulation of the autonomic nervous system without causing negative inotropic effects. It acts directly on sinus pacemaker cells and vagal nerve terminals to decrease chronotropic & dromotropic activity. Thus it slows conduction and blocks reentry pathways through the AV node and also slows conduction through the SA node.

**INDICATIONS:**

Hemodynamically stable PSVT (including WPW) refractory to vagal maneuvers

**CONTRAINDICATIONS:**

1. 2<sup>nd</sup> or 3<sup>rd</sup> degree heart block (without a functioning pacemaker)
2. Sick Sinus Syndrome
3. Known hypersensitivity
4. Pregnancy (C)
5. Known atrial fibrillation or atrial flutter (not effective)

**PRECAUTIONS:**

1. May cause refractory bronchospasm. Use with caution with COPD and asthma.
2. Extra caution (and lower than normal doses) should be used in patients receiving Carbamazepine (Tegretol) which could potentiate AV block of adenosine.
3. Lower than normal doses (3 mg or less) of Adenosine should be used in patients receiving Dipyridamole (Persantin).

**DOSAGE:**

**Adults:**

- 6.0 mg rapid IVP, immediately followed by rapid 10 ml Normal Saline flush.
- If No response in 1 - 2 minutes – 12 mg rapid IVP and 10 ml NS rapid IVP.
- If No response in 2 minutes – 12 mg rapid IVP and 10 ml NS rapid IVP.

**Pediatrics:**

- 0.1 mg / kg rapid IVP, max dose 6 mg, immediately followed by rapid Normal Saline flush.
- If No response in 1 - 2 minutes – 0.2 mg / kg, max dose 12 mg, rapid IVP and NS rapid IVP.

ADENOSINE

# Medication

## 13-2

Continued

# ADENOSINE

Pediatric Rapid flush bolus:							
<u>&lt; 1 Year</u>	<u>1 – 3 Years</u>			<u>4 Years</u>			
2.5 ml	5.0 ml			10.0 ml			
Age	Pre-Term		Term		6 Months		
Weight (kg)	1.5		3.0		8.0		
0.1 mg / kg	0.15 mg		0.3 mg		0.8 mg		
0.2 mg / kg	0.3 mg		0.6 mg		1.6 mg		
Age (in years)	1	3	6	8	10	12	14
Weight (kg)	10.0	14.0	20.0	25.0	34.0	40.0	50.0
0.1 mg / kg	1mg	1.4 mg	2 mg	2.5 mg	3.4 mg	4 mg	5 mg
0.2 mg / kg	2 mg	2.8 mg	4 mg	5 mg	7 mg	8 mg	10 mg

### ONSET:

15 seconds or less

### DURATION:

10 seconds

### SIDE EFFECTS

- Flushing
- Chest pain
- Dyspnea
- Headache

- Diaphoresis
- Metallic Taste
- Dizziness
- Lightheadedness

- Numbness
- Nausea / Vomiting
- Palpitations
- Marked bradycardia

### INTERACTIONS:

1. Additive effects – Digoxin, Calcium Channel Blockers
2. Antagonistic effects – Methylxanthines (caffeine, Theophylline)
3. Potentiating effects – Dipyridamole (Persantine)

### PEARLS:

1. Higher doses of Adenosine are likely to be needed for patients receiving Theophylline or using large quantities of caffeine.

# Medication 13-3

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Albuterol

**REVISED:** 05/2012

**DRUG NAME:** Albuterol Sulfate

**TRADE NAME:** Albuterol, Proventil, Ventolin

**DRUG CLASS:**

1. Beta<sub>2</sub> Agonist
2. Sympathomimetic

**MECHANISM OF ACTION:**

Acts selectively on Beta<sub>2</sub> receptor sites in the lungs, relaxing bronchial smooth muscle, decreasing airway resistance, and relief of bronchospasm. Although beta selective, it will cause some CNS stimulation, cardiac stimulation, increased diuresis, and gastric acid secretion.

**INDICATIONS:**

1. Bronchial asthma
2. Bronchospasm in acute exacerbation of COPD (chronic bronchitis, emphysema)
3. Bronchospasm associated with cardiac asthma
4. Bronchospasm in:
  - a. Anaphylaxis
  - b. Burns
  - c. Toxic Inhalations

**CONTRAINdications:**

1. Known hypersensitivity
2. Tachydysrhythmias

**PRECAUTIONS:**

1. Hypertension
2. Lactation and Pregnancy (C)
3. Diabetes
4. Seizures
5. Known cardiac disease
6. Hyperthyroidism

**DOSAGE:**

**Adults:**

- **MDI:** 1 - 2 inhalations, repeated every 15 minutes as needed.
- **Nebulizer:** 5 mg (1 cc of 5% solution) via nebulizer with oxygen flow at 6 - 8 LPM, normally takes approximately 8 - 12 minutes to administer. May repeat as necessary.

**Pediatrics:**

- **MDI:** Compliance with MDI is difficult to achieve, nebulizer is preferred.
- **Nebulizer:** 2.5 mg (0.5 cc of 5% solution) via nebulizer with oxygen flow at 6 - 8 LPM, normally takes approximately 8 - 12 minutes to administer. May repeat as necessary.

ALBUTEROL

# Medication

## 13-3

Continued

# ALBUTEROL

### ONSET:

5 -15 minutes after inhalation, usually with prompt improvement

### DURATION:

3 - 4 hours

### SIDE EFFECTS:

- |  |  |  |
|--|--|--|
| <ul style="list-style-type: none"><li>• Palpitations,<br/>Tachycardia</li><li>• Anxiety, Nervousness</li><li>• Dizziness</li></ul> | <ul style="list-style-type: none"><li>• Headache</li><li>• Tremors</li><li>• Nausea / Vomiting</li></ul> | <ul style="list-style-type: none"><li>• Hypertension</li><li>• Dysrhythmias</li><li>• Chest Pain</li></ul> |
|--|--|--|

### INTERACTIONS:

1. Additive effects – MAOI's, TCA's, and other sympathomimetics
2. Antagonistic effects – Beta Blockers including propanolol and Esmolol

### PEARLS:

1. The first dose is administered in conjunction with Atrovent. Second and subsequent nebulizers are with Albuterol only.
2. The nebulizer system can be adapted to accommodate a mask if the patient is too fatigued or working too hard to hold the nebulizer. It can also be adapted to ET administration. Both ET and mask nebulizer treatments should have an O<sub>2</sub> flow rate of 8 - 10 L / min.
3. The medication chamber should be kept upright to ensure efficient medication administration, patients have a tendency to tilt the chamber, recheck it often. "Tap" the container toward the end of the treatment to ensure complete administration.
4. Monitor for dramatic increase in heart rate, development of frequent ventricular ectopy, or development of serious CNS symptoms.
5. Albuterol can cause hyperglycemia and hypokalemia. Both of these effects occur from stimulation of beta<sub>2</sub>-receptors, resulting in gluconeogenesis and intracellular movement of potassium. These effects occur most commonly with inhalation (via nebulization) of relatively large doses of Albuterol (e.g., 5 - 10 mg).

# Medication 13-4

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Amiodarone

**REVISED:** 05/2012

**DRUG NAME:** Amiodarone

**TRADE NAME:** Cordarone, Pacerone

**DRUG CLASS:** Class III Anti-dysrhythmic

## **MECHANISM OF ACTION:**

Amiodarone has a multitude of different actions as an anti-dysrhythmic. It prolongs the duration of the action potential and effective refractory period and noncompetitively inhibits alpha and beta receptors while possessing vagolytic and calcium-channel blocking properties. It is also a negative dromotrope, chronotrope, and vasodilator.

## **INDICATIONS:**

1. First line anti-dysrhythmic in ventricular fibrillation / pulseless ventricular tachycardia
2. Stable ventricular tachycardia (monomorphic or polymorphic)
3. Hemodynamically stable wide-complex tachycardia
4. Narrow-complex Supra-ventricular Tachycardia

## **CONTRAINdications:**

1. Sick Sinus Syndrome and AV block (*not treated concomitantly with a pacemaker*)
2. Cardiogenic Shock
3. Pulmonary Congestion
4. Hypotension
5. Hypersensitivity
6. TCA Overdose
7. Use of Procainamide

## **PRECAUTIONS:**

1. Heart failure (*because of negative inotropic effects*)
2. Should be avoided in congenital or acquired Long QT syndrome or history of Torsade de Pointe (TDP)
3. Pre-existing pulmonary disease (*may cause fatal pulmonary toxicity*)
4. Hepatic disease
5. Pregnancy (D)

## **DOSAGE:**

### **Adults:**

- Pulseless Arrest: 300 mg IVP initial dose then 150 mg IVP repeated once in 3 - 5 minutes. Maximum dose: 2 gm IV in 24 hours.
- Wide-Complex Tachycardia: 150 mg IV infusion over 10 minutes then administer 1 mg / min IV infusion over 6 hours.

AMIODARONE

# Medication 13-4

Continued

## AMIODARONE

### Pediatrics:

- Pulseless Arrest: 5 mg / kg IVP, repeated once in 3 - 5 minutes.
- Perfusion Tachycardias: 5 mg / kg IV infusion over 40 minutes. Infusion may be repeated, up to a total dosage of 15 mg / kg / day IV.

### ONSET:

2 - 3 minutes

### DURATION:

Variable

### SIDE EFFECTS

- Hypotension
- Dizziness
- Headache
- Bradycardia

- AV conduction abnormalities
- Flushing / Salivation
- QT prolongation

- Torsades de Pointe
- Nausea & vomiting

### INTERACTIONS:

1. Synergistic or additive effects with other anti-dysrhythmics.
2. May potentiate bradycardias and hypotension with beta-blockers and calcium channel blockers.
3. May potentiate the effects of warfarin (Coumadin).
4. Should not be used routinely with drugs that prolong the QT interval.
5. Amiodarone is incompatible with furosemide (lasix), heparin, and / or sodium bicarbonate. When possible, infuse via dedicated IV line.

### Adult Infusion Mixing Procedures

#### 150 mg over 10 minutes

Add **150 mg of Amiodarone in 50 mL D<sub>5</sub>W** (3mg / mL), with 10 gtt set, and run solution at 50 gtt / min (1gtt / second).

#### 1 mg / minute infusion

Dilute **150 mg Amiodarone in 100 mL D<sub>5</sub>W** (1.5 mg / mL), attach 10 gtt set, and run solution at 7gtt / min (1gtt / 9 seconds).

### Pediatric Dosing

Age	Term	6 mos	1 years	3 years	6 years	8 years	10 years	12 years	14 years
Weight (lb / kg)	6.6 lb 3 kg	17.6 lb 8 kg	22 lb 10 kg	30.8 lb 14 kg	44 lb 20 kg	55 lb 25 kg	75 lb 34 kg	88 lb 40 kg	110 lb 50 kg
Amiodarone 5 mg / kg	15 mg	40 mg	50 mg	70 mg	100 mg	125 mg	170 mg	200 mg	250 mg

# Medication 13-5

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Aspirin

**REVISED:** 05/2012

**DRUG NAME:** Aspirin (Acetylsalicylic acid)

**TRADE NAME:** ASA, Aspergum, Bayer Aspirin, Easprin, Ecotrin, Empirin

**DRUG CLASS:** Nonsteroidal anti-inflammatory drug (NSAID)

**MECHANISM OF ACTION:**

Aspirin is an anti inflammatory agent and an inhibitor of platelet function. Aspirin works by blocking the formation of the substance Thromboxane A<sub>2</sub>, which causes platelets to aggregate and arteries to constrict. The use of aspirin has been shown to cause an overall reduction of mortality in patients experiencing AMI.

**INDICATIONS:**

1. Acute myocardial infarction
2. Suspected cardiac chest pain

**CONTRAINdications:**

1. Hypersensitivity
2. Active bleeding disorder

**PRECAUTIONS:**

Pregnancy (D)

**DOSAGE:**

**Adults:**

- 324 mg PO

**Pediatrics:**

- Not recommended

**ONSET:**

PO: 5 - 30 minute

**DURATION:**

PO: 1 - 4 hours

**SIDE EFFECTS**

- Tinnitus
- Heartburn
- Gastrointestinal hemorrhage
- Prolonged bleeding time

- Nausea and vomiting
- Asthma attack (rare, with certain metabolic disorders,(i.e., C<sub>1</sub> Esterase deficiency)

ASPIRIN

# Medication 13-5

Continued

## ASPIRIN

### **INTERACTIONS:**

May decrease anti-hypertensive effects of ACE inhibitors and beta-blockers

### **PEARLS:**

1. Regardless of patient daily medication regimen, full dose should be given when treating chest pain.

# Medication 13-6

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Atropine

**REVISED:** 05/2012

**DRUG NAME:** Atropine Sulfate

**TRADE NAME:** Atropine

**DRUG CLASS:**

1. Parasympathetic
2. Anticholinergic agent

**MECHANISM OF ACTION:**

Atropine is a competitive inhibitor of acetylcholine at muscarinic receptor sites. The increase of sympathetic activity seen with atropine administration is due to the drug's parasympatholytic effects. In the setting of symptomatic bradycardias, atropine decreases vagal effects on the heart resulting in increased chronotropy and dromotropy (with little or no inotropic effects). Atropine is also used in cholinergic exposures as a direct antidote for the poison.

**INDICATIONS:**

1. Symptomatic bradycardias
2. Pre-intubation in children
3. Poisoning with Organophosphates:
  - Carbamate
  - Mushrooms
  - Nerve gas
  - Other cholinergic agents

**CONTRAINDICATIONS:**

1. According to 2010 AHA guidelines, Atropine is no longer recommended in arrest setting
2. Non-arrest setting:
  - a. Myasthenia gravis
  - b. Closed angle glaucoma
  - c. Atrial fibrillation and flutter
  - d. Known hypersensitivity
  - e. Thyrotoxicosis
  - f. Urinary tract obstruction

ATROPIE

# Medication 13-6

Continued

## ATROPINE

### PRECAUTIONS:

1. Atropine may actually worsen 2<sup>nd</sup> degree Type II and 3<sup>rd</sup> degree AV blocks
2. CAD and HF
3. COPD
4. HTN
5. Renal / hepatic disease
6. Geriatrics
7. Pregnancy
8. Minimum doses: (Smaller doses can cause a paradoxical bradycardia)
  - Adult < 0.5 mg
  - Pediatric < 0.1 mg

### DOSAGE:

#### Adults:

- Symptomatic Bradycardia: 0.5 – 1 mg IVP every 3 - 5 min. Maximum dose, 3 mg IVP.
- Poisonings: IV: 1 – 2 mg as needed to decrease cholinergic symptoms.
- Mark 1 Kit (Auto injector): 2 mg.

#### Pediatrics:

- Symptomatic Bradycardia: 0.2 mg / kg every 3 - 5 minutes, as needed. Minimum dose 0.1 mg; maximum dose 0.5mg in children and 1 mg in adolescents.
- Poisonings: 0.05 mg / kg every 3 - 5 minutes, as needed, to decrease cholinergic symptoms.

### ONSET:

Within seconds

### DURATION:

2 - 6 hours

### SIDE EFFECTS

#### 1. Anti-cholinergic effects, (remember the pneumonic):

- |  |   |
|--|---|
| <ul style="list-style-type: none"><li>• <b>Dry as a bone</b> - Dry mucous membranes, urinary retention, constipation</li><li>• <b>Mad as a hatter</b> - Restlessness, tachycardia, palpitations, headache, dizziness</li></ul> | <ul style="list-style-type: none"><li>• <b>Red as a beet</b> - Flushed, hot, dry skin</li><li>• <b>Blind as a bat</b> - Pupillary dilation (mydriasis), blurred vision (cycloplegia), photophobia</li></ul> |
|--|---|

#### 2. Tachydysrhythmias

#### 3. Ventricular Tachycardia

#### 4. Ventricular Fibrillation

#### 5. Nausea and vomiting

# Medication 13-6

Continued

## **INTERACTIONS:**

1. Anti-cholinergics increase vagal blockade.
2. Potential adverse effects when administered with digitalis, cholinergics, and neostigmine.
3. Enhanced effects are possible with antihistamines, Procainamide, quinidine, antipsychotics, antidepressants, benzodiazepines, and phenothiazines.
4. When administered too soon after sodium bicarbonate (without allowing sufficient fluid to flush the line), a precipitate will form.

## **PEARLS:**

1. To recognize cholinergic poisonings remember the SLUDGE, DUMBELS, and Days of the week mnemonics.
2. Pushing “too small a dose” or pushing atropine too slowly may elicit paradoxical bradycardia.
3. Remember bradycardia in a pediatric patient, is often the result of hypoxia / hypoxemia rather than a primary cardiac problem. Ventilation is always preferred over pharmacological intervention.
4. In the setting of cholinergic poisoning, the treating physician may order a substantial dosage – often in the range of 10 – 40 mg.

**ATROpine**

# Medication 13-6

Continued

**ATROPINE**

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# Medication 13-7

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Bumetanide

**REVISED:** 05/2012

**DRUG NAME:** Bumetanide

**TRADE NAME:** Bumex, Burinex

**DRUG CLASS:** Loop diuretic

## MECHANISM OF ACTION:

Bumetanide has a rapid onset that inhibits reabsorption of both sodium and chloride in the ascending loop of Henle and proximal renal tubule. This inhibition interferes with the chloride-binding co-transport system, thus causing increased excretion of water, sodium, chloride, magnesium, phosphate, and calcium.

## INDICATIONS:

1. Heart failure
2. Pulmonary Edema
3. Hypertensive crisis

## CONTRAINdications:

1. Hypersensitivity to drug or sulfonamides
2. Anuria
3. Severe electrolyte imbalance

## PRECAUTIONS:

1. May cause hypokalemia
2. Pregnancy (C)

## DOSAGE:

### Adults:

- 1 - 2 mg IV over 1 - 2 minutes

### Pediatrics:

- Not recommended.

## ONSET:

IV: 2 - 3 minutes

## DURATION:

PO: 4 - 6 hours

## SIDE EFFECTS

- |   |  |
|---|--|
| <ul style="list-style-type: none"><li>• Muscle cramps</li><li>• Hypotension</li><li>• Dizziness</li></ul> | <ul style="list-style-type: none"><li>• Headache</li><li>• Nausea &amp; vomiting</li></ul> |
|---|--|

## INTERACTIONS:

May increase risk of digoxin toxicity from Bumetanide-induced hypokalemia

BUMETANIDE

# Medication 13-7

Continued

## BUMETANIDE

### PEARLS:

1. Bumetanide is only stocked in the ODEMSA drug box when a shortage of Furosemide has occurred.
2. Larger doses may be necessary in patients with impaired renal function to obtain the same therapeutic response.
3. Bumetanide may produce significant diuresis; it is important that patients are closely monitored for hypokalemia, hypomagnesemia, and volume depletion.
4. Dose equivalency (approximate):
  - Bumetanide 1 mg = furosemide 40 mg = torsemide 10 mg

# Medication 13-8

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Calcium Chloride 10%

**REVISED:** 05/2012

**DRUG NAME:** Calcium Chloride 10%

**TRADE NAME:** Calcium Chloride, Calcium, CaCl<sub>2</sub>

**DRUG CLASS:**

Electrolyte replacement

**MECHANISM OF ACTION:**

Calcium chloride increases the force of cardiac contractility by initiating myofibril shortening. In normally functioning hearts, calcium will produce positive inotropic and vasoconstrictive effects while increasing systemic arterial blood pressure. In abnormally functioning hearts, calcium will produce positive inotropic effects, which may increase or decrease systemic vascular resistance. Calcium chloride also appears to increase ventricular automaticity.

**INDICATIONS:**

1. Hyperkalemia
2. Hypermagnesemia (Antidote for respiratory depression due to magnesium sulfate administration)
3. Hypocalcemia (Calcium channel blocker overdose)

**CONTRAINdications:**

1. Hypercalcemia
2. Digitalis toxicity
3. Ventricular fibrillation during resuscitation

**PRECAUTIONS:**

1. May induce digitalis toxicity in patients receiving digoxin
2. Can cause tissue necrosis and sloughing
3. Pregnancy (C)
4. Respiratory disease / failure
5. Cor pulmonale

**DOSAGE:**

**Adults:**

- Calcium channel blocker OD: 2.0 - 4.0 mg / kg 10% solution slow IVP and repeat as necessary in 10 minute intervals.
- Asystole / PEA with suspected hyperkalemia: 4.0 mg / kg slow IVP.

**Pediatrics:**

- 20 mg / kg infused slowly over 10 minutes (no faster than 100 mg / min). Maximum 1 gm / dose.

**ONSET:**

5 - 15 minutes

CALCIUM CHLORIDE 10%

# Medication 13-8

Continued

CALCIUM CHLORIDE 10%

## DURATION:

Dose dependent (effects may persist for 4 hours after IV administration)

SIDE EFFECTS	
<ul style="list-style-type: none"><li>• Metallic taste</li><li>• Burning</li><li>• “Heat waves”</li><li>• Bradycardia (may cause asystole)</li><li>• Hypotension</li><li>• Cardiac arrhythmias</li></ul>	<ul style="list-style-type: none"><li>• Increased digitalis toxicity</li><li>• Extravasation with necrosis and sloughing</li><li>• Vasospasm in coronary and cerebral arteries</li><li>• Nausea and vomiting</li></ul>

## INTERACTIONS:

1. Precipitates with sodium bicarbonate epinephrine, and potassium phosphate.
2. When given to a patient on digoxin, can cause elevated digoxin levels and possibly digitalis toxicity.
3. May antagonize the effects of Verapamil.

## PEARLS:

1. To prevent tissue necrosis, make sure to administer the drug through an IV that is patent and flowing well.
2. Flush well between administration of calcium chloride and sodium bicarbonate to avoid precipitate.
3. May sometimes be requested by medical control to be co-administered with Cardizem to offset hypotension in hypotensive patients.

# Medication 13-9

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Dextrose

**REVISED:** 05/2012

**DRUG NAME:** Dextrose

**TRADE NAME:** Dextrose, Dextrose 50%, D<sub>50</sub>, D<sub>50</sub>W, Glucose

**DRUG CLASS:** Monosaccharide, principal form of carbohydrate used in the body

**MECHANISM OF ACTION:**

Increases serum blood glucose levels

**INDICATIONS:**

Hypoglycemia confirmed by glucometer

**CONTRAINdications:**

1. Intracranial hemorrhage
2. Cerebrovascular accident (CVA)
3. Closed head injury

**PRECAUTIONS:**

1. Can precipitate severe neurologic impairment in alcoholic patients (Wernicke-Korsakoff's syndrome). This is related to thiamine deficiency and thiamine should be given, when available, before dextrose in these cases.
2. If smaller veins are used, local venous irritation may occur.
3. Infiltration may cause necrosis.

**DOSAGE:**

**Adults:**

- 12.5 – 50.0 gm of Dextrose 50% solution, slow IVP.

**Pediatrics:**

- < 30 days old, administer **Dextrose 10% (2 ml / kg)** via IV or IO.
- < 8 years old, administer Dextrose 25% (2 ml / kg) via IV or IO.
- 8 years old, administer Dextrose 50% (0.5 mg / kg, max 25 mg) via IV / IO.

**ONSET:**

Can be one (1) minute or less to see immediate improvement, usually 5 - 20 minutes to see complete resolution of signs and symptoms

**DURATION:**

Depends on the degree of hypoglycemia

## SIDE EFFECTS

- |  |   |
|--|---|
| <ul style="list-style-type: none"><li>• Pain, warmth, or burning upon administration</li><li>• Infiltration/extravasation can cause necrosis</li></ul> | <ul style="list-style-type: none"><li>• Phlebitis, sclerosis, and thrombosis of vein can occur</li><li>• Rhabdomyolysis</li></ul> |
|--|---|

**DEXTROSE**

# Medication

## 13-9

Continued

# DEXTOSE

### INTERACTIONS:

No significant interactions

### PEARLS:

1. Symptomatic hypoglycemia nearly always means an altered mental status. Altered mental status often means a scene safety issue. **Make sure you are aware of your environment**, ensure you have sufficient personnel to handle the situation -- don't be hesitant to leave an unsafe scene.
2. Patient's family, friends, or relatives, if present, can be a good source of information about the patient's habits and their normal recovery from hypoglycemia.
3. When practical, obtain pre / post Dextrose administration glucometer readings. The post Dextrose reading should be obtained at least 10 minutes following administration.
4. Because the pH of Dextrose is quite irritating to the vasculature, use a reasonably large bore IV & large vein. To further minimize the irritation potential, run fluid wide open while administering D<sub>50</sub> and check venous patency often.
5. It is acceptable to treat a hypoglycemic patient without using a full dose.
6. If the patient refuses transport, it is important to get them something substantive to eat and to ensure that someone will be with them for awhile.
7. Because of the long half-life (therapeutic duration) associated with oral hypoglycemic agents and long acting insulin; often these patients have hypoglycemic relapses and therefore should be carefully monitored in a medical control facility. To the extent practical, these patients should be transported for further care.

### Procedure for making Dextrose 25% and 10%

Dextrose 25%	Dextrose 10%
In 50 ml syringe, mix 25 ml of Dextrose 50% with 25 ml Normal Saline. Mixture will yield 50 ml of Dextrose 25%	In 50 ml syringe, mix 10 ml of Dextrose 50% with 40 ml Normal Saline. Mixture will yield 50 ml of Dextrose 10%

Age	Pre-Term	Term	3 months	6 months	1 year	3 years	6 years	8 years
Weight (lb / kg)		6.6 lb 3 kg	13.2 lb 6 kg	17.6 lb 8 kg	22 lb 10 kg	30.8 lb 14 kg	44 lb 20 kg	55 lb 25 kg
Dextrose 10% 2.0 ml / kg	3.0 ml	6.0 ml						
Dextrose 25% 2.0 ml / kg			12.0 ml (3 gm)	16.0 ml (4 gm)	20.0 ml (5 gm)	28.0 ml (7 gm)	40.0 ml (10 gm)	50.0 ml (12.5 gm)

# Medication 13-10

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Diazepam

**REVISED:** 05/2012

**DRUG NAME:** Diazepam

**TRADE NAME:** Valium, Diastat

**DRUG CLASS:**

1. Benzodiazepine (non-barbiturate sedative-hypnotic agent)
2. Anticonvulsant
3. Skeletal muscle relaxant
4. Schedule IV controlled substance

**MECHANISM OF ACTION:**

Diazepam acts at the level of the limbic, thalamic, and hypothalamic regions of the Central nervous system (CNS) through potentiation of GABA (inhibitory neurotransmitter). Diazepam also decreases neural cell activity in all regions of CNS. Anxiety is decreased by inhibiting cortical and limbic arousal while promoting relaxation through inhibition of spinal motor reflex pathways, and depression of muscle & motor nerve function directly. As an anticonvulsant, diazepam augments pre-synaptic inhibitions of neurons, limiting the spread of electrical activity. However, diazepam does not alter the electrical activity of the seizure's focus.

**INDICATIONS:**

1. Major motor seizures / status epilepticus
2. Sedation prior to cardioversion
3. Sedation maintenance for mechanically ventilated patients
4. Skeletal muscle relaxant
5. Acute anxiety
6. Vertigo
7. Management of alcohol withdrawal symptoms

**CONTRAINdications:**

1. Shock
2. Coma
3. Respiratory Depression
4. Hypersensitivity
5. Closed – angle glaucoma

**PRECAUTIONS:**

1. Reduced doses, up to 50%, have been recommended when treating geriatric patients
2. Use caution when administering to patients with:
  - Hepatic dysfunction
  - Current substance abuse
  - Renal insufficiency
  - Parkinson's disease
  - Myasthenia gravis
  - History of drug addiction Pregnancy (D)

**DIAZEPAM**

# Medication 13-10

Continued

## DIAZEPAM

### DOSAGE:

#### Adults:

##### **Epileptic Convulsions:**

- 2.5 – 5.0 mg IV or IM. Dose may be repeated every 5 minutes as needed.

##### **Sedation Maintenance:**

- 0.1 mg / kg slow IVP, every 30 minutes as needed, maximum single dose 5.0 mg.

##### **Behavioral Emergency:**

- 5.0 mg IV or IM.

#### Pediatrics:

##### **Seizures and Sedation:**

- 0.3 mg / kg via IV or IO slowly over no less than one minute. Dose may be repeated every 5 minutes for continued seizures.
- Rectal dosing: 0.5 mg / kg via PR.

Age	Pre-Term	Term	3 months	6 months	1 year	3 years	6 years	8 years
Weight (lb / kg)	3.3 lb 1.5 kg	6.6 lb 3 kg	13.2 lb 6 kg	17.6 lb 8 kg	22 lb 10 kg	30.8 lb 14 kg	44 lb 20 kg	55 lb 25 kg
Diazepam IV (5.0 mg / ml) 0.3 mg / kg	0.1 ml	0.2 ml	0.4 ml	0.5 ml	0.6 ml	0.84 ml	1.2 ml	1.5 ml
Diazepam PR (5.0 mg / ml) 0.5 mg / kg	0.15 ml	0.3 ml	0.6 ml	0.8 ml	1.0 ml	1.4 ml	2.0 ml	2.0 ml

### ONSET:

IV – 5 Minutes

IM – 15 – 30 Minutes

### DURATION:

IV – 15 – 60 Minutes

IM – 15 – 60 Minutes

### SIDE EFFECTS

Minor	Major
<ul style="list-style-type: none"><li>• CNS depression</li><li>• Dizziness</li><li>• Drowsiness</li><li>• Lethargy</li><li>• Ataxia</li></ul>	<ul style="list-style-type: none"><li>• Respiratory depression</li><li>• Apnea</li><li>• Hypotension</li><li>• Cardiac arrest</li><li>• Valium rage</li></ul>

# Medication 13-10

Continued

## INTERACTIONS:

Normal saline flush should precede and follow administration, because of its incompatibility with all other drugs.

## PEARLS:

1. Diazepam pushed rapidly will have more “*dramatic*” effects than pushed slowly.
2. When giving an IM injection of diazepam, use a large muscle mass (i.e., gluteus). Versed or Ativan are both more readily absorbed through the muscle mass, and may be considered a better choice in certain situations, when available.
3. “Diastat” is a pre-filled tube of Diazepam specifically designed for rectal administration. It is pre-measured, and is often made available to parents by their family physician to administer to children with severe seizure disorders. Preliminary studies show it **MAY** have less incidence of respiratory depression, but all precautions still apply.

DIAZEPAM

# Medication 13-10

Continued

**DIAZEPAM**

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# Medication 13-11

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Diltiazem

**REVISED:** 05/2012

**DRUG NAME:** Diltiazem

**TRADE NAME:** Cardizem

**DRUG CLASS:**

Antiarrhythmic Class IV

## **MECHANISM OF ACTION:**

Diltiazem is a class IV antiarrhythmic agent. It decreases the automaticity in the sinoatrial (SA) node and prolongs refractoriness in the atrioventricular (AV) node. Diltiazem also inhibits the influx of extracellular calcium ions to myocardial and vascular smooth muscle cells, as well as decreasing the cardiac contractility and inhibiting constriction of vascular smooth muscle. In patients with PSVT, Diltiazem interrupts the reentry pathway in the AV node and restores normal sinus rhythm. Finally, it decreases ventricular response rate in atrial fibrillation and flutter.

## **INDICATIONS:**

1. Atrial fibrillation with a ventricular response of 120 beats per minute or greater
2. Paroxysmal supraventricular tachycardia (PSVT) accompanied by a narrow QRS complexes refractory to vagal maneuvers and adenosine

## **CONTRAINDICATIONS:**

1. Bradycardia
2. Hypotension
3. Patients who present in HF
4. Pregnancy (C)

## **PRECAUTIONS:**

1. Patients who receive long term beta blocker therapy

## **DOSAGE:**

### **Adults:**

- 0.25 mg / kg bolus over **2 minutes**. If response is inadequate, 0.35 mg / kg over 2 minutes 15 minutes after initial dose.

### **Pediatrics:**

- 1.0 mcg / kg slow IVP.

## **ONSET:**

IV: 1 - 3 minutes

## **DURATION:**

15 minutes after first dose and can be continuously infused for up to 24 hours

**DILTIAZEM**

# Medication 13-11

Continued

## DILTIAZEM

SIDE EFFECTS	
Minor	Major
<ul style="list-style-type: none"><li>• Nausea and vomiting</li><li>• Headache</li><li>• Drowsiness</li><li>• Sore throat</li></ul>	<ul style="list-style-type: none"><li>• Severe bradycardia</li><li>• HF</li><li>• Hypotension (<i>may be reversed with 0.5-1.0 gm Calcium Chloride</i>)</li><li>• Facilitated accessory conduction in patients with WPW syndrome.</li></ul>

### INTERACTIONS:

Beta blockers

### PEARLS:

1. Patients with a high intake of grapefruit or grapefruit juice may be at risk for life threatening interactions regarding Diltiazem.
2. Diltiazem is used to treat hypertension (high blood pressure), angina (chest pain), and certain heart rhythm disorders.
3. Diltiazem should not be used in "sick sinus syndrome" or "AV block" (unless the patient has a pacemaker), low blood pressure, or if they've recently had a heart attack.

# Medication 13-12

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Diphenhydramine

**REVISED:** 05/2012

**DRUG NAME:** Diphenhydramine Hydrochloride

**TRADE NAME:** Benadryl

**DRUG CLASS:**

1. Antihistamine
2. H<sub>1</sub> Antagonist

**MECHANISM OF ACTION:**

Diphenhydramine blocks H<sub>1</sub> receptors, causing bronchoconstriction and contraction of the gut, and H<sub>2</sub> receptors causing peripheral vasodilation and secretion of gastric acid. As an H<sub>1</sub> antagonist, Diphenhydramine also has Anticholinergic properties in varying degrees which accounts for its anti-dyskinetic and anti-emetic effects.

**INDICATIONS:**

1. Anaphylaxis
2. Allergic Reactions
3. Urticaria
4. Sedation
5. Motion Sickness and vertigo
6. Nausea and vomiting
7. Histamine release secondary to DXM use
8. Extrapyramidal / dystonic reaction

**CONTRAINDICATIONS:**

1. Hypersensitivity
2. Acute asthma attack
3. Lower respiratory tract disease
4. Newborns and nursing mothers

**PRECAUTIONS:**

1. Hypertension
2. Cardiac disease
3. Renal disease
4. Bronchial asthma
5. Seizures
6. Pregnancy Category (C)
7. Closed angle glaucoma (avoid if at all possible)

**DOSAGE:**

**Adults:**

- 25.0 – 50.0 mg IV or IM

**Pediatrics:**

- 1.0 mg / kg IV or IO. Maximum dose of 25 mg

**DIPHENHYDRAMINE**

# Medication 13-12

Continued

## DIPHENHYDRAMINE

### ONSET:

IV – Immediate  
IM – 30 minutes

### DURATION:

IV – 4 - 7 hours  
IM – 4 - 7 hours

### SIDE EFFECTS

- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>• Drowsiness / Dizziness</li><li>• Lack of coordination</li><li>• Confusion</li><li>• Dry mouth</li><li>• Drying of bronchial secretions</li></ul> | <ul style="list-style-type: none"><li>• Blurred vision</li><li>• Urinary retention</li><li>• Hypotension</li><li>• Tachycardia</li><li>• Bradycardia</li></ul> |
|--|--|

### INTERACTIONS:

1. Additive effects – other CNS depressants
2. MAOIs – May prolong the anticholinergic effects

### PEARLS:

1. Adjunctive therapy to epinephrine in anaphylaxis & severe allergic reactions.  
The epinephrine causes immediate bronchodilation by activating  $B_2$  receptors, while the diphenhydramine inhibits further histamine response.
2. Sometimes given with Phenergan, Inapsine, and Haldol as pre-treatment for dystonic effects, and for additional sedation.

# Medication 13-13

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Dopamine

**REVISED:** 05/2012

**DRUG NAME:** Dopamine Hydrochloride

**TRADE NAME:** Dopamine, Intropin

**DRUG CLASS:**

1. Adrenergic dopaminergic catecholamine
2. Sympathomimetic

**MECHANISM OF ACTION:**

Dopamine is a naturally occurring catecholamine that is the chemical precursor of norepinephrine. It produces endogenous norepinephrine release leading to increased cardiac contractility and increased systemic vascular resistance. Dopamine is generally dose dependant in its effects:

- **1 - 2 µg / kg / min** - stimulates the dopaminergic receptors causing dilation of the renal, mesenteric, and cerebral arteries.
- **2 - 10 µg / kg / min** - stimulates the beta receptors causing inotropic and chronotropic responses.
- **10 - 20 µg / kg / min** - stimulates the alpha and beta receptors causing vasoconstriction of renal, mesenteric, and peripheral arteries and veins.
- **> 20 µg / kg / min** - Mimics pure alpha effects similar to epinephrine-like effects. Although rare, it is occasionally used at this range in-hospital.

**INDICATIONS:**

1. Cardiogenic shock
2. Cardiogenic shock with pulmonary edema (HF)
3. Hypovolemic shock / hypotension (after fluid resuscitation)
4. Neurogenic shock
5. Septic shock

**CONTRAINdications:**

1. Women on oxytocin
2. Tachydysrhythmias
3. Ventricular fibrillation
4. Ventricular tachycardia
5. Uncorrected hypovolemia
6. Patients with known heochromocytoma

**PRECAUTIONS:**

1. MAOIs, TCAs, cardiac stimulants, and vasopressors may cause increased heart rate, hypertensive crisis and SV dysrhythmias
2. Will precipitate in basic, alkaline solutions
3. May cause necrosis, sloughing at infusion site
4. Pregnancy (C)

**DOPAMINE**

# Medication 13-13

## Continued

### DOSAGE:

## **Adults:**

- 2.0 – 20.0 µg / kg / minute titrated to effect. Infusion is made by adding 400 mg of Dopamine to 250 ml Normal Saline, yielding 1600 µg/ml concentration.

Pediatrics:

- 2.0 – 20.0 µg / kg / minute titrated to effect. Infusion is made by adding (6 mg x weight in kg) to 100 ml Normal Saline: **1gtt / min (cc / hr) = 1 µg / kg / min**

## **ONSET:**

2 – 4 minutes

## DURATION:

**10 – 15 minutes**

## SIDE EFFECTS:

- Dysrhythmias, including ventricular fibrillation and ventricular tachycardia
  - Hypertension
  - Headache / Dizziness
  - Nausea and vomiting  
  - Tremors
  - Tachycardia
  - Flushing
  - Angina, AMI
  - Ectopy
  - Bradycardia

## INTERACTIONS-

1. Potentiating effects – TCAs, MAOIs, bretylium
  2. Precipitates in alkaline solutions
  3. May cause hypotension when used concomitantly with phenytoin (Dilantin)

## PEARLS:

1. Can cause tissue necrosis and sloughing. Take care to avoid infiltration, use central intravenous access or the large veins of the arm.
  2. The dose should be titrated to patient's (desired) hemodynamic response.

Dopamine IV Infusion													
Add 400 mg of Dopamine to 250 ml of NS (1600 mcg / ml) and attach 60 gtt/s IV tubing.													
Mcg / min	Weight in kilograms												
	2.5	5	10	20	30	40	50	60	70	80	90	100	125
	Microdrops / minute (ml / hr)												
2.0 mcg				1.5	2	3	4	5	5	6	7	8	11
5.0 mcg	1	2	4	8	11	15	19	23	26	30	34	38	47
10.0 mcg	1	2	4	8	11	15	19	23	26	30	34	38	47
15.0 mcg	1.4	3	6	11	17	23	28	34	39	45	51	56	70
20.0 mcg	2	4	8	15	23	30	38	45	53	60	68	75	94

# Medication 13-14

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Epinephrine

**REVISED:** 05/2012

**DRUG NAME:** Epinephrine

**TRADE NAME:** Adrenaline, Epi

**DRUG CLASS:**

1. Adrenergic catecholamine
2. Sympathomimetic

**MECHANISM OF ACTION:**

- $\beta_1$  - Contractility, inotropic, increases AV conduction, and automaticity
- $\beta_2$  - Bronchodilation and skeletal muscle vasodilation
- $\alpha_1$  - Peripheral vasoconstriction and “fight or flight” response
- Small doses – Beta effects dominate increasing vasodilation
- Large doses – Alpha effects dominate increasing vasoconstriction, systemic vascular resistance, and blood pressure

**INDICATIONS:**

1. Anaphylaxis
2. Acute bronchospasm associated with asthma or COPD (refractory to first-line agents)
3. Pulseless Arrest
4. Croup, epiglottitis, and RSV

**CONTRAINDICATIONS:**

1. None in cardiac arrest, severe anaphylaxis
2. Hypersensitivity

**PRECAUTIONS:**

1. Hypertension
2. Ischemic heart disease
3. Cerebrovascular insufficiency
4. Deactivates / precipitates with alkaline solutions (sodium bicarbonate)
5. Will increase myocardial oxygen demand
6. Pulmonary edema
7. Pregnancy (C)
8. Geriatrics
9. Protect from light

*\*\*\*All patients receiving inhaled beta agonists and / or Anticholinergic medications should be observed for at least one hour for return of symptoms following treatment.*

**EPINEPHRINE**

# Medication 13-14

Continued

## EPINEPHRINE

### DOSAGE:

#### Adults:

##### Pulseless Arrest

- 1 mg (1:10,000) IVP every 3 - 5 minutes

##### Anaphylaxis

- 0.3 mg (1:1,000) IM (preferred) or SQ
- Infusion for refractory case: 2.0 – 10.0 µg / min infusion titrated to BP response
- Epinephrine Neb (for laryngeal edema only): 5.0 mg (1:1,000) nebulized undiluted

##### Acute Bronchospasm (associated with asthma or COPD refractory to first line agents)

- 0.3 mg (1:1,000) IM (preferred) or SQ

##### Symptomatic Bradycardia and Hypotension and Refractory Hypotension in Calcium Channel Blocker and Beta Blocker Overdose

- 2.0 – 10.0 µg / minute infusion titrated to BP response

#### Pediatrics:

##### Pulseless Arrest

- 0.01 mg / kg (1:10,000) IV/ IO every 3 - 5 minutes
- **Neonates:** 0.01 – 0.03 mg / kg (1:10,000) IV/IO every 3 - 5 minutes

##### Anaphylaxis

- 0.01 mg / kg (1:1,000, 0.01 ml / kg) IM (preferred) or SQ, max dose 0.3 mg
- Racemic Epinephrine (2.25%) Neb (for laryngeal edema only): 0.5 ml (2.25%) mixed with 3.0 ml Normal Saline nebulized
- Infusion for refractory case: 0.1 – 2.0 µg / kg / minute infusion with Medical Control authorization

##### Croup and Diagnosed RSV

- Racemic Epinephrine (2.25%) Neb (for laryngeal edema only): 0.5 ml (2.25%) mixed with 3.0 ml Normal Saline nebulized

### ONSET:

IV: 1 – 2 minutes

IM / SQ: 5 – 10 minutes

### DURATION:

5 – 10 minutes

# Medication 13-14

Continued

SIDE EFFECTS	
<ul style="list-style-type: none"><li>Anxiety / Fear / Tremors</li><li>Pallor</li><li>Angina</li><li>Hypertension</li><li>Nausea &amp; vomiting</li></ul>	<ul style="list-style-type: none"><li>Arrhythmias</li><li>Ventricular Fibrillation</li><li>Tachycardia</li><li>Dizziness</li><li>Headache</li></ul>

## INTERACTIONS:

- Potentiating by TCAs and MAOIs
- Antagonized by beta blockers
- Precipitates in alkaline solutions

## PEARLS:

- Sodium bicarbonate and furosemide will inactivate epinephrine; ensure that you flush the IV line well following administration of either of these agents.

### Epinephrine IV Infusion

Add 1 mg of Epinephrine 1:10,000 in 250 ml D<sub>5</sub>W (4 mcg / ml) and attach 60 gtts IV tubing.

Mcg / minute	2.0 mcg	5.0 mcg	7.0 mcg	10.0 mcg
Drops / minute (mL / hr)	30 gtts	75 gtts	100 gtts	150 gtts

EPINEPHRINE

# Medication 13-14

Continued

**EPINEPHRINE**

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# Medication 13-15

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Fentanyl

**REVISED:** 05/2012

**DRUG NAME:** Fentanyl Citrate

**TRADE NAME:** Sublimaze, Atiq (lollipop form for pediatrics)

**DRUG CLASS:**

1. Synthetic opiate, narcotic analgesic
2. Opiate
3. Schedule II controlled substance

**MECHANISM OF ACTION:**

Fentanyl is a powerful synthetic opiate with a mechanism of action similar to Morphine, though it is considered both faster acting and of shorter duration than Morphine. Fentanyl interacts with opiate receptors decreasing pain impulse transmission at the spinal cord level and higher in the CNS while also being a potent  $\mu$ -opiate receptor agonist. Peripheral vasodilation is also caused by fentanyl's ability to increase venous capacitance and decreases venous return (chemical phlebotomy) by depressing the responsiveness of alpha-adrenergic receptors. Since it decreases both preload and afterload it may also decrease myocardial oxygen demand. Fentanyl is metabolized in the liver, excreted by the kidneys, and stored in body fat.

**INDICATIONS:**

1. Moderate to severe pain
2. Sedation maintenance for mechanically ventilated patients

**CONTRAINDICATIONS:**

Hypersensitivity

**PRECAUTIONS:**

1. Respiratory depression
2. Severe heart disease
3. Geriatrics
4. Pregnancy (C), increases to (D) when administered for prolonged periods or high doses when administered to patients who are close to full term
5. Liver / kidney failure (may prolong duration)

**DOSAGE:**

**Adults:**

- 1.0 - 3.0 mcg / kg slow IVP, every 20 - 30 minutes as needed

**Pediatrics:**

- 1.0 mcg / kg slow IVP

**ONSET:**

IV: 1 - 3 minutes

IM: 10 - 20 minutes

FENTANYL

# Medication 13-15

Continued

## FENTANYL

### DURATION:

1 - 2 hours, with peak effects 30 minutes post administration

### SIDE EFFECTS

- |  |   |
|--|---|
| <ul style="list-style-type: none"><li>• Dizziness</li><li>• Altered level of consciousness</li><li>• Hallucinations</li><li>• Euphoria</li><li>• Mental impairment</li><li>• Hypotension</li><li>• Seizures (rare)</li></ul> | <ul style="list-style-type: none"><li>• Lightheadedness</li><li>• Bradycardia</li><li>• Tachycardia</li><li>• Nausea &amp; Vomiting</li><li>• CNS depression</li><li>• Respiratory depression</li><li>• Muscle rigidity</li></ul> |
|--|---|

### INTERACTIONS:

1. CNS depressants may enhance effects (antihistamines, anti-emetics, sedatives, hypnotics, barbiturates, and alcohol).
2. Do not mix in line with heparin.

### PEARLS:

1. Fentanyl MUST be given slowly, as chest wall muscle rigidity, seizures, and hypotension have been associated with rapid administration.
2. Fentanyl is significantly more potent than Morphine (approximately 50 - 100 times as potent, mg to mg). At clinically equivalent doses, Fentanyl is similar in effectiveness to morphine, with a quicker onset and shorter duration.
3. Compared to other opiates (e.g., Demerol or Morphine), it has less profound adverse effects, minimal histamine release, and does not adversely affect the seizure threshold.
4. Apnea and significant respiratory depression have been noted with doses > 5 mcg / kg.
5. Any opiate analgesics can cause spasm of the Sphincter of Oddi (ampulla) and the renal tract. Fentanyl is not believed to have any more adverse effect on this than Morphine.
6. Narcotic analgesia used to be considered contraindicated in the pre-hospital setting for abdominal pain of unknown etiology. It was thought that analgesia would hinder the ER physician or surgeon's evaluation of abdominal pain. It is now becoming widely recognized that severe pain actually confounds physical assessment of the abdomen and that narcotic analgesia rarely diminishes all of the pain related to the abdominal pathology. It would seem to be both prudent & humane to "take the edge off of the pain" in this situation, with the goal of reducing, not necessarily eliminating the discomfort. Additionally, in the practice of modern medicine the exact diagnosis of the etiology of abdominal pain is rarely made on physical examination alone, but also includes laboratory tests, x-ray, ultrasound, and CT scan, essential in the diagnosis of abdominal pain. Therefore medication of abdominal pain is both humane and appropriate medical care.

# Medication 13-16

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Furosemide

**REVISED:** 05/2012

**DRUG NAME:** Furosemide

**TRADE NAME:** Lasix

**DRUG CLASS:**

Sulfonamide-type loop diuretic

**MECHANISM OF ACTION:**

Furosemide inhibits the reabsorption of both sodium and chloride in the ascending limb of the loop of Henle, resulting in an excretion of sodium, chloride, and water. In addition, it increases renal excretion of potassium, hydrogen, calcium, magnesium, bicarbonate, ammonium, and phosphate. Furosemide also decreases left ventricular filling pressure (preload) by first decreasing peripheral vascular resistance and increasing peripheral venous capacity.

**INDICATIONS:**

1. Pulmonary edema
2. Heart failure (HF)

**CONTRAINdications:**

1. Hypovolemia, dehydration
2. Severe pre-existing electrolyte
3. Hypersensitivity to sulfonamides and thiazides

**PRECAUTIONS:**

1. Diabetes mellitus (may worsen control)
2. Renal disease
3. Hepatic disease
4. Anuria
5. Pregnancy (C)
6. May cause electrolyte imbalance

**DOSAGE:**

**Adults:**

- Recommend 20 - 80mg slow IVP for adults

**Pediatrics:**

- 0.5 – 1.0 mg / kg slow IVP, maximum dose of 6.0 mg / kg / day

**ONSET:**

5 minutes, peak at 10 - 20 minutes

**DURATION:**

6 hours

**FUROSEMIDE**

# Medication 13-16

Continued

## FUROSEMIDE

SIDE EFFECTS	
<ul style="list-style-type: none"><li>Transient or permanent hearing loss,</li><li>Tinnitus</li><li>Hypovolemia</li><li>Hyperglycemia</li><li>Hyperuricemia</li></ul>	<ul style="list-style-type: none"><li>Hypotension</li><li>Hypokalemia (or other electrolyte imbalances)</li><li>Weakness</li><li>Dizziness</li></ul>

### INTERACTIONS:

- Incompatible with any drug in syringe.
- Additive effects – Anti-hypertensive's, nitrates, and other diuretics.

### PEARLS:

- The secret to avoiding transient / permanent deafness or tinnitus when administering furosemide is to administer it *SLOWLY*. "Ototoxicity increased proportionately as the rate of infusion of parenteral furosemide increased from 4 mg / min (no ototoxicity), to 5 - 6 mg / min (no ototoxicity), to 25 mg / min (9 / 15 patients developed reversible hearing loss), to 67 mg / min (10 / 10 patients developed tinnitus and deafness that persisted for 90 minutes.<sup>1</sup>
- When administering the medication to a pregnant patient, the benefits must outweigh the risks (life or limb situation).
- In the pre-hospital setting, furosemide should be administered IV, to the extent practical.
- The initial effects from increased venous capacitance should be seen within about 5 minutes. Diuresis will begin within 15 - 30 minutes after administration.

Age	Pre-term	Term	6 months
Weight (lb / kg)	3.3 lb 1.5 kg	6.6 lb 3 kg	17.6 lb 8 kg
Furosemide 0.5 mg / kg	0.75 mg	1.5 mg	4.0 mg
Furosemide 1.0 mg / kg	1.5 mg	3.0 mg	8.0 mg

Age	1 year	3 years	6 years	8 years	10 years	12 years	14 years
Weight (lb / kg)	22 lb 10 kg	30.8 lb 14 kg	44 lb 20 kg	55 lb 25 kg	75 lb 34 kg	88 lb 40 kg	110 lb 50 kg
Furosemide 0.5 mg / kg	5.0 mg	7.0 mg	10.0 mg	12.5 mg	17.0 mg	20.0 mg	25.0 mg
Furosemide 1.0 mg / kg	10.0 mg	14.0 mg	20.0 mg	25.0 mg	34.0 mg	40.0 mg	50.0 mg

1

DeVito JM, Vance JR. Furosemide-associated ototoxicity. Clinical Pharm. 1983; 2:507-9.

# Medication 13-17

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Glucagon

**REVISED:** 05/2012

**DRUG NAME:** Glucagon

**TRADE NAME:** Glucagon

**DRUG CLASS:**

Pancreatic hormone ( $\alpha_2$  cells in pancreas)

**MECHANISM OF ACTION:**

Glucagon increases blood glucose by stimulating glycogenolysis and inhibiting conversion of glucose to glycogen. This process stimulates gluconeogenesis (metabolism of glucose in the liver), relaxes the smooth muscle of the GI tract, and produces positive inotropic and chronotropic effects.

**INDICATIONS:**

1. Hypoglycemia
2.  $\beta$ -blocker or calcium channel blocker toxicity

**CONTRAINdications:**

1. Known hypersensitivity
2. Known insulinoma (can precipitate hypoglycemia secondary to insulin release)
3. Known pheochromocytoma (can precipitate substantial hypertension secondary to catecholamine release)

**PRECAUTIONS:**

1. Cardiac disease, CAD
2. Geriatrics
3. Malnutrition
4. Alcoholism
5. Hepatic disease
6. Renal insufficiency
7. Pregnancy (B)

**DOSAGE:**

**Adults:**

**Hypoglycemia**

- 1.0 mg IM

**Beta blocker Overdose**

- 1.0 mg IVP / IO if no response to atropine. If no response in five (5) minutes, administer one (1) repeat dose 1 mg IVP / IO.

**Calcium channel blocker overdose**

- 1.0 mg IVP / IO if no response to calcium chloride. If no response in five (5) minutes, administer one (1) repeat dose 1 mg IVP / IO.

GLUCAGON

# Medication 13-17

Continued

## GLUCAGON

### Pediatrics:

#### Hypoglycemia

- Less than 20 kg: 0.5 mg IM
- Greater than or equal to 20 kg: 1mg IM

#### Beta blocker Overdose

- 1.0 mg IVP / IO if no response to atropine. If no response in five (5) minutes, administer one (1) repeat dose 1 mg IVP / IO.

#### Calcium channel blocker overdose

- 1.0 mg IVP / IO if no response to calcium chloride. If no response in five (5) minutes, administer one (1) repeat dose 1 mg IVP / IO.

### ONSET:

IV – 5 - 20 minutes

IM – 30 minutes

### DURATION:

1 - 2 hours

### SIDE EFFECTS

- |                       |                    |
|-----------------------|--------------------|
| • Nausea and vomiting | • Urticaria (rare) |
| • Angina (rare)       | • Dizziness (rare) |

### INTERACTIONS:

Beta blockers may interfere with glucagon's actions

### PEARLS:

1. Glucagon only works when there are normal liver stores of glycogen. It will not work in patients with chronic hypoglycemia, malnutrition, starvation. It also may not work in patients with chronic alcoholism for similar reasons, including hepatic disease.
2. First line treatment for hypoglycemia is always glucose. Use glucagon as a last resort in insulin-dependent diabetics as they will already have depleted stores of glycogen. Glucagon will deplete glycogen stores further and it takes some time for the stores to regenerate.
3. Any patient receiving glucagon should be transported to an appropriate medical facility to be monitored for refractory hypoglycemia.

Age	Term	3 months	6 months	1 year	3 years	6 years	8 years
Weight (lb / kg)	6.6 lb 3 kg	13.2 lb 6 kg	17.6 lb 8 kg	22 lb 10 kg	30.8 lb 14 kg	44 lb 20 kg	55 lb 25 kg
Glucagon 0.1 mg / kg	0.3 mg	0.6 mg	0.8 mg	1.0 mg	1.0 mg	1.0 mg	1.0 mg

# Medication 13-18

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Ipratropium

**REVISED:** 05/2012

**DRUG NAME:** Ipratropium Bromide

**TRADE NAME:** Atrovent

**DRUG CLASS:** Anti-cholinergic

**MECHANISM OF ACTION:**

Ipratropium antagonizes the action of acetylcholine by blocking muscarinic cholinergic receptors, resulting in bronchodilation and drying of respiratory tract secretions.

**INDICATIONS:**

1. Bronchial asthma
2. Bronchospasm in acute exacerbation of COPD (chronic bronchitis, emphysema)
3. Bronchospasm in: Anaphylaxis, Burns, Toxic inhalations
4. Bronchospasm associated with cardiac asthma

**CONTRAINDICATIONS:**

1. Known hypersensitivity .
2. Known hypersensitivity to atropine, atropine derivatives, or bromide

**PRECAUTIONS:**

1. Cardiac disease, CAD
2. Hypertension
3. Geriatrics
4. Pregnancy (B)

**DOSAGE:**

**Adults:**

**Nebulizer**

- 0.5 mg via nebulizer with 6 – 8 liters of Oxygen. Do not repeat

**Pediatrics:**

**Nebulizer**

- 0.25 mg via nebulizer with 6 – 8 liters of Oxygen. Do not repeat

**ONSET:**

5 - 15 minutes

**DURATION:**

4 - 6 hours

**IPRATROPIUM**

# Medication 13-18

Continued

## IPRATROPIUM

### SIDE EFFECTS

- |   |   |
|---|---|
| <ul style="list-style-type: none"><li>• Palpitations</li><li>• Cough, dry mouth</li><li>• Blurred vision</li><li>• Anxiety, nervousness</li></ul> | <ul style="list-style-type: none"><li>• Dizziness</li><li>• Headache</li><li>• Rash</li><li>• Nausea &amp; vomiting</li></ul> |
|---|---|

### INTERACTIONS:

None

### PEARLS:

1. The nebulizer system can be adapted to accommodate a mask if the patient is too fatigued or working too hard to hold the nebulizer. It can also be adapted to ET administration. Both ET and mask nebulizer treatments should have an O<sub>2</sub> flow rate of 8 - 10 L / minute.
2. The medication chamber should be kept upright to ensure efficient medication administration, patients have a tendency to tilt the chamber, recheck it often. "Tap" the container toward the end of the treatment to ensure complete administration.
3. All patients receiving nebulizer beta agonists and / or anti-cholinergics should be observed for at least one (1) hour after treatment.
4. Patients, when appropriate, should have a cardiac monitor and have venous access established along with bronchodilator treatment.
5. Monitor for dramatic increase in heart rate, development of frequent ventricular ectopy, or development of serious CNS symptoms.
6. Atrovent has some immediate effects, but peak effects are delayed. Therefore, Atrovent is more appropriate for maintenance treatment than for acute bronchospasm. Thus, administration of Atrovent alone is not useful in our setting. In combination with Albuterol, Atrovent promotes more effective, maintainable bronchodilation than Albuterol alone.

# Medication 13-19

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Lorazepam

**REVISED:** 05/2012

**DRUG NAME:** Lorazepam

**TRADE NAME:** Ativan

**DRUG CLASS:**

1. Benzodiazepine
2. Anticonvulsant
3. Schedule IV Controlled Substance

**MECHANISM OF ACTION:**

Lorazepam acts at the level of the limbic, thalamic, and hypothalamic regions of the central nervous system (CNS) through potentiation of GABA (inhibitory neurotransmitter). It decreases neural cell activity in all regions of the CNS and promotes relaxation through inhibition of the spinal motor reflex pathway while depressing muscle and motor nerve function directly. Anxiety is decreased by Lorazepam's ability to inhibit cortical and limbic arousal. As an anti-convulsant, Lorazepam augments the presynaptic inhibition of neurons, limiting the spread of electrical activity without actually altering the electrical activity of the seizure's focus. Although Lorazepam has a shorter elimination half-life than diazepam, Lorazepam persists in the CNS longer than diazepam due to the "redistribution phenomena".

**INDICATIONS:**

1. Major motor seizures
2. Status epilepticus
3. Sedation maintenance for mechanically ventilated patients
4. Sedation prior to cardioversion
5. Acute anxiety
6. Management of alcohol withdrawal symptoms

**CONTRAINdications:**

1. Shock
2. Coma
3. Respiratory depression
4. Current substance abuse (relative)
5. Hypersensitivity
6. Pregnancy (D)
7. Closed angle glaucoma

**PRECAUTIONS:**

1. Reduce dose for geriatrics
2. Hepatic dysfunction
3. Renal insufficiency
4. History of drug addiction
5. Parkinson's Disease
6. Myasthenia gravis

**LORAZEPAM**

# Medication 13-19

Continued

## LORAZEPAM

### DOSAGE:

#### Adults:

##### Status Epilepticus

- 2.0 mg - 4.0 slow IVP / IM. Dose may be repeated once. Maximum total dose of 10.0 mg

##### Cardioversion/ Pacing/ Sedation

- 1.0 – 2.0 mg IVP. Dose may be repeated once.

##### Behavioral Emergency

- 1.0 – 2.0 mg IVP / IM. Dose may be repeated once.

##### Sedation Maintenance

- 0.05 mg / kg slow IVP, every 30 minutes as needed, maximum single dose 1.0 mg.

#### Pediatrics:

##### Status Epilepticus

- 0.1 mg / kg slow IVP/ IM. Dose may be repeated once in 5 - 10 minutes to a maximum dose of 2.0 mg.

##### Cardioversion/ Pacing/ Sedation

- 0.05 – 0.1 mg / kg slow IVP. Maximum total dose of 2.0 mg.

### ONSET:

IV: 5 - 15 minutes

IM: 20 - 30 minutes (highly variable)

### DURATION:

IV: 6 - 8 hours

IM: 24 - 48 hours

### SIDE EFFECTS

Minor	Major
<ul style="list-style-type: none"><li>• CNS depression</li><li>• Dizziness</li><li>• Drowsiness</li><li>• Lethargy</li><li>• Ataxia</li></ul>	<ul style="list-style-type: none"><li>• Respiratory depression</li><li>• Apnea</li><li>• Hypotension</li><li>• Paradoxical CNS stimulation</li><li>• Bradycardia</li><li>• Cardiac arrest</li></ul>

### INTERACTIONS:

Additive with other CNS depressants

# Medication 13-19

Continued

## **PEARLS:**

1. Stocked by ODEMSA only when diazepam is unavailable.
2. Inadvertent intra-arterial injection may produce arteriospasms, resulting in gangrene that may require amputation.
3. Lorazepam expires in six weeks when not refrigerated. Do not use if discolored or if solution contains precipitate.
4. To avoid patient discomfort, Lorazepam should be injected into a large muscle or large vein.
5. As a dosing guideline, 2 mg of Lorazepam is roughly equivalent to 5 mg of diazepam.

**LORAZEPAM**

# Medication 13-19

Continued

**LORAZEPAM**

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# Medication 13-20

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Magnesium Sulfate

**REVISED:** 05/2012

**DRUG NAME:** Magnesium Sulfate

**TRADE NAME:** Mag, Mag Sulfate, MgSO<sub>4</sub>, Mg<sup>++</sup>

**DRUG CLASS:**

1. Antidysrhythmic
2. Anticonvulsant
3. CNS Depressant

**MECHANISM OF ACTION:**

As an Antidysrhythmic, magnesium sulfate is a physiological calcium channel blocker that reduces SA node impulse formation and prolongs conduction time in the myocardium. As an anticonvulsant, magnesium sulfate reduces striated muscle contractions and blocks peripheral neuromuscular transmission by reducing acetylcholine release at the myoneural junction.

**INDICATIONS:**

1. Torsades de Pointes
2. Refractory V-Fib or V-Tachycardia (with or without pulse) with suspected hypomagnesemia
3. Seizure prevention and control in preeclampsia and eclampsia
4. Status asthmaticus unresponsive to β agonists or anticholinergics

**CONTRAINdications:**

1. Heart block
2. Myocardial infarction
3. Hypermagnesemia

**PRECAUTIONS:**

Renal insufficiency

**DOSAGE:**

**Adults:**

**Refractory VT, VF, and Torsades de Pointe**

- 1.0 - 2.0 gm in 50 cc Normal Saline over 5 - 10 minutes.

**Refractory bronchospasm**

- 1.0 - 2.0 gm in 50 cc Normal Saline over 5 - 10 minutes.

**Eclampsia**

- 4.0 gm in 250 ml Normal Saline over 5 - 10 minutes.

**Pediatrics:**

**Refractory VT, VF, and Torsades de Pointe**

- 25 - 50 mg / kg in 50 cc over 5 - 10 minutes. Max dose 2 gm.

**Refractory bronchospasm**

- 25 - 50 mg / kg in 50 cc over 5 - 10 minutes. Max dose 2 gm.

# MAGNESIUM SULFATE

# Medication 13-20

Continued

## MAGNESIUM SULFATE

### ONSET:

IV: Immediate

IM: 3 - 4 hours

### DURATION:

IV: 30 - 60 minutes

IM: 3 - 4 hours

### SIDE EFFECTS

- Flushing, diaphoresis
- Itching, rash
- Hypothermia
- Drowsiness
- Respiratory depression / Failure
- Bradycardia, AV heart block

- Cardiac arrest
- Circulatory collapse
- Complete heart block
- Flaccid paralysis
- Absence of knee jerk
- Hypotension

### INTERACTIONS:

1. Incompatible with alcohol, salicylates, and sodium bicarbonate
2. Additive effects can occur with other CNS depressants
3. Concurrent use with nifedepine in the treatment of maternal hypertension can cause increased hypotension or pronounced muscle weakness and may harm the fetus.
4. Can cause cardiac conduction abnormalities when used in conjunction with cardiac glycosides.

### IV Infusion for Refractory VT / VF, Torsades de Pointe, or Bronchospasm (25 - 50 mg / kg [Pediatric] or 1.0 - .0 gm [Adult] over 10 minutes)

Add Magnesium Sulfate to 50 ml Normal Saline and attach 10 gtts IV tubing.  
Run at 50 gtts / min.

### IV Infusion for Eclampsia (4.0 gm over 5 - 10 minutes)

Add 4.0 gm of Magnesium Sulfate in 250 ml Normal Saline and attach 10 gtts IV tubing. Run wide open or at 250 gtts / min if attached to infusion pump.

### PEARLS:

1. In some case of Torsades de Pointes, 5.0 - 9.0 gm of Magnesium Sulfate has been required.
2. As a smooth muscle relaxant, magnesium sulfate is also a potentially effective second line intervention in cases of severe, refractory bronchospasm secondary to Asthma.
3. Use magnesium sulfate aggressively in the setting of eclampsia. If eclamptic seizures are refractory to Magnesium Sulfate, then proceed to benzodiazepines.

# Medication 13-21

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Metoprolol

**REVISED:** 05/2012

**DRUG NAME:** Metoprolol Tartrate

**TRADE NAME:** Lopressor, Toprol XL

**DRUG CLASS:**

1. Beta-adrenergic blocking agent
2. Anti-hypertensive selective  $\beta_1$ -blocker

**MECHANISM OF ACTION:**

Metoprolol blocks the action of the sympathetic nervous system, a portion of the involuntary nervous system, by blocking beta receptors on sympathetic nerves.

**INDICATIONS:**

ST elevation myocardial infarction

**CONTRAINDICATIONS:**

1. Heart rate less than 70 / minute
2. Systolic blood pressure less than 120 mmHg
3. 2<sup>nd</sup> or 3<sup>rd</sup> degree heart block
4. Cardiogenic shock
5. Decompensated cardiac failure
6. Sick sinus syndrome
7. Hypersensitivity
8. Asthma
9. Erectile dysfunction medication use

**PRECAUTIONS:**

1. Liver dysfunction
2. Renal dysfunction
3. Pulmonary disease
4. Diabetes mellitus
5. MAOI use within past 14 days
6. Concurrent administration with Diltiazem (may cause severe hypotension)
7. Pregnancy (C)

**DOSAGE:**

**Adults:**

- 5 mg IV over 5 minutes. Repeat once after 5 minutes. Maximum dose: 15 mg

**Pediatrics:**

- Not recommended

**ONSET:**

IV: Immediate

METOPROLOL

# Medication 13-21

Continued

## METOPROLOL

### DURATION:

IV: 5 - 8 hours

### SIDE EFFECTS

- Abdominal cramping
- Nausea & vomiting
- Lightheadedness
- Bradycardia
- Hypotension

- Shortness of breath
- Asthma exacerbation
- Fever
- Fatigue

### INTERACTIONS:

Patients may require an adjustment of their insulin dosage, due to the drugs ability to increase blood glucose levels.

# Medication 13-22

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Midazolam

**REVISED:** 05/2012

**DRUG NAME:** Midazolam

**TRADE NAME:** Versed

**DRUG CLASS:**

1. Benzodiazepine (non-barbiturate sedative-hypnotic agent)
2. Schedule IV controlled substance

**MECHANISM OF ACTION:**

Midazolam acts at the level of the limbic, thalamic, and hypothalamic regions of the central nervous system (CNS) through potentiation of GABA (inhibitory neurotransmitter) by decreasing neural cell activity in all regions of the CNS. Anxiety is decreased by inhibiting cortical and limbic arousal while promoting relaxation through inhibition of the spinal motor reflex pathway and depressing muscle & motor nerve function directly. As an anticonvulsant, Midazolam augments the presynaptic inhibitions of neurons, limiting the spread of electrical activity without altering the electrical activity of the seizure's focus. Midazolam has twice the affinity for benzodiazepine receptors than diazepam and has more potent amnesic effects. It is also short acting and roughly 3 - 4 times more powerful than diazepam.

**INDICATIONS:**

1. Sedation prior to cardioversion
2. Sedation maintenance in mechanically ventilated patients
3. Seizure control

**CONTRAINdications:**

1. Shock
2. Coma
3. Hypersensitivity
4. Closed angle glaucoma
5. Pregnancy (D)

**PRECAUTIONS:**

1. Patients with respiratory insufficiency (asthma, COPD, etc.) are more susceptible to respiratory depression
2. Effects are enhanced by other CNS depressants
3. Elderly
4. Hypotension
5. Use caution when administering to patients with:
  - Hepatic dysfunction
  - Renal insufficiency
  - History of drug addiction
  - Parkinson's disease
  - Myasthenia gravis

MIDAZOLAM

# Medication 13-22

Continued

## MIDAZOLAM

### DOSAGE:

#### Adults:

##### **Status epilepticus, Cardioversion and pacing**

- 2.5 mg IVP, every 5 minutes as needed, maximum total dose of 20.0 mg.

##### **Sedation**

- 0.1 mg / kg slow IVP, every 20 - 30 minutes as needed, maximum single dose 5.0 mg.

#### Pediatrics:

- 0.05-0.1 mg/kg slow IVP

IN: .2 mg/kg max 10 mg half dose per nostril

### ONSET:

IV: 1 - 3 minutes

IM: 5 - 15 minutes

### DURATION:

2 hours (dose dependant)

SIDE EFFECTS	
Minor	Major
<ul style="list-style-type: none"><li>• Nausea &amp; vomiting</li><li>• Headache</li><li>• Drowsiness</li><li>• Lethargy</li><li>• Cough</li><li>• Hiccups</li></ul>	<ul style="list-style-type: none"><li>• Respiratory depression</li><li>• Apnea</li><li>• Hypotension</li><li>• Paradoxical CNS stimulation (i.e., Valium rage)</li><li>• Cardiac arrest</li></ul>

### INTERACTIONS:

Additive with other CNS depressants

### PEARLS:

1. Premedication with an opiate may potentiate Midazolam, reducing the dose 30 - 50% is suggested.
2. Can cause phlebitis and pain at the IM injection sight.
3. Has more potential than other benzodiazepines to cause respiratory depression and arrest. Slower administration may reduce the respiratory depressant potential. Use with extreme caution in pediatrics.
4. Elderly, debilitated, or patients under the influence of other CNS depressants require reduced dosages.
5. Midazolam is preferred over other benzodiazepines in cases without IV access due to more rapid IM absorption; however it may have more profound respiratory depression.

# Medication 13-23

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Morphine Sulfate

**REVISED:** 05/2012

**DRUG NAME:** Morphine Sulfate

**TRADE NAME:** Duramorph, Morphine, MS, MSO<sub>4</sub>

**DRUG CLASS:**

1. Narcotic analgesic
2. Opiate
3. Schedule II controlled substance

**MECHANISM OF ACTION:**

Morphine Sulfate interacts with opiate receptors which decreases pain impulse transmission at the spinal cord level and higher in the central nervous system (CNS). Morphine, being a potent  $\mu$ -opiate receptor agonist, also causes peripheral vasodilation. This vasodilation increases venous capacity and decreases venous return (chemical phlebotomy) by depressing the responsiveness of alpha-adrenergic receptors. Since it decreases both preload and afterload it may decrease myocardial oxygen demand.

**INDICATIONS:**

1. Moderate to severe pain
2. Pulmonary edema
3. MI with ST elevation
4. Sedation maintenance in mechanically ventilated patients

**CONTRAINdications:**

1. Hypovolemia
2. Hypotension
3. Hypersensitivity
4. Head injury
5. Patients who have taken MAOIs within 14 days

**PRECAUTIONS:**

1. Respiratory depression
2. Severe heart disease
3. May worsen bradycardia or heart block in inferior MI (vagotonic effect)
4. Geriatrics
5. Hepatic / renal disease
6. Pregnancy (C), increases to (D) if used for prolonged periods of high doses in patients close to full term

## MORPHINE SULFATE

# Medication 13-23

Continued

## MORPHINE SULFATE

### DOSAGE:

#### Adults:

##### Pain management, STEMI, Pulmonary edema

- 2.5 - 5.0 mg IVP or 5.0 - 10.0 mg IM. Dosage may be repeated every 5 - 10 minutes as needed
- Contact **Medical Control** for orders to exceed 10 mg total administration

##### Sedation

- 1.0 – 3.0 mg slow IVP, every 30 - 45 minutes as needed

#### Pediatrics:

- 0.1 - 0.2 mg / kg IVP. Dosage may be repeated every 5 - 10 minutes
- Contact **Medical Control** for orders to exceed 10 mg total administration

### ONSET:

IV: 3 - 5 minutes

IM: 15 - 60 minutes

### DURATION:

3 - 7 hours

### SIDE EFFECTS

<ul style="list-style-type: none"><li>• Dizziness</li><li>• Altered level of consciousness</li><li>• Hallucinations</li><li>• Euphoria</li><li>• Mental impairment</li><li>• Hypotension</li></ul>	<ul style="list-style-type: none"><li>• Lightheadedness</li><li>• Bradycardia</li><li>• Tachycardia</li><li>• Nausea &amp; vomiting</li><li>• CNS depression</li><li>• Respiratory depression</li></ul>
--	---

### INTERACTIONS:

1. CNS depressants may enhance effects (antihistamines, anti-emetics, sedatives, hypnotics, barbiturates, and alcohol).
2. MAOIs may cause paradoxical excitation.

# Protocol 13-23

Continued

## PEARLS:

1. Morphine in RSI / MAI: Morphine has both a longer duration of action and a longer onset time than Fentanyl. It takes as much as 3 - 5 minutes for morphine to adequately sedate a patient. In addition, morphine may not blunt the rise in ICP, tachycardia or hypertension as well as Fentanyl.
2. Give the medication time to work and reduce the normal dose during administration to elderly patients. Repeated doses without giving the initial dose a chance to work may result in profound CNS depression, hypotension, etc.
3. Be judicious in your use of narcotic analgesics, the relief of pain and suffering is one of medicines primary goals, however don't "snow" people.
4. Opiate analgesics can cause spasm of the sphincter of Oddi. The sphincter of Oddi is the muscular valve surrounding the exit of the bile duct and pancreatic duct into the duodenum, at the papilla of Vater. In addition similar effects are believed to be true in renal tract. This is not a contraindication for the administration of morphine in these situations, simply a consideration.
5. Narcotic analgesia used to be considered contraindicated in the pre-hospital setting for abdominal pain of unknown etiology. It was thought that analgesia would hinder the ER physician or surgeon's evaluation of abdominal pain. It is now becoming widely recognized that severe pain actually confounds physical assessment of the abdomen and that narcotic analgesia rarely diminishes all of the pain related to the abdominal pathology. It would seem to be both prudent & humane to *"take the edge off of the pain"* in this situation, with the goal of reducing, not necessarily eliminating the discomfort. Additionally, in the practice of modern medicine the exact diagnosis of the etiology of abdominal pain is rarely made on physical examination alone, but also includes laboratory tests, x-ray, ultrasound, and CT scan, essential in the diagnosis of abdominal pain.

**MORPHINE SULFATE**

# Medication 13-23

Continued

**MORPHINE SULFATE**

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# Medication 13-24

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Naloxone

**REVISED:** 05/2012

**DRUG NAME:** Naloxone

**TRADE NAME:** Narcan

**DRUG CLASS:**

Narcotic antagonist

**MECHANISM OF ACTION:**

Naloxone binds competitively to opiate receptor sites, displacing narcotics and synthetic narcotics. Naloxone also antagonizes all actions of narcotics.

**INDICATIONS:**

1. Complete or partial reversal of depression caused by narcotics or synthetic narcotics
2. Coma of unknown etiology

**CONTRAINdications:**

Known hypersensitivity

**PRECAUTIONS:**

1. Pre-existing cardiac disease
2. Patients who have received cardio-toxic drugs
3. Pregnancy (B)
4. Abrupt and complete reversal can cause withdrawal-type effects
5. Use caution in poly-pharmaceutical overdoses

**DOSAGE:**

**Adults:**

- 0.5 mg – 2.0 mg Slow IVP to maintain good spontaneous respiratory effort. Dose may be repeated as needed. Failure to obtain reversal after 10 mg usually indicates another disease process or overdose on non-opioid drugs.

**Pediatrics:**

- 0.1 mg / kg IVP. Dosage may be repeated as needed.

**ONSET:**

IV: 1 - 2 minutes

IM: 2 - 8 minutes

**DURATION:**

30 - 60 minutes

NALOXONE

# Medication 13-24

Continued

## NALOXONE

SIDE EFFECTS	
<ul style="list-style-type: none"><li>• Tachycardia</li><li>• Hypotension</li><li>• Hypertension</li></ul>	<ul style="list-style-type: none"><li>• Dysrhythmias</li><li>• Nausea &amp; vomiting</li><li>• Diaphoresis</li></ul>

### INTERACTIONS:

Incompatible with alkaline drugs

### PEARLS:

1. Many opiates have a longer bioavailability than Naloxone, therefore assess for re-sedation and repeat administration as needed.
2. Failure to obtain reversal after 10 mg usually indicates another disease process or overdose on non-opioid drugs.
3. Use with caution in poly-pharmaceutical overdoses, reversal of opiate may result in an extremely hyperdynamic patient (i.e. "speedball").
4. Use just enough Naloxone to reverse severe signs and symptoms (i.e., respiratory depression, loss of airway control, and hypotension). We don't need to completely wake these people up in the field! Doing so may create a situation where a patient may become combative, belligerent, and refuse transport requiring law enforcement intervention.
5. If patient has obviously aspirated, consider bypassing Naloxone administration and transport the patient. Intubate as required.
6. If pushed too rapidly, this medication will induce vomiting.
7. Osterwalder, et al notes that "*In 1000 clinically diagnosed intoxications with heroin or heroin mixtures, from 4 to 30 serious complications can be expected. Such a high incidence of complications is unacceptable and could theoretically be reduced by artificial respiration with a bag valve device (hyperventilation) as well as by administering Naloxone in minimal divided doses, injected slowly.*" This is supported by other studies and case reports as well. It is recommended that a couple of minutes of careful ventilation with a BVM (with Sellick's maneuver) be performed prior to Naloxone administration to decrease the incidence of uncommon, but serious, complications.

# Medication 13-25

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Nitroglycerin

**REVISED:** 05/2012

**DRUG NAME:** Nitroglycerin

**TRADE NAME:** NitroStat, Nitrol, Nitrolingual, Nitro-Bid Ointment, Tridil, Nitro, NTG

**DRUG CLASS:**

1. Anti-anginal agent
2. Nitrate
3. Vasodilator

**MECHANISM OF ACTION:**

Nitrates relax peripheral venous vessels, causing a pooling of venous blood and decreased venous return to the heart, which decreases preload. Nitrates also reduce both arterial impedance and venous filling pressures, resulting in a reduction of the left ventricular systolic wall tension, which decreases afterload. These actions result in a reduction of the myocardial workload and the myocardial oxygen demand. It also causes some vasodilatation of coronary arteries (limited by atherosclerosis) increasing perfusion of ischemic myocardium. Nitroglycerin relaxes all other types of smooth muscle as well.

**INDICATIONS:**

1. Myocardial infarction with ST elevation
2. Acute pulmonary edema

**CONTRAINdications:**

1. Head injury
2. Increased intracranial pressure
3. Cerebral hemorrhage
4. Hypotension
5. Hypovolemia
6. Hypersensitivity to nitrates
7. Constrictive Pericarditis
8. Pericardial effusion
9. Recent erectile dysfunction medication use in past 24 hours, Cialis® (Tadalafil), Viagra® (Sildenafil), Levitra® (Vardenafil HCl)
10. Severe anemia (causes oxidation of hemoglobin to methemoglobin and could exacerbate anemia)

**PRECAUTIONS:**

1. Nitroglycerin deteriorates rapidly after bottle is opened, bottle should be opened and dated, and also protected from light
2. Use with caution in patients with closed-angle glaucoma, may increase intraocular pressure
3. Elderly may be more susceptible to the effect of nitrates
4. Hepatic disease (metabolism may be impaired and lead to increased risk of Methemoglobinemia)
5. Postural hypotension
6. Pregnancy (C)

**NITROGLYCERIN**

# Medication 13-25

Continued

## NITROGLYCERIN

### DOSAGE:

#### Adults:

##### Tablet:

- One tablet (0.4 mg) sublingual, may be repeated every 3 - 5 minutes (up to 3 SL) for chest pain
- Two tablets (0.4 mg) SL, repeated every 5 minutes for HF

##### Ointment:

- 1.0 inch of ointment (15 mg)

##### IV infusion:

- Begin administration at 5 mcg / min. Infusion may be increased 5 – 10 mcg / min every 5 minutes, max dose of 200 mcg / min

#### Pediatrics:

- Not normally recommended for pre-hospital use

### ONSET:

Tablet: 1 - 3 minutes

Ointment: 20 - 60 minutes

IV: Immediate

### DURATION:

Tablet: Up to 30 minutes

Ointment: 4 - 8 hours

IV: Several minutes, dose dependent

### SIDE EFFECTS

- |   |   |
|---|---|
| <ul style="list-style-type: none"><li>• Headache, due to vasodilation</li><li>• Hypotension</li><li>• Dizziness</li><li>• Nausea and vomiting</li><li>• Xerostomia (dry mouth)</li><li>• Reflex tachycardia</li><li>• Skin rash</li></ul> | <ul style="list-style-type: none"><li>• Flushing</li><li>• Anxiety</li><li>• Agitation</li><li>• Methemoglobinemia (rare, usually with high doses of the IV formulation, but can be seen with normal therapeutic doses)</li></ul> |
|---|---|

### INTERACTIONS:

1. Alcohol may produce additive hypotension.
2. Aspirin results in increased serum nitrate concentrations.
3. Additive interaction: Calcium channel blockers and beta-blockers can result in symptomatic orthostatic hypotension.
4. Sympathomimetics may antagonize the effects of nitroglycerin.
5. Nitroglycerin may compromise the efficacy of alteplase, TPA when administered concomitantly.

# Medication 13-25

Continued

## PEARLS:

1. Sublingual tablets: Place tablet under the tongue or in the buccal pouch and allow the tablet(s) to dissolve. Advise patient not to swallow sublingual (intrabuccal) tablets.
2. Apply the nitroglycerin ointment with gloves and to a hair-free region of the torso. Cover with the dose-measuring application paper (may tape in place). Do not rub or massage the ointment as this will cause rapid absorption and interfere with the sustained action.
3. Wear gloves when applying paste. If you get ointment or IV Tridil on your skin, sit down quickly!
4. Orthostatic hypotension, xerostomia (dry mouth), & headache are probably the most common side effects associated with nitroglycerin administration, warn your patient.

NITROGLYCERIN

# Medication 13-25

Continued

**NITROGLYCERIN**

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# Medication 13-26

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Ondansetron (Zofran)

**REVISED:** 05/2012

**DRUG NAME:** Ondansetron

**TRADE NAME:** Zofran, Zofran ODT

**DRUG CLASS:**

1. Anti-emetic
2. Selective serotonin (5-HT<sub>3</sub>) receptor antagonist

**MECHANISM OF ACTION:**

Ondansetron reduces the activity of the vagus nerve, which activates the vomiting center in the medulla oblongata, and also blocks serotonin receptors in the chemoreceptor trigger zone. Ondansetron has little effect on vomiting caused by motion sickness.

**INDICATIONS:**

Moderate to severe nausea and vomiting

**CONTRAINDICATIONS:**

1. Hypersensitivity
2. Prolonged QT syndrome
3. Concurrent use of Apomorphine (Apokyn), an anti-parkinsonian drug

**PRECAUTIONS:**

1. Not well studied in children less than 2 years of age
2. Use with caution with patients concurrently using drugs which affect QT interval (i.e., procainamide, amiodarone, tricyclic anti-depressants, and haldol)
3. Use with caution with patients suffering from hepatic impairment (consider prolonging dosage intervals or decreasing dose)

**DOSAGE:**

**Adults:**

- 0.1 mg / kg slow IVP over 2 - 5 minutes, max 4.0 mg per dose. If no effect, initial dose may be repeated after 5 minutes.

**Pediatrics:**

- 0.1 mg / kg slow IVP over 2 - 5 minutes, max 4.0 mg per dose. If no effect, initial dose may be repeated after 5 minutes.

**ONSET:**

IV: Rapid, with peak effect in 15 - 30 minutes

**DURATION:**

IV: 2 - 4 hours

ONDANSETRON (ZOFTRAN)

# Medication 13-26

Continued

## ONDANSETRON (ZOFTRAN)

SIDE EFFECTS	
<ul style="list-style-type: none"><li>Sedation</li><li>Hypotension</li><li>Tachycardia</li><li>Angina</li></ul>	<ul style="list-style-type: none"><li>Extra-pyramidal side effects (rare)</li><li>Torsades de Pointe (rare)</li><li>Constipation</li></ul>

### INTERACTIONS:

1. Additive effects with medications that prolong QT interval.
2. Additive CNS depressant effects.

### PEARLS:

1. Pregnancy Class B - Usually safe but benefits must outweigh the risks. Ondansetron showed no benefit over the antiemetic Promethazine (Phenergan) (Pregnancy Class C) for Hyper-emesis Gravida (HEG) in a double blinded randomized study. It may be used for cases refractory to other treatments/drugs.
2. The rate of IV administration should not be less than 30 seconds and preferably over 2 - 5 minutes.
3. Avoid use with Apomorphine (Apokyn, Uprima). Apokyn is used to treat Parkinson's disorders, and Uprima is used to treat erectile dysfunction. This is important to note because both of these compositions may promote nausea in some patients.
4. Ondansetron (Zofran) may not be as effective for vertigo and labyrinthitis related nausea and vomiting.
5. Ondansetron (Zofran) is safe and effective for nausea and vomiting in trauma patients and can be used in conjunction with pain management.

Age	Term	6 months	1 year	3 years	6 years	8 years	10 years	12 years	14 years
Weight (lb / kg)	6.6 lb 3 kg	17.6 lb 8 kg	22 lb 10 kg	30.8 lb 14 kg	44 lb 20 kg	55 lb 25 kg	75 lb 34 kg	88 lb 40 kg	110 lb 50 kg
Ondansetron 0.1 mg / kg			1.0 mg	1.4 mg	2.0 mg	2.5 mg	3.5 mg	4.0 mg	4.0 mg

# Medication 13-27

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Oxygen

**REVISED:** 05/2012

**DRUG NAME:** Oxygen

**TRADE NAME:** Oxygen

**DRUG CLASS:**

Medical gas

**MECHANISM OF ACTION:**

Oxygen is transported to the cells via the hemoglobin found in red blood cells. It breaks down glucose into a usable energy form.

**INDICATIONS:**

Suspected or possible hypoxia due to trauma or medical emergencies

**CONTRAINDICATIONS:**

There are no contraindications in the field. Never deprive a patient of oxygen

**PRECAUTIONS:**

1. Monitor patients with a history of COPD
2. Prolonged administration of high flow may cause damage to neonate eyes - retrobulbar fibroplasia (RLF)

**DOSAGE:**

**Adults and pediatrics: Titrate dosages to maintain SPO<sub>2</sub> > 94% but < 100%**

- 2 - 4 LPM Nasal Cannula
- 10 - 15 LPM non-rebreather mask
- 15 LPM bag-valve-mask

**ONSET:**

Immediate

**DURATION:**

Therapeutic effects probable as long as delivery is continued

**SIDE EFFECTS**

**Minor**

- |                              |             |
|------------------------------|-------------|
| • Drying of mucous membranes | • Epistaxis |
| • Nasal Irritation           |             |

OXYGEN

# Medication 13-27

Continued

OXYGEN

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# Medication 13-28

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Prednisone

**REVISED:** 05/2012

**DRUG NAME:** Prednisone

**TRADE NAME:** Deltasone, Meticortem, Orasone, Steripred

**DRUG CLASS:** Corticosteroid

## **MECHANISM OF ACTION:**

Prednisone's mechanism of action is not clearly defined although it is known that it decreases inflammation. This is accomplished mainly by its ability to stabilize leukocyte lysosomal membranes and suppress immune response.

## **INDICATIONS:**

1. Severe exacerbation of asthma
2. Allergic reaction / anaphylaxis

## **CONTRAINdications:**

1. Hypersensitivity
2. Children less than 3 years of age

## **PRECAUTIONS:**

1. Recent myocardial infarction
2. Gastrointestinal ulcers
3. Renal disease
4. Diabetes mellitus
5. Hypertension
6. Cirrhosis
7. Hypothyroidism
8. Heart failure
9. Pregnancy (C)

## **DOSAGE:**

### **Adults:**

- 60 mg PO

### **Pediatrics:**

- 1.0 - 2.0 mg / kg PO

## **ONSET:**

Variable

## **DURATION:**

Variable

# PREDNISONE

# Medication 13-28

Continued

## PREDNISONE

### SIDE EFFECTS

- |                   |                |
|-------------------|----------------|
| • Hypertension    | • Hypokalemia  |
| • Pulmonary edema | • Hypocalcemia |

### INTERACTIONS:

1. May increase glucose and cholesterol levels.
2. May cause false-negative results in nitroblue tetrazolium test for systemic bacterial infections.

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Sodium Bicarbonate

**REVISED:** 05/2012

**DRUG NAME:** Sodium Bicarbonate

**TRADE NAME:** Bicarb, NaHCO<sub>3</sub>

**DRUG CLASS:** Alkalizing agent

**MECHANISM OF ACTION:**

In the presence of hydrogen ions, sodium bicarbonate dissociates to sodium and carbonic acid, the carbonic acid picks up a hydrogen ion changing to bicarbonate and then dissociates into water and CO<sub>2</sub>, functioning as an effective buffer and alkalinizing the blood. In summary, increases plasma bicarbonate, which can buffer metabolic acids and move tricyclic anti-depressants and phenobarbital off receptor sites and back into circulation.

**INDICATIONS:**

1. Pre-existing metabolic acidosis (severe hypoxia, extended cardiac arrest).
2. Hyperkalemia
3. Tricyclic or phenobarbital overdose
4. Crush injury / entrapment

**CONTRAINdications:**

1. None when used in severe hypoxia and extended cardiac arrest
2. Metabolic alkalosis
3. Respiratory alkalosis
4. Hypokalemia
5. Hypocalcemia
6. Hypernatremia (administration of sodium may be detrimental)
7. Severe pulmonary edema (administration of sodium may be detrimental)

**PRECAUTIONS:**

1. Bicarbonate administration produces CO<sub>2</sub>, which crosses cell membranes more rapidly than the bicarbonate itself, potentially worsening intracellular acidosis
2. Heart failure (may worsen)
3. Pregnancy (C)
4. Infiltration can cause tissue necrosis
5. Renal disease

**DOSAGE:**

**Adults:**

- 1.0 mEq / kg IV bolus, may repeat ½ dose 10 minutes thereafter, as needed.

SODIUM BICARBONATE

# Medication 13-29

Continued

## SODIUM BICARBONATE

### Pediatrics:

- 1.0 mEq / kg IV bolus, may repeat  $\frac{1}{2}$  dose 10 minutes thereafter, as needed.

### ONSET:

IV: 2 - 10 minutes

### DURATION:

30 - 60 minutes

### SIDE EFFECTS:

- |  |   |
|--|---|
| <ul style="list-style-type: none"><li>• Alkalosis</li><li>• Hyper-irritability</li><li>• Seizures</li><li>• Tetany (electrolyte imbalance)</li><li>• Hypernatremia</li><li>• Hyperosmolality</li><li>• Lowering of serum K<sup>+</sup></li></ul> | <ul style="list-style-type: none"><li>• Cardiac and respiratory arrest</li><li>• Increased binding of calcium to serum proteins</li><li>• Decreased fibrillation threshold</li><li>• Sodium and water overload</li><li>• Inhibition of oxygen release to tissue</li></ul> |
|--|---|

### INTERACTIONS:

Most sympathomimetics will be deactivated by alkaline solutions. Be sure to flush IV line before & after administration to avoid inactivating sympathomimetics and precipitating with Calcium Chloride.

### PEARLS:

1. Few calcium salts will form a precipitate and clog the IV line.
2. Use relatively early in the setting of confirmed TCA overdoses. Tachycardia (even before QRS widening) and CNS depression are symptomatic enough to initiate alkalinization. By the time hypotension develops, the patient is often close to the seizure threshold and may be too late to benefit from sodium bicarbonate.
3. Ensure IV is patent to avoid tissue sloughing at the injection site.

# Medication 13-30

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Vasopressin

**REVISED:** 05/2012

**DRUG NAME:** Vasopressin, ADH

**TRADE NAME:** Pitressin

**DRUG CLASS:** Exogenous, parenteral form of anti-diuretic hormone (ADH)

**MECHANISM OF ACTION:**

Vasopressin provides direct stimulation of smooth muscle V1 receptors, causing intense peripheral vasoconstriction of skin, skeletal muscle, intestine, and fat with less constriction of coronary and renal vascular beds. In unnaturally high doses, vasopressin also acts as a non-adrenergic peripheral vasoconstrictor. Vasopressin produces no skeletal muscle vasodilation or increased myocardial oxygen demand during CPR because it has no beta-adrenergic activity.

**INDICATIONS:**

Cardiac arrest

**CONTRAINdications:**

None in the arrest setting

**PRECAUTIONS:**

1. Epilepsy
2. Heart failure
3. Asthma
4. Coronary artery disease
5. Pregnancy class (C)

**DOSAGE:**

**Adults:**

- 40 units *once* in place of the first or second epinephrine

**Pediatrics:**

- Not recommended

**ONSET:**

Immediate

**DURATION:**

Variable

**SIDE EFFECTS**

**Possible post-resuscitation:**

- |  |   |
|--|---|
| <ul style="list-style-type: none"><li>• Ischemic chest pain</li><li>• Abdominal distress</li><li>• Nausea and vomiting</li></ul> | <ul style="list-style-type: none"><li>• Sweating</li><li>• Tremors</li><li>• Bronchial constriction</li></ul> |
|--|---|

**INTERACTIONS:**

None significant

**VASOPRESSIN**

# Medication 13-30

Continued

**VASOPRESSIN**

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# Medication 13-31

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Ziprasidone

**REVISED:** 05/2012

**DRUG NAME:** Ziprasidone

**TRADE NAME:** Geodon, Zeldox

**DRUG CLASS:** Anti-psychotic agent

## **MECHANISM OF ACTION:**

Ziprasidone is a benzylisothiazolylpiperazine antipsychotic. The exact mechanism of action is unknown. However, it is known that Ziprasidone functions as an antagonist at the D<sub>2</sub>, 5-HT<sub>2A</sub>, and 5-HT<sub>1D</sub> receptors and as an agonist at the 5-HT<sub>1A</sub> receptor.

Ziprasidone has a high affinity for dopamine, serotonin, and alpha-adrenergic receptors and a moderate affinity for histamine receptors, where it is believed to act as an antagonist. Ziprasidone also displays some inhibition of synaptic reuptake of serotonin and norepinephrine, although the clinical significance of this is unknown.

## **INDICATIONS:**

Acute agitation, anxiety, tension, or hostility

## **CONTRAINDICATIONS:**

1. Recent history of cardiac arrhythmia
2. Recent MI
3. Severe heart failure
4. Dysrhythmias
5. Elderly patients with dementia-related psychosis

## **PRECAUTIONS:**

1. Cardiovascular disease
2. Hypotension
3. Acute renal disease
4. Cerebrovascular disease
5. Patients taking anti-hypertensive medications
6. Hypovolemia
7. Pregnancy (C)

## **DOSAGE:**

### **Adults:**

- 10.0 - 20.0 mg IM. Maximum dose 40 mg / day.
- Add 1.2 ml of sterile water to vial and shake vigorously until the entire drug is dissolved. 20 mg single dose vial in 1.0 ml of reconstituted solution.

### **Pediatrics:**

- Not recommended.

## **ONSET:**

IM: 10 - 30 minutes, with peak effect at 60 minutes

**ZIPRASIDONE**

# Medication 13-31

Continued

## ZIPRASIDONE

### DURATION:

IM: 2 - 5 hours

### SIDE EFFECTS

- |   |  |
|---|--|
| <ul style="list-style-type: none"><li>• Orthostatic hypotension</li><li>• Dizziness</li><li>• Syncope</li></ul> | <ul style="list-style-type: none"><li>• Torsades de Pointe</li><li>• QT prolongation</li></ul> |
|---|--|

### INTERACTIONS:

1. Patients taking Carbamazepine may need higher than normal doses of Ziprasidone to be effective.

# Medication 13-32

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Lidocaine

**REVISED:** 05/2012

## \*\*\*RSI DRUG BOX\*\*\*

**DRUG NAME:** Lidocaine

**TRADE NAME:** Xylocaine

**DRUG CLASS:**

1. Antiarrhythmic
2. Analgesic

**MECHANISM OF ACTION:**

Lidocaine is indicated for patients with suspected head injury to manage increased intracranial pressure. Lidocaine has been shown to blunt the cardiovascular response to the stimulation of the airway. It also decreases the likelihood of tachycardia and hypertension. Lidocaine decreases intracranial and intraocular pressure that can be associated with RSI.

**INDICATIONS:**

RSI in patients with suspected head injury

**CONTRAINdications:**

1. Heart block
2. Severe hypovolemia
3. HF
4. Bradycardia

**PRECAUTIONS:**

1. Patients with known hypersensitivity.
2. Reduce dose by 50% in the elderly
3. Use caution when administering to patients with:
  - Hepatic dysfunction
  - Renal insufficiency
  - History of drug addiction
  - Parkinson's disease
  - Myasthenia gravis

**DOSAGE:**

**Adults and Pediatrics:**

**RSI Pre-medications**

- 1.0 - 2.0 mg / kg IV (max. dose 150 mg), 2 - 5 minutes prior to laryngoscopy. Maximum efficiency is 3 - 5 minutes after dosing.

**ONSET:**

IV: 1 - 3 minutes

LIDOCAINE

# Medication 13-32

Continued

## LIDOCAINE

### DURATION:

2 - 6 hours (dose dependant)

SIDE EFFECTS	
Minor	Major
<ul style="list-style-type: none"><li>• Drowsiness</li><li>• Confusion</li><li>• Nausea &amp; Vomiting</li></ul>	<ul style="list-style-type: none"><li>• Seizures</li><li>• Bradycardia</li><li>• Hypotension</li><li>• Heart blocks</li><li>• Cardiac / respiratory arrest</li></ul>

### INTERACTIONS:

Additive with other CNS depressants

### PEARLS:

1. Illegal use has been noted with cocaine. Cocaine numbs the gums and lidocaine potentiates this numbing.
2. Lidocaine is used in digitalis overdoses.
3. The mechanism of action of lidocaine when used during AMI is not well documented and according to recent studies, is no longer recommended as prophylaxis during stabilizing and resuscitation efforts.
4. Lidocaine has also been efficient in refractory cases of status epilepticus.
5. ODEMSEA Drug Box: **Lidocaine is used as a premedication in the RSI box, and is not available in the ODEMSEA drug box.**

# Medication 13-33

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Etomidate

**REVISED:** 05/2012

## \*\*\*RSI DRUG BOX\*\*\*

**DRUG NAME:** Etomidate

**TRADE NAME:** Amidate

**DRUG CLASS:**

1. Sedative / amnestic
2. Amnesic

**MECHANISM OF ACTION:**

Etomidate is an anxiolytic sedative and hypnotic agent; with an onset of action of 30 seconds, and duration of action from five (5) to (10) minutes. It is well suited as an induction agent for RSI because its pharmacokinetic profile closely matches that of Succinylcholine and it has minimal cardiovascular side effects. The transient suppression of cortisol synthesis is of no clinical significance with a single dose.

**INDICATIONS:**

Sedatives must be administered prior to administration of a neuromuscular blocking agent to eliminate the sensation of paralysis.

**CONTRAINDICATIONS:**

1. Adrenal insufficiency
2. Known hypersensitivity
3. Patients with evidence of septic shock

**PRECAUTIONS:**

Use caution when administering to patients with:

- Adrenal insufficiency
- Patient's already on narcotic pain management or benzodiazepines

**DOSAGE:**

**Adults and Pediatrics:**

**0.3 mg / kg**

- Consider dose reduction in the elderly because of age related differences in kinetic parameters and increased risk for cardiac depression in older hypertensive patients.

**ONSET:**

IV: 30 seconds

**DURATION:**

5 - 10 minutes

ETOMIDATE

# Medication 13-33

Continued

## ETomidate

### SIDE EFFECTS

- Clinically significant adrenal insufficiency has been noted with prolonged infusions.

### INTERACTIONS:

Potentiated effects with concurrent administrations of opiates and benzodiazepines

### PEARLS:

1. Etomidate has anesthetic and amnestic properties, but has no analgesic properties.
2. Etomidate has a rapid onset of action and a low cardiovascular risk profile, and therefore is less likely to cause a significant drop in blood pressure than other induction agents.
3. Etomidate is unlikely to cause hypotension and so is ideal to use as an induction agent with critically ill patients, such as patients with sepsis, without negative effects from transient worsening of low blood pressure
4. At the typical dose, anesthesia is induced for about 5 - 10 minutes even though the half-life of drug metabolism is approximately 75 minutes. This is because Etomidate is redistributed from the plasma to other tissues.
5. ODEMSA Drug box: **Etomidate is used as a sedative in the RSI box, and is not available in the ODEMSA drug box.**

# Medication 13-34

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Succinylcholine

**REVISED:** 05/2012

## \*\*\*RSI DRUG BOX\*\*\*

**DRUG NAME:** Succinylcholine

**TRADE NAME:** Anectine

**DRUG CLASS:** Depolarizing neuromuscular blockade

### **MECHANISM OF ACTION:**

Succinylcholine is an ultra-short acting, depolarizing-type, skeletal muscle relaxant. It is well suited for RSI but does have some potentially life-threatening side effects in certain patient populations. Succinylcholine has an onset of action of 45 seconds with an initial dose. Its duration of action is from five (5) to ten (10) minutes. In normal skeletal muscle, following depolarization, acetylcholine dissociates from the receptor and is rapidly hydrolyzed by acetylcholinesterase and the muscle cell is ready for the next signal. Succinylcholine has a longer duration of effect than acetylcholine and is not hydrolyzed by acetylcholinesterase. By maintaining the membrane potential above threshold, it does not allow the muscle cell to repolarize. When acetylcholine binds to an already depolarized receptor it cannot cause further depolarization. Calcium is removed from the muscle cell cytoplasm independent of repolarization (depolarization signaling and muscle contraction are independent processes). As the calcium is taken up by the sarcoplasmic reticulum, the muscle relaxes. This explains muscle flaccidity rather than Tetany following fasciculation.

### **INDICATIONS:**

Succinylcholine is a paralytic agent used to facilitate rapid sequence intubation in patients meeting RSI criteria.

### **CONTRAINDICATIONS:**

1. Muscular dystrophy
2. Myopathies
3. Hyperkalemia
4. Stroke
5. Spinal cord injury
6. Prolonged immobilization
7. Denervation syndromes

### **PRECAUTIONS:**

Patients with recent history of burns or crush injury due to elevated potassium levels

### **DOSAGE:**

#### **Adults:**

- 1.5 mg / kg may repeat in two to three minutes to achieve paralysis

#### **Pediatrics:**

- 2.0 mg / kg infants
- 3.0 mg / kg infants

**SUCCINYLCHOLINE**

# Medication 13-34

Continued

## SUCCINYLCHOLINE

### ONSET:

IV: 30 seconds

### DURATION:

5 - 10 minutes

SIDE EFFECTS	
<ul style="list-style-type: none"><li>• Fasciculation's</li><li>• Increased IOP (intraocular pressure)</li><li>• Bradycardia</li><li>• Malignant hyperthermia</li></ul>	<ul style="list-style-type: none"><li>• Hyperkalemia</li><li>• Increased ICP (intracranial pressure)</li><li>• Cardiac dysrhythmias</li><li>• Rhabdomyolysis</li></ul>

### INTERACTIONS:

Several penicillin based antibiotics are known to have adverse reactions with Succinylcholine. In general, the respiratory depression effect is potentiated.

### PEARLS:

1. The side effect of hyperkalemia happens because the acetylcholine receptor is propped open, allowing continued flow of potassium ions into the extracellular fluid.
2. Succinylcholine does not produce unconsciousness or anesthesia, and its effects may cause considerable psychological distress while simultaneously making it impossible for a patient to communicate.
3. Malignant hyperthermia can result from Succinylcholine administration where a drastic and uncontrolled increase in skeletal muscle oxidative metabolism occurs. This overwhelms the body's capacity to supply oxygen, remove carbon dioxide, and regulate body temperature, eventually leading to circulatory collapse and death if not treated quickly.
4. ODEMSEA Drug box: **Succinylcholine is a neuromuscular paralytic in the RSI box, and is not available in the ODEMSEA drug box.**

# Medication 13-35

**SECTION:** Medication Reference

**PROTOCOL TITLE:** Vecuronium Bromide

**REVISED:** 05/2012

## \*\*\*RSI DRUG BOX\*\*\*

**DRUG NAME:** Vecuronium Bromide

**TRADE NAME:** Norcuron

**DRUG CLASS:** Non-depolarizing neuromuscular blockade

### **MECHANISM OF ACTION:**

Vecuronium acts by competing for cholinergic receptors at the motor end-plate. The antagonism to acetylcholine is inhibited and neuromuscular block is reversed by acetylcholinesterase inhibitors. Vecuronium is about 1/3 more potent than pancuronium however; the duration of neuromuscular blockade produced by Vecuronium bromide is shorter than that of pancuronium at initially equipotent doses; the time to onset of paralysis decreases and the duration of maximum effect increases with increasing Vecuronium bromide doses.

### **INDICATIONS:**

Vecuronium is a paralytic agent used to facilitate rapid sequence intubation in patients meeting RSI criteria

### **CONTRAINDICATIONS:**

Patient's with known hypersensitivity

### **PRECAUTIONS:**

1. Patients who have had Succinylcholine administered prior to Vecuronium will need less medication to produce the full paralytic effect or Vecuronium
2. Use caution when administering to patients with:
  - Parkinson's disease
  - Hepatic disease
  - Myasthenia gravis

### **DOSAGE:**

#### **Adults:**

*Previously sedated with Succinylcholine may consider:*

- 0.04 - 0.06 mg / kg
- 0.1 mg / kg IV Push (up to a maximum initial dose of 10mg). Then 1/2 initial dose IV Push may be repeated 20 minutes after initial dose as indicated.

VECURONIUM BROMIDE

# Medication 13-35

Continued

## VECURONIUM BROMIDE

### ONSET:

IV: 30 seconds – 60 seconds

### DURATION:

25 - 40 minutes

### SIDE EFFECTS

• Fasciculation's	• Hyperkalemia
• Increased IOP (intraocular pressure)	• Increased ICP (intracranial pressure)
• Bradycardia	• Cardiac dysrhythmias
• Malignant hyperthermia	• Rhabdomyolysis

### INTERACTIONS:

Magnesium sulfate may enhance neuromuscular blockade

### PEARLS:

1. Vecuronium has no known effect on consciousness, the pain threshold.
2. In late pregnancy, elimination half-life may be shortened to approximately 35 - 40 minutes.
3. Unlike other nondepolarizing skeletal muscle relaxants, Vecuronium has no clinically significant effects on hemodynamic parameters.
4. Severe anaphylactic reactions to neuromuscular blocking agents, including Vecuronium bromide, have been reported.
5. Patients with cirrhosis have revealed prolonged recovery time in keeping with the role the liver plays in Vecuronium metabolism and excretion.
6. ODEMSA Drug box: **Vecuronium bromide is a neuromuscular paralytic in the RSI box, and is not available in the ODEMSA drug box.**

# Section 14

SECTION: Appendices

REVISED: 05/2012

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5.	<b>Anatomy of the Hand</b>	Appendix 14 - 5
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## Section 14

# APPENDICES

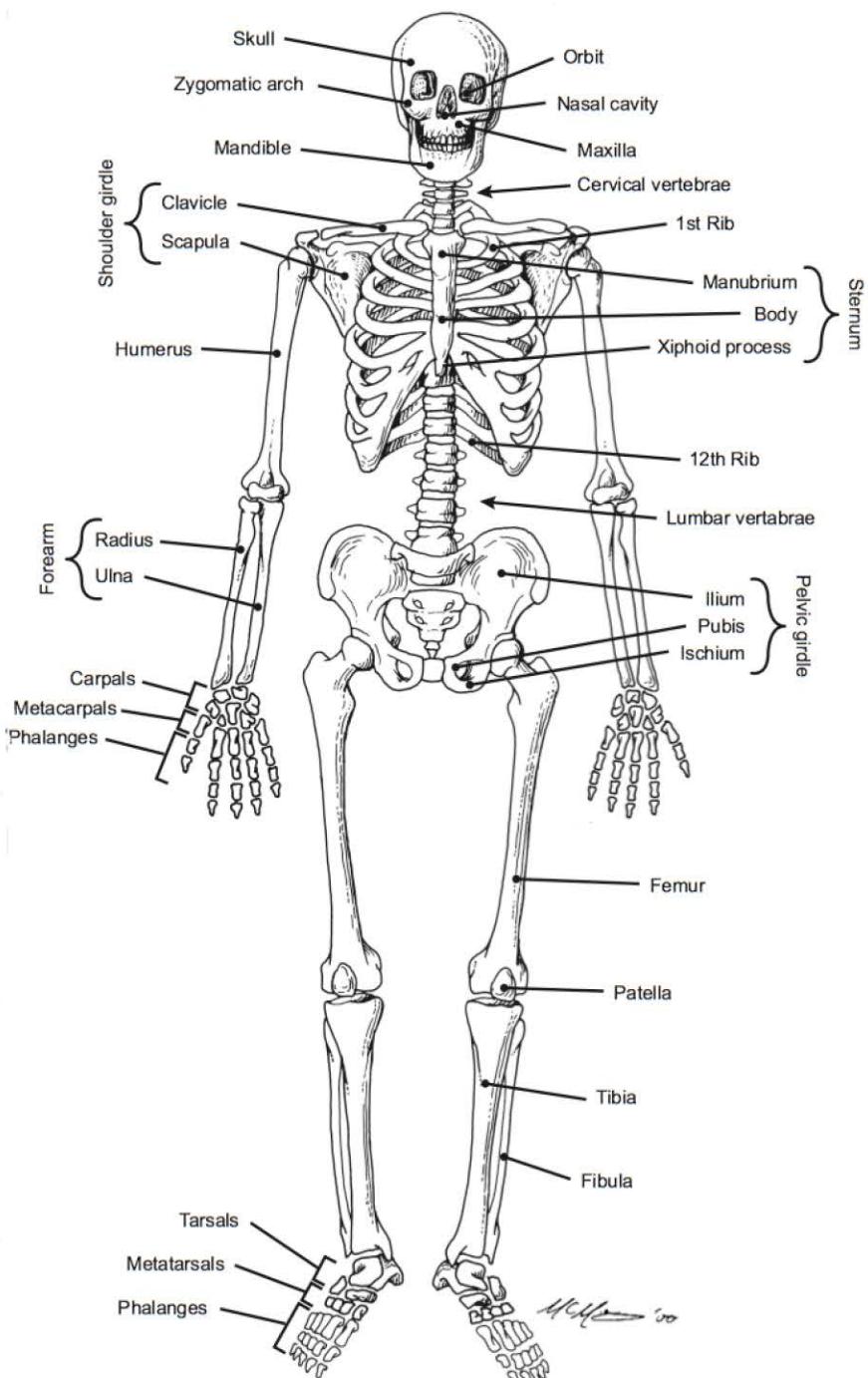
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# Appendix 14-1

**SECTION:** Appendix

**PROTOCOL TITLE:** Skeleton – Anterior View

**REVISED:** 05/2012



Skeletal System, Anterior View

Photo courtesy of anatomicalprints.com

**SKELETON ANTERIOR VIEW**

# Appendix 14-1

Continued

**SKELETON ANTERIOR VIEW**

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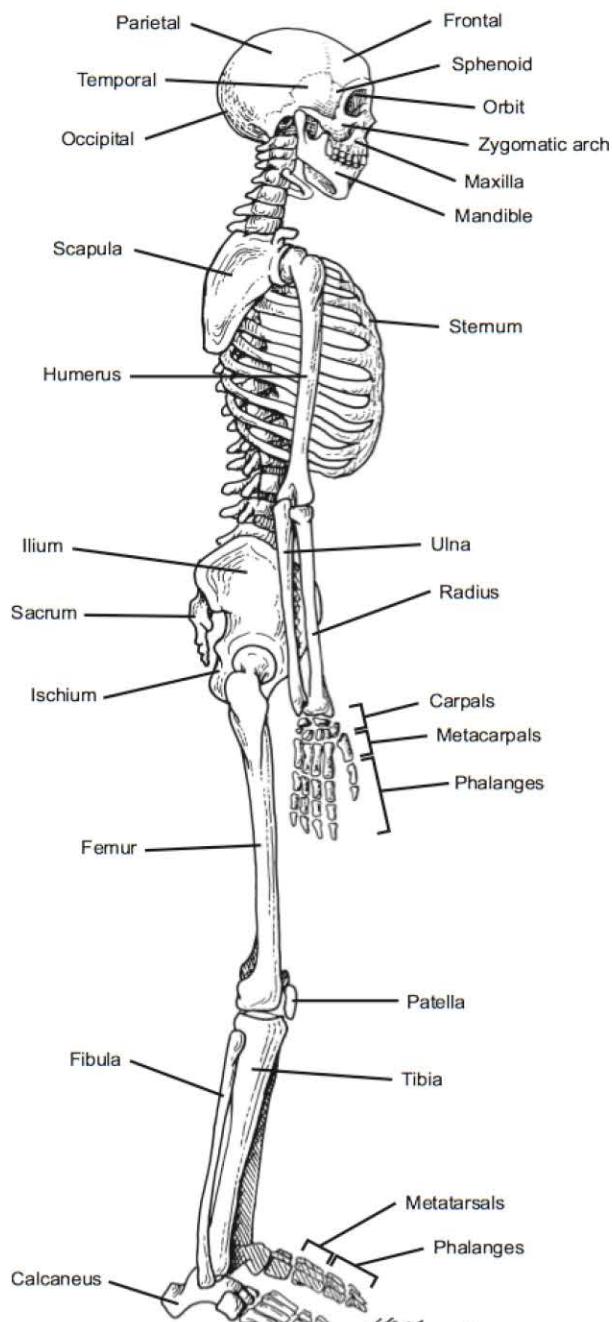
# Appendix 14-2

**SECTION:** Appendix

**PROTOCOL TITLE:** Skeleton – Lateral View

**REVISED:** 05/2012

## SKELETON LATERAL VIEW



Skeletal System, Lateral View

# Appendix 14-2

Continued

**SKELETON LATERAL VIEW**

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# Appendix 14-3

## VERTEBRAL COLUMN

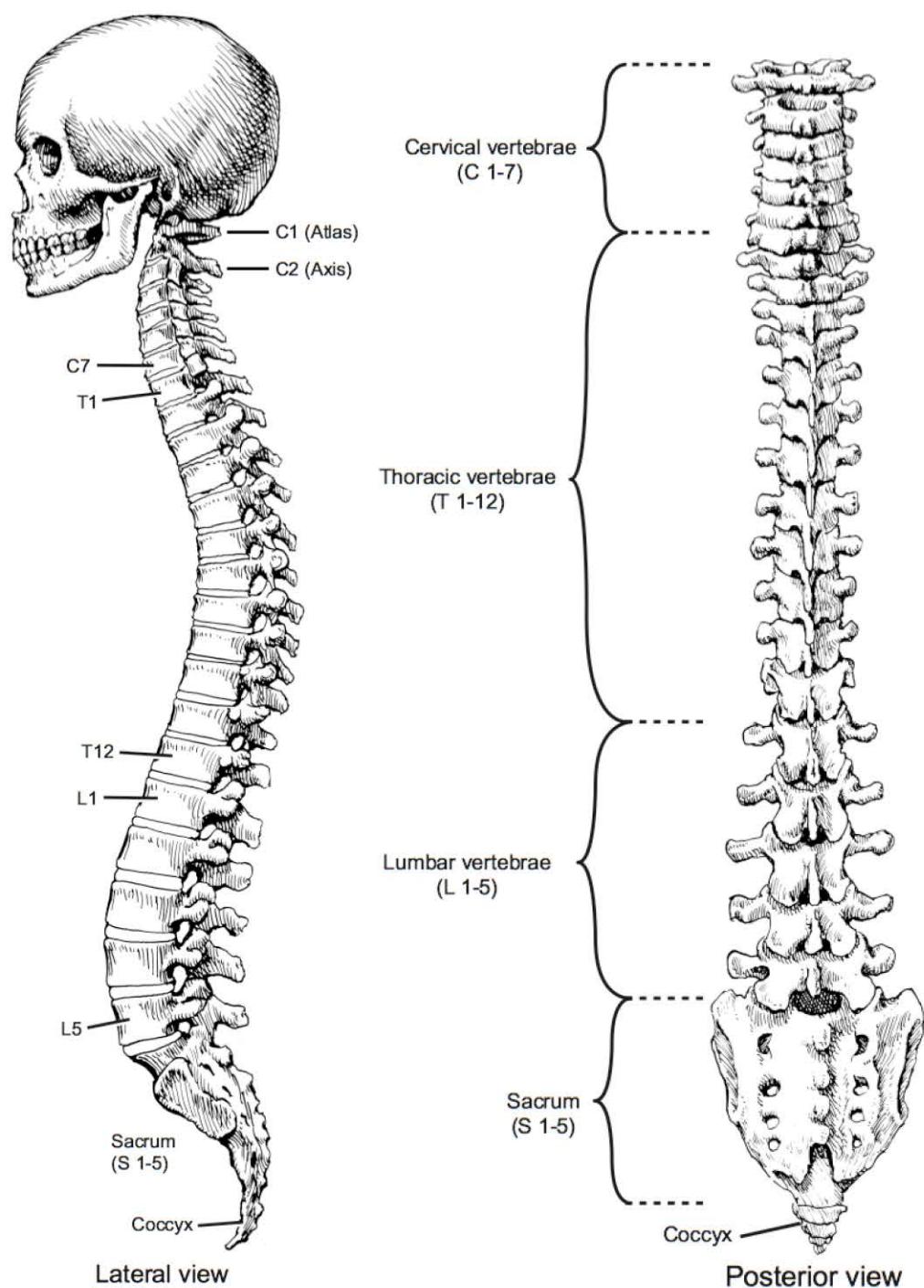


Photo courtesy of anatomicalprints.com

# Appendix 14-3

Continued

## VERTEBRAL COLUMN

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# Appendix

## 14-4

**SECTION:** Appendix

**PROTOCOL TITLE:** Skull Anatomy

**REVISED:** 05/2012

# SKULL ANATOMY

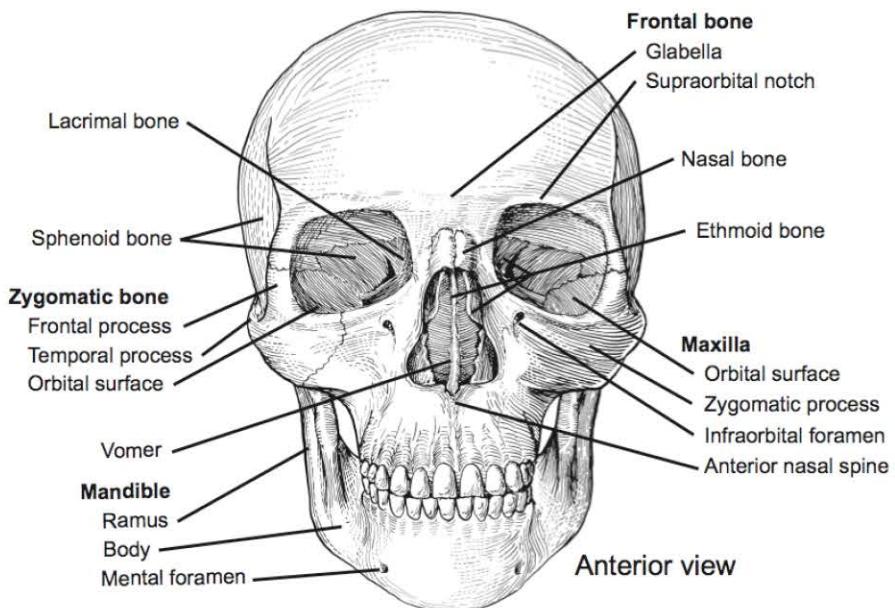
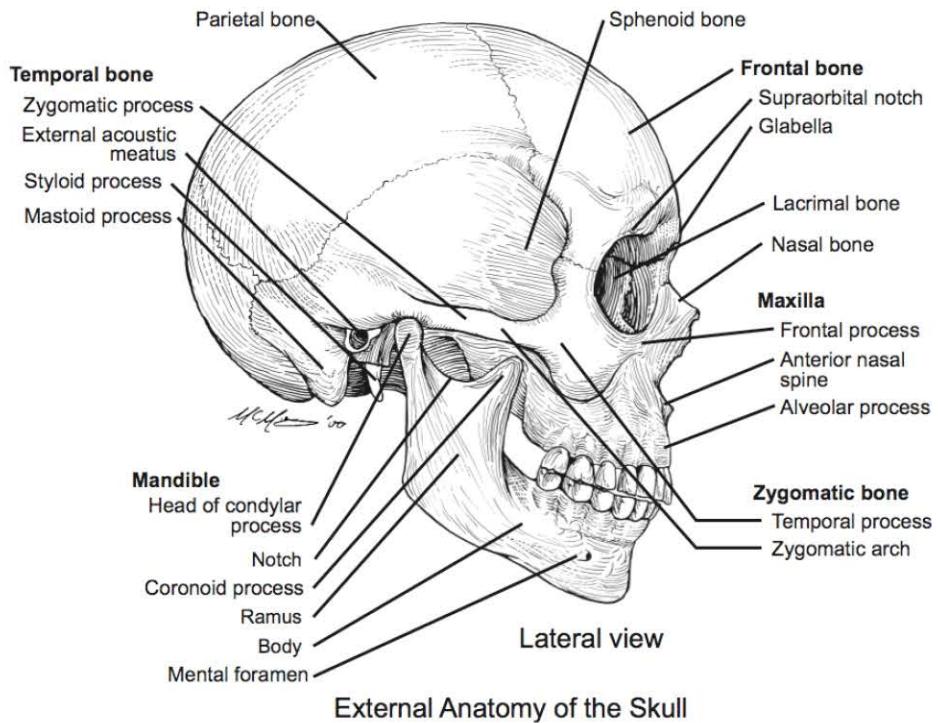


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## Appendix

# 14-4

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# SKULL ANATOMY

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# Appendix 14-5

SECTION: Appendix

PROTOCOL TITLE: Hand Anatomy

REVISED: 05/2012

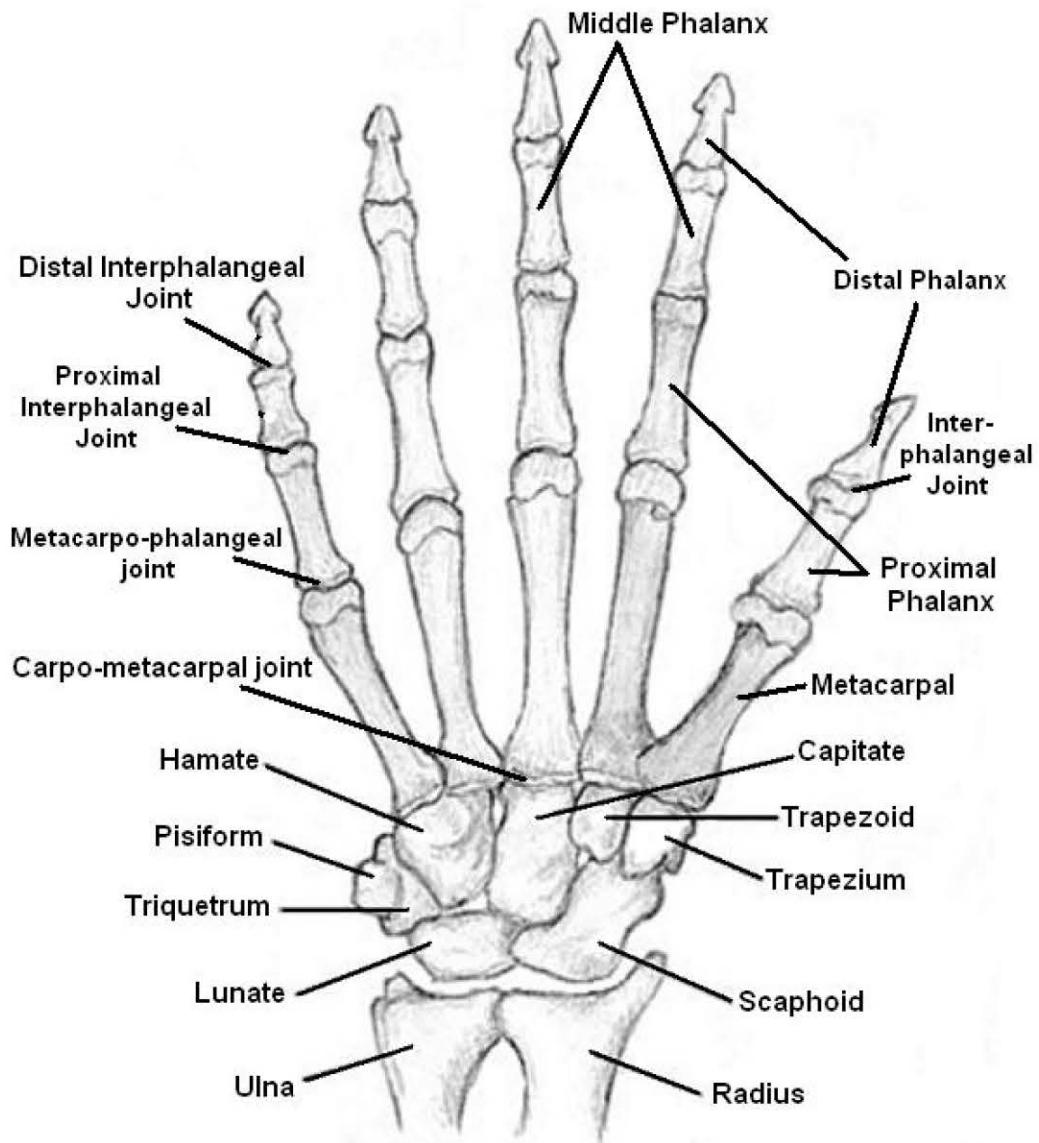


Photo courtesy of anatomicalprints.com

HAND ANATOMY

## Appendix

# 14-5

Continued

# HAND ANATOMY

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# Appendix 14-6

SECTION: Appendix

PROTOCOL TITLE: Foot Anatomy

REVISED: 05/2012

## FOOT ANATOMY

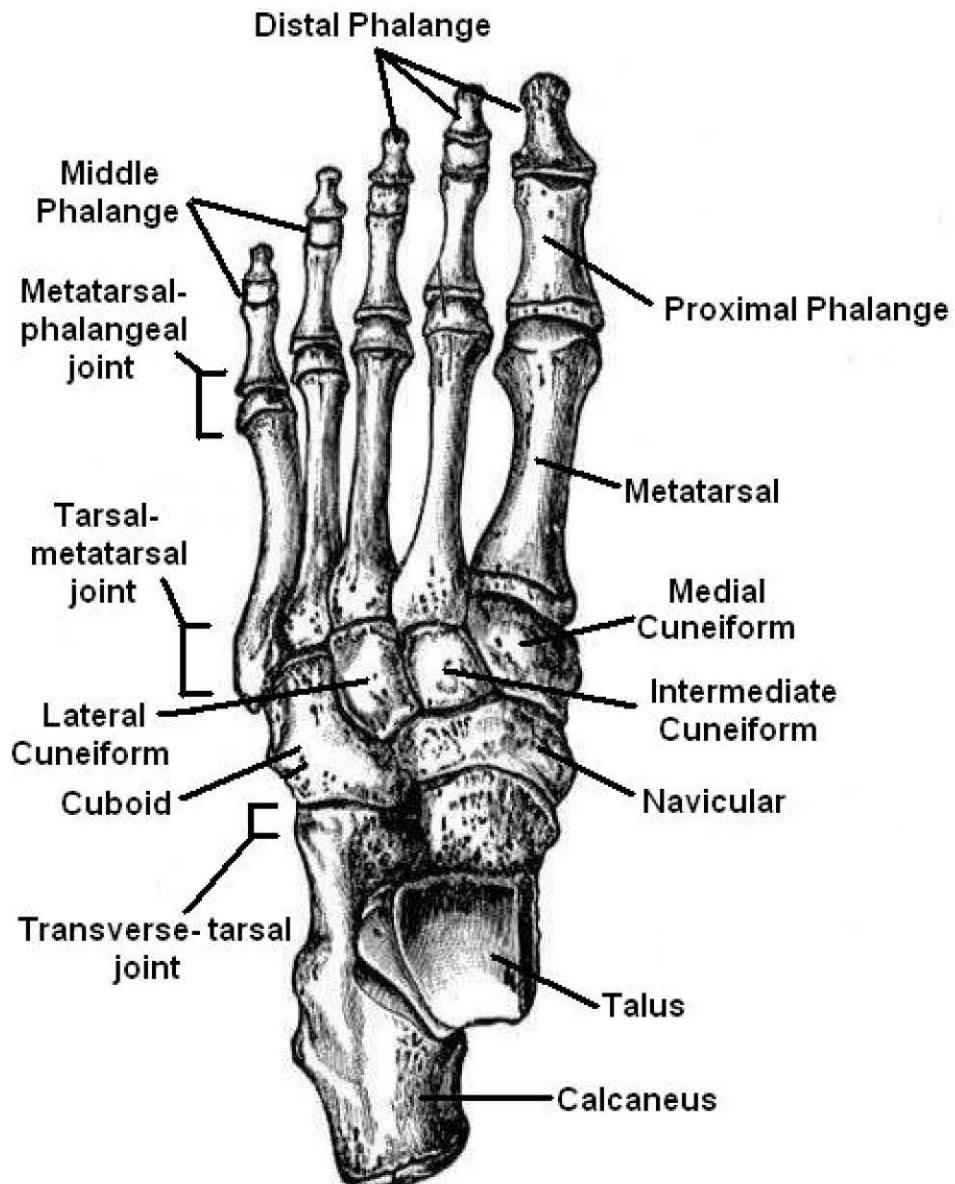


Photo courtesy of anatomicalprints.com

# Appendix 14-6

Continued

## FOOT ANATOMY

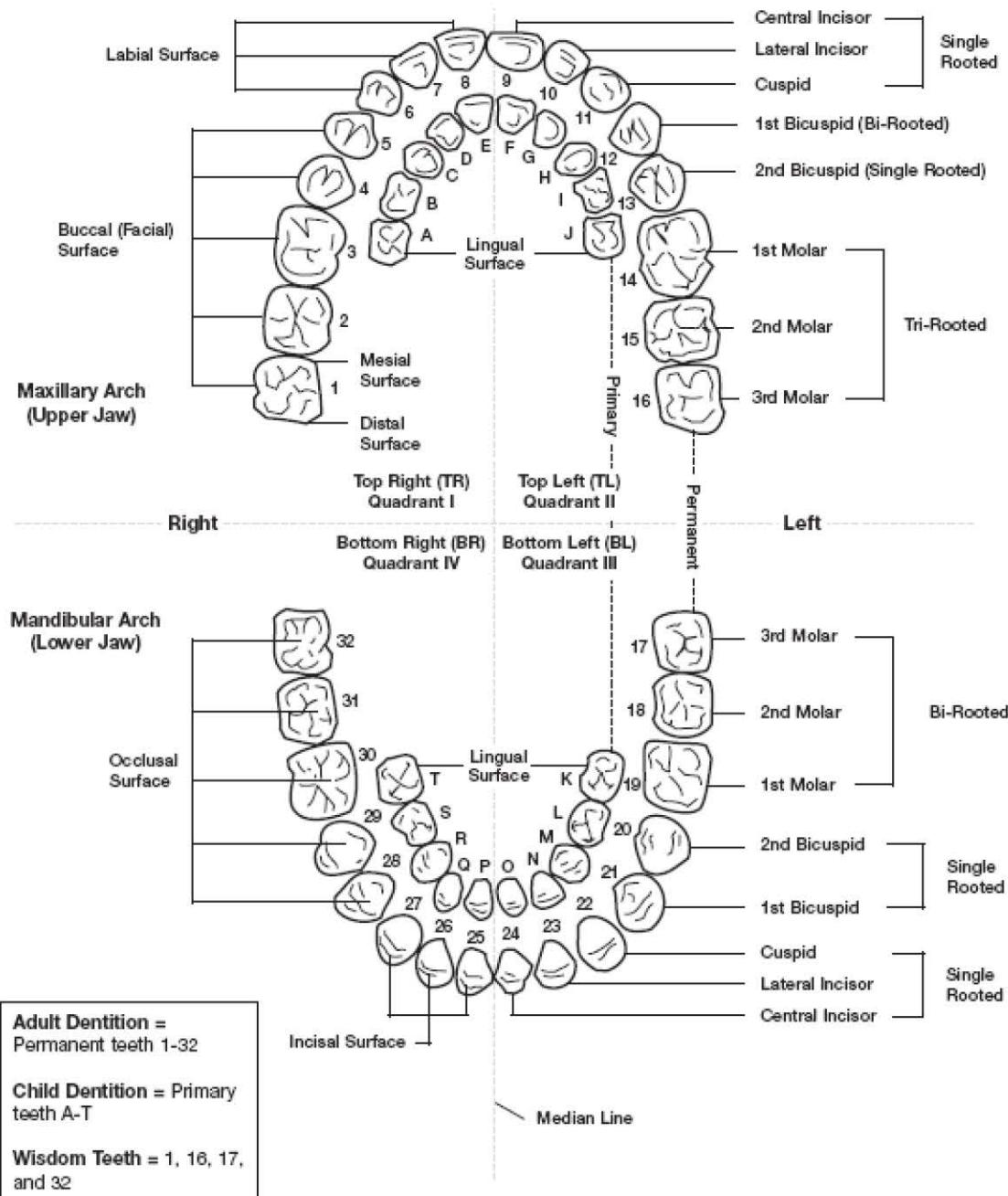
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# Appendix 14-7

**SECTION:** Appendix

**PROTOCOL TITLE:** Tooth Chart

**REVISED:** 05/2012



**TOOTH CHART**

## Appendix

# 14-7

Continued

## TOOTH CHART

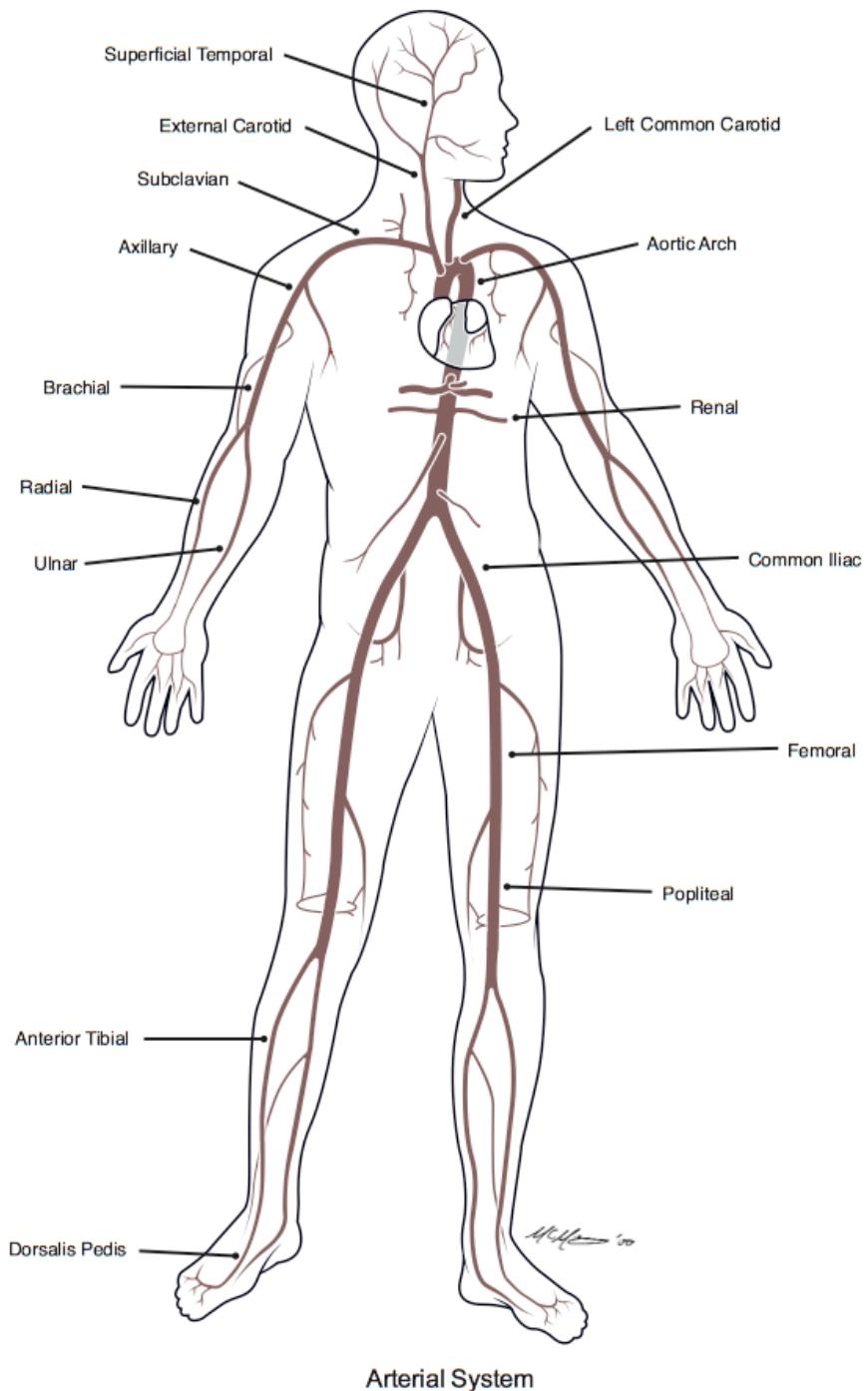
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# Appendix 14-8

**SECTION:** Appendix

**PROTOCOL TITLE:** Arterial System

**REVISED:** 05/2012



## ARTERIAL SYSTEM

# Appendix 14-8

Continued

## ARTERIAL SYSTEM

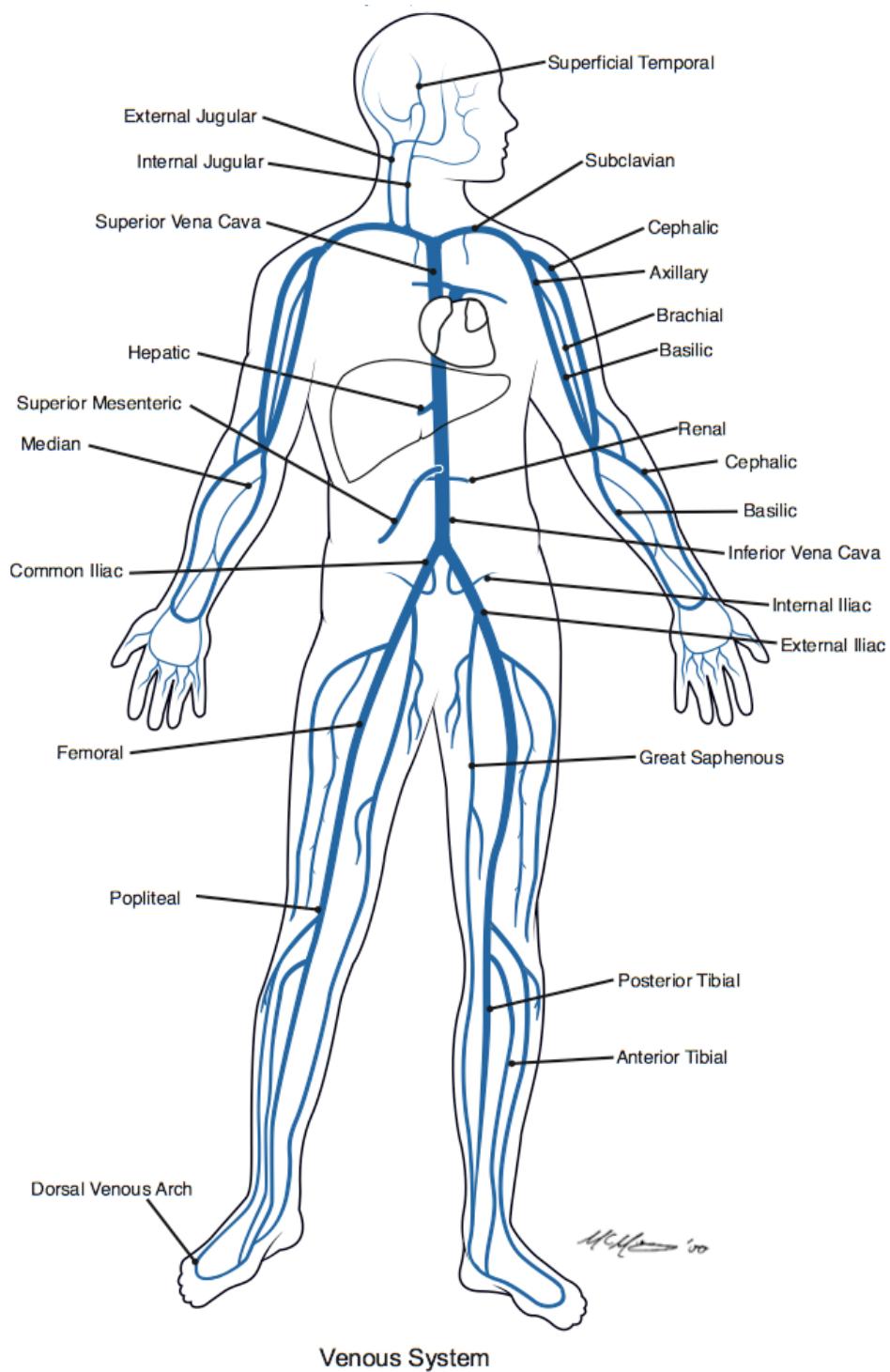
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# Appendix 14-9

**SECTION:** Appendix

**PROTOCOL TITLE:** Venous System

**REVISED:** 05/2012



**VENOUS SYSTEM**

# Appendix 14-9

Continued

## VENOUS SYSTEM

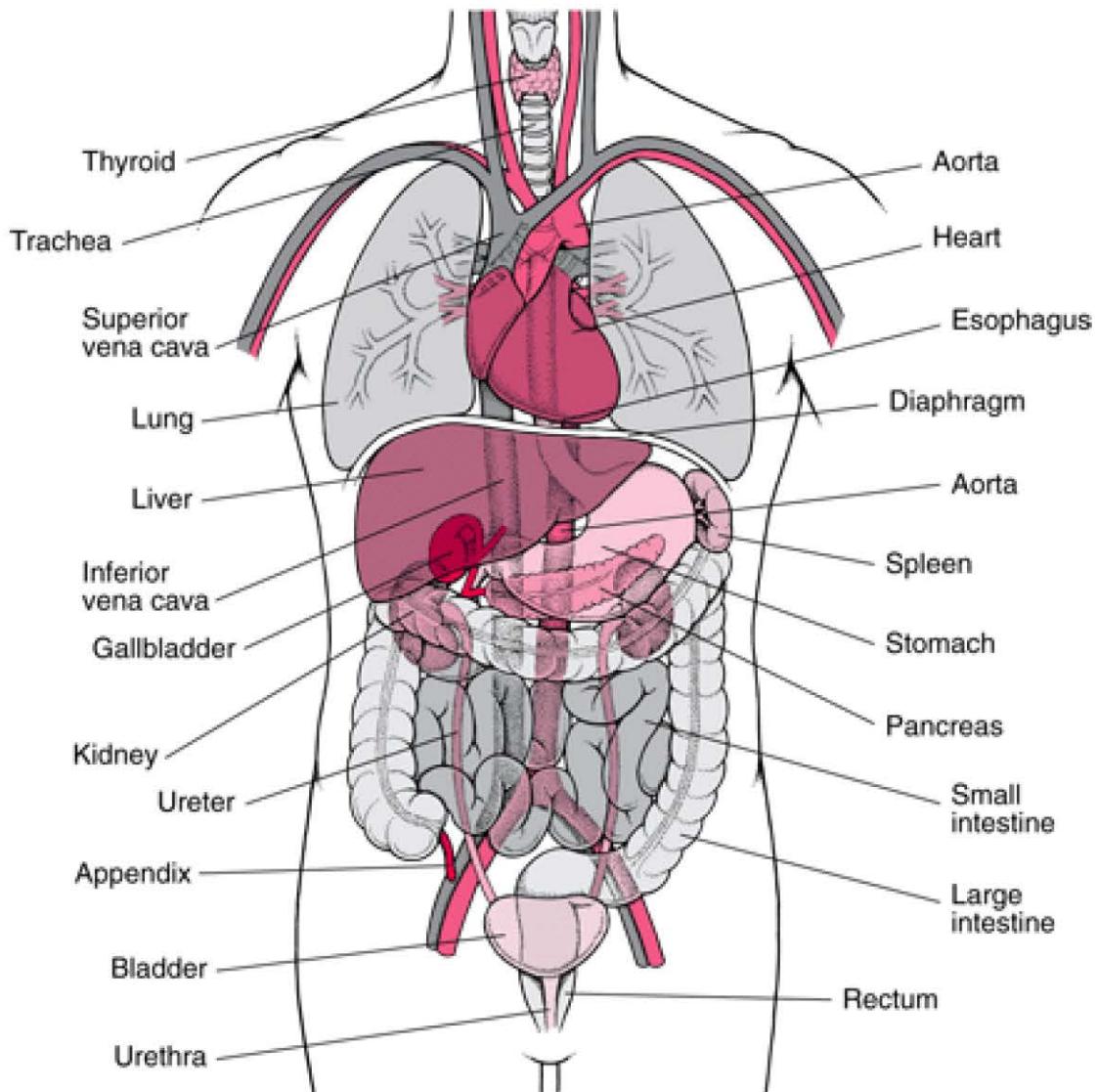
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# Appendix 14-10

**SECTION:** Appendix

**PROTOCOL TITLE:** Thoracic and Abdominal Organs

**REVISED:** 05/2012



## THORACIC AND ABDOMINAL ORGANS

# Appendix 14-10

Continued

## THORACIC AND ABDOMINAL ORGANS

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# Appendix 14-11

**SECTION:** Appendix

**PROTOCOL TITLE:** Anatomy of the Heart

**REVISED:** 05/2012

## Interior Anatomy of the Heart

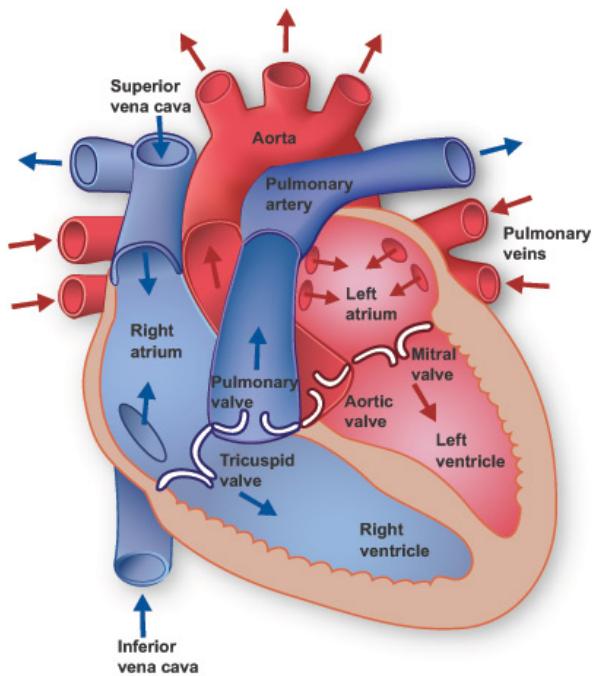


Photo Courtesy of: [texasheartinstitute.org](http://texasheartinstitute.org)

## Coronary Arteries of the Heart

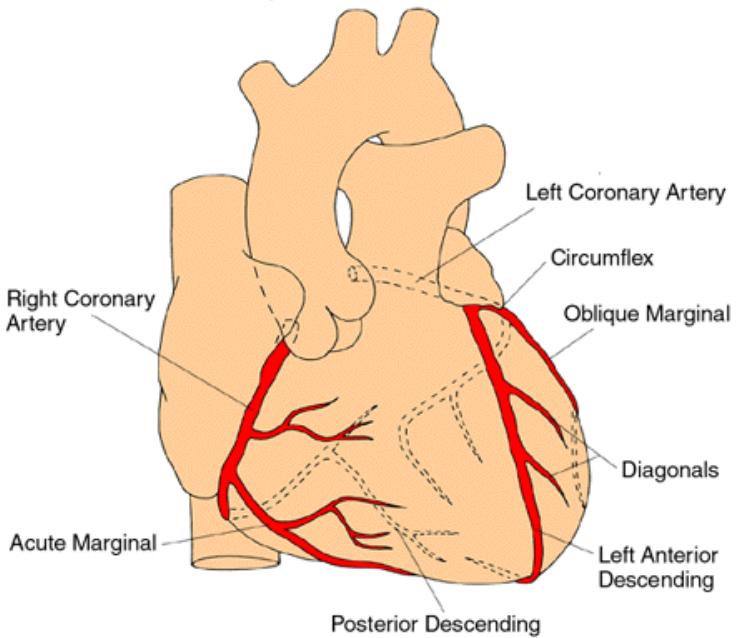


Photo Courtesy of [bigappleheartsurgery.com](http://bigappleheartsurgery.com)

HEART

# Appendix 14-11

Continued

HEART

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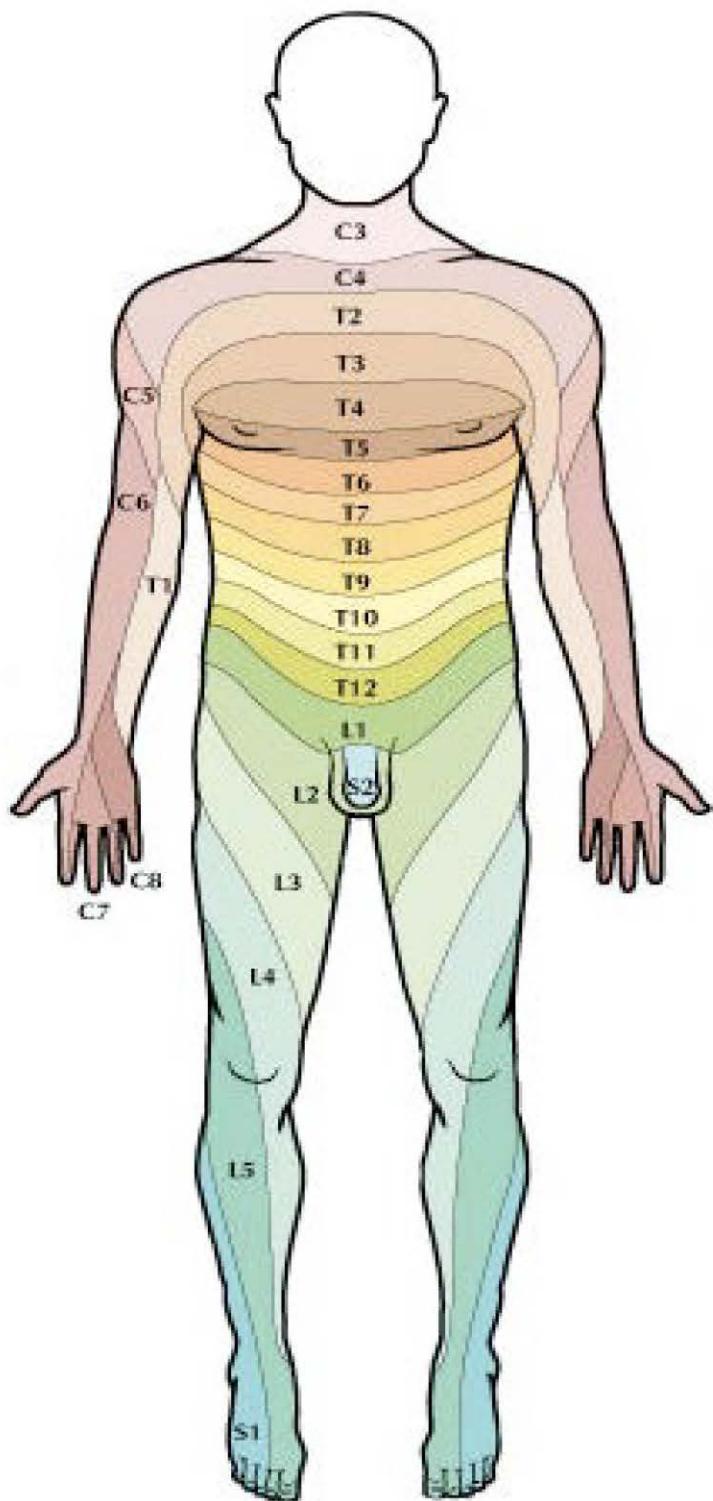
# Appendix 14-12

**SECTION:** Appendices

**PROTOCOL TITLE:** Dermatomes Anterior

**REVISED:** 05/2012

## DERMATOMES ANTERIOR



# Appendix 14-12

Continued

## DERMATOMES ANTERIOR

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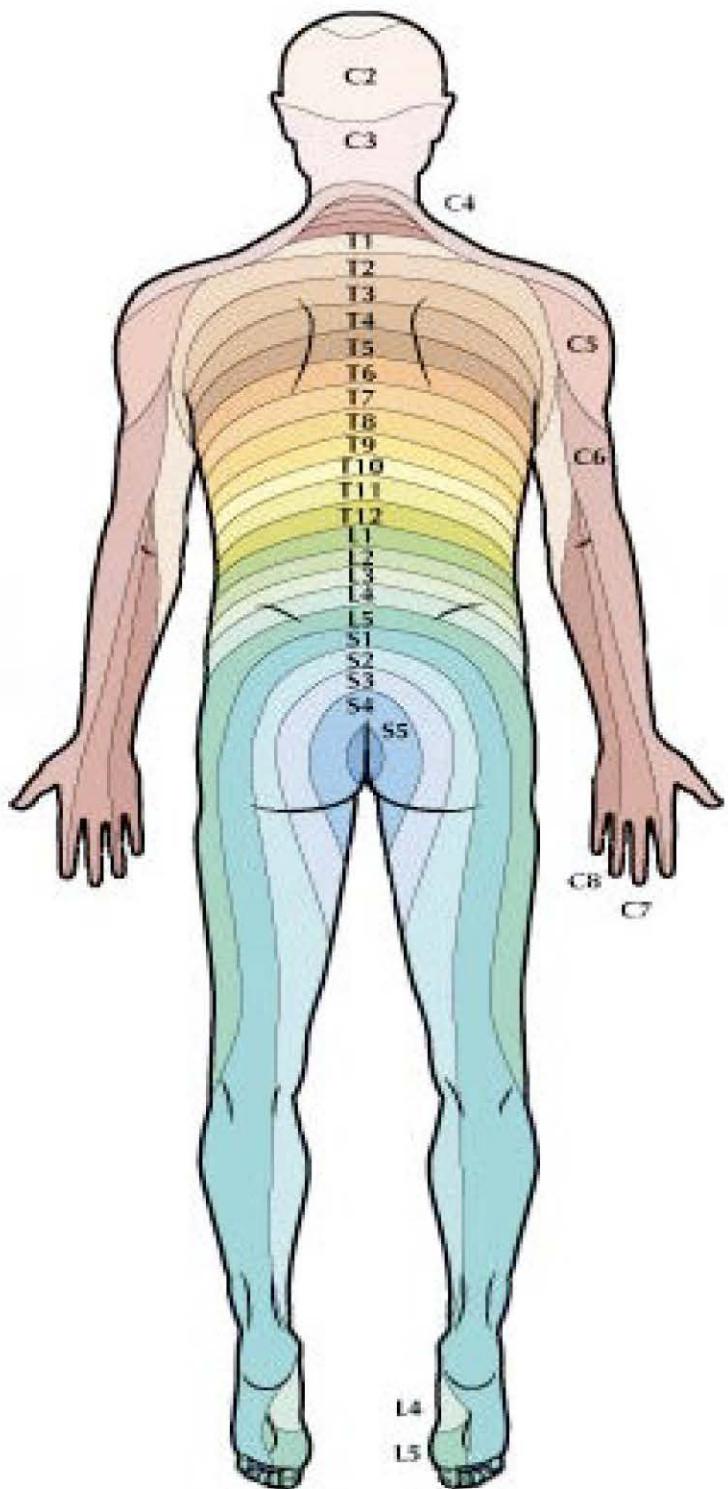
# Appendix 14-13

**SECTION:** Appendices

**PROTOCOL TITLE:** Dermatomes Posterior

**REVISED:** 05/2012

## DERMATOMES POSTERIOR



# Appendix 14-13

Continued

## DERMATOMES POSTERIOR

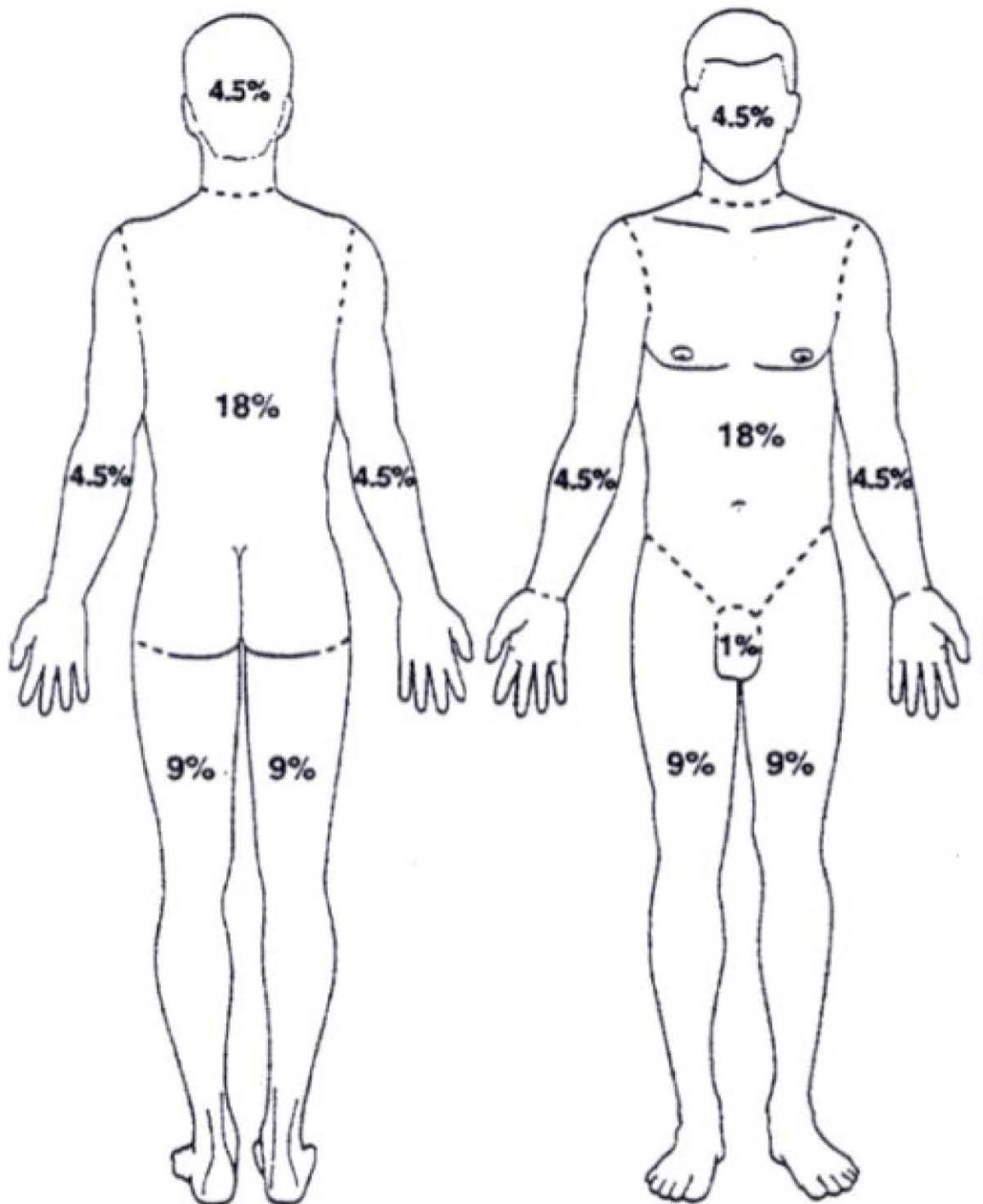
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# Appendix 14-14

**SECTION:** Appendices

**PROTOCOL TITLE:** Adult Burn Chart

**REVISED:** 05/2012



## ADULT BURN CHART

# Appendix 14-14

Continued

## ADULT BURN CHART

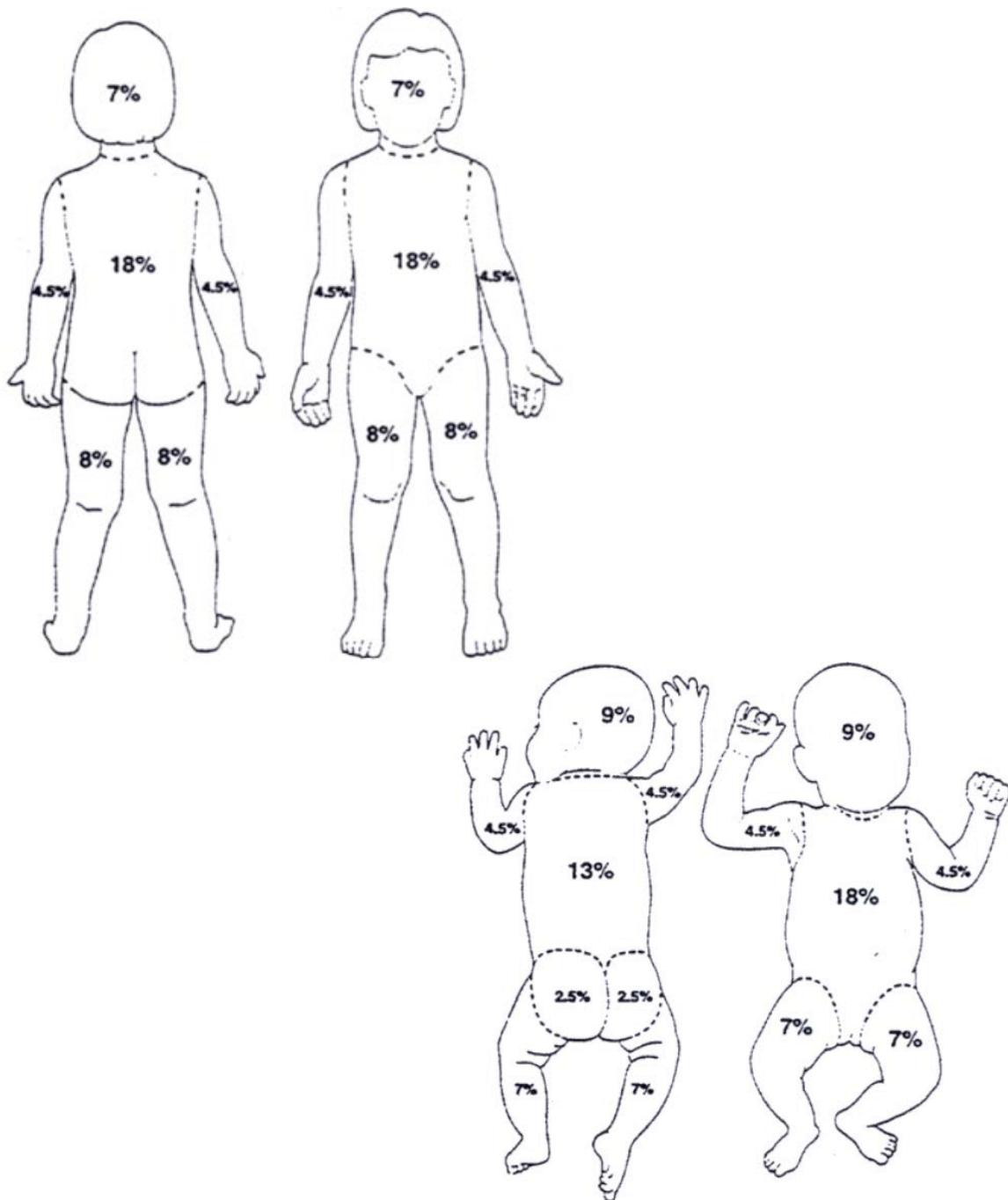
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# Appendix 14-15

**SECTION:** Appendices

**PROTOCOL TITLE:** Pediatric Burn Chart

**REVISED:** 05/2012



Pictures courtesy of: [my.firefighternation.com](http://my.firefighternation.com)

## PEDIATRIC BURN CHART

# Appendix 14-15

Continued

## PEDIATRIC BURN CHART

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