VV. TRAUMA PROTOCOL: BURNS

1. Initiate General Patient Care.
2. Presentation
   a) The primary objectives in burn care by EMS providers are to stop the burning process, establish IV access, avoid hypothermia, and transport patients quickly and safely to a burn center. While patients with large burns (greater than 20%), facial burns, and/or significant smoke inhalation often require endotracheal intubation and mechanical ventilation during their resuscitation and care, airway compromise in the first few hours following a burn is uncommon.
      (1) In adults, prehospital tracheal intubation following acute burns is generally unnecessary unless signs of respiratory failure are present (symptomatic airway obstruction, shock, altered mental status, hypoxemia while receiving supplemental oxygen, or dyspnea, etc.).
      (2) Pediatric airways are smaller than adult airways and require frequent and thorough assessment for signs of respiratory distress. Intubate if necessary.
   b) Burns are the body's response to injuries to the skin, muscles, bone, nerves, and blood vessels caused by thermal, chemical, electrical, radiation, or light source. Patients may exhibit any of the following: reddening of the skin, deep and intense pain, blisters, mottled appearance, and/or charred black or brown areas with severe or no pain.
   c) Indications for Referral to a Burn Center
      (1) All third degree burns (full thickness)
      (2) Second degree burns (partial thickness) greater than 10% total body surface area
      (3) Burns of the face, hands, feet, major joints, genitalia, or perineum
      (4) Electrical burns, including lightning or contact with high voltage (greater than 120 volts)
      (5) Suspected inhalation injury of toxic smoke (Monitor the patients with suspected inhalation injury for delayed airway obstruction, respiratory distress, or oxygen desaturation as the patient may need emergent airway management.)
      (6) Circumferential burns involving the extremities or torso
      (7) Chemical burns should be transported to the closest appropriate hospital for decontamination prior to referral to a burn center

PATIENTS WITH BURNS AND TRAUMA SHOULD BE REFERRED TO THE NEAREST APPROPRIATE TRAUMA CENTER FOR INITIAL CARE.

CHILDREN WHO MEET BURN INCLUSIVE CRITERIA WHO HAVE NOT REACHED THEIR 15TH BIRTHDAY SHOULD BE TRANSPORTED TO A PEDIATRIC BURN CENTER.

IF PATIENT HAS EXPOSURE TO CARBON MONOXIDE/SMOKE INHALATION, REFER TO CARBON MONOXIDE/SMOKE INHALATION PROTOCOL.

3. Treatment
   a) Extract the patient from burning vehicles or buildings if safe to do so and move patient to a place of relative safety.

VV. TRAUMA PROTOCOL: BURNS (Continued)

b) Do what is necessary to stop the burning process. If water is used to extinguish the fire, remove wet clothing and dry the patient to prevent hypothermia.
c) Administer oxygen in as high a concentration of oxygen as possible *(note: pulse oximetry is not reliable in the presence of carbon monoxide or cyanide exposure)*.
d) Determine percent of body surface area (BSA) burned and depth.
e) Treat associated trauma.
f) For burns greater than 10%, follow Hypothermia Protocol as well.
g) Remove all rings, bracelets, and other jewelry.
h) Cover wounds appropriately (with a clean sheet or Mylar blanket—sterile dressings no longer recommended).
i) For chemical burns, brush off dry chemical, remove clothing, flush with water.

DO NOT GIVE ANYTHING BY MOUTH.

DO NOT PLACE ICE OR ICE PACKS ON ANY PATIENT WITH BURNS GREATER THAN 5% TOTAL BODY SURFACE AREA.

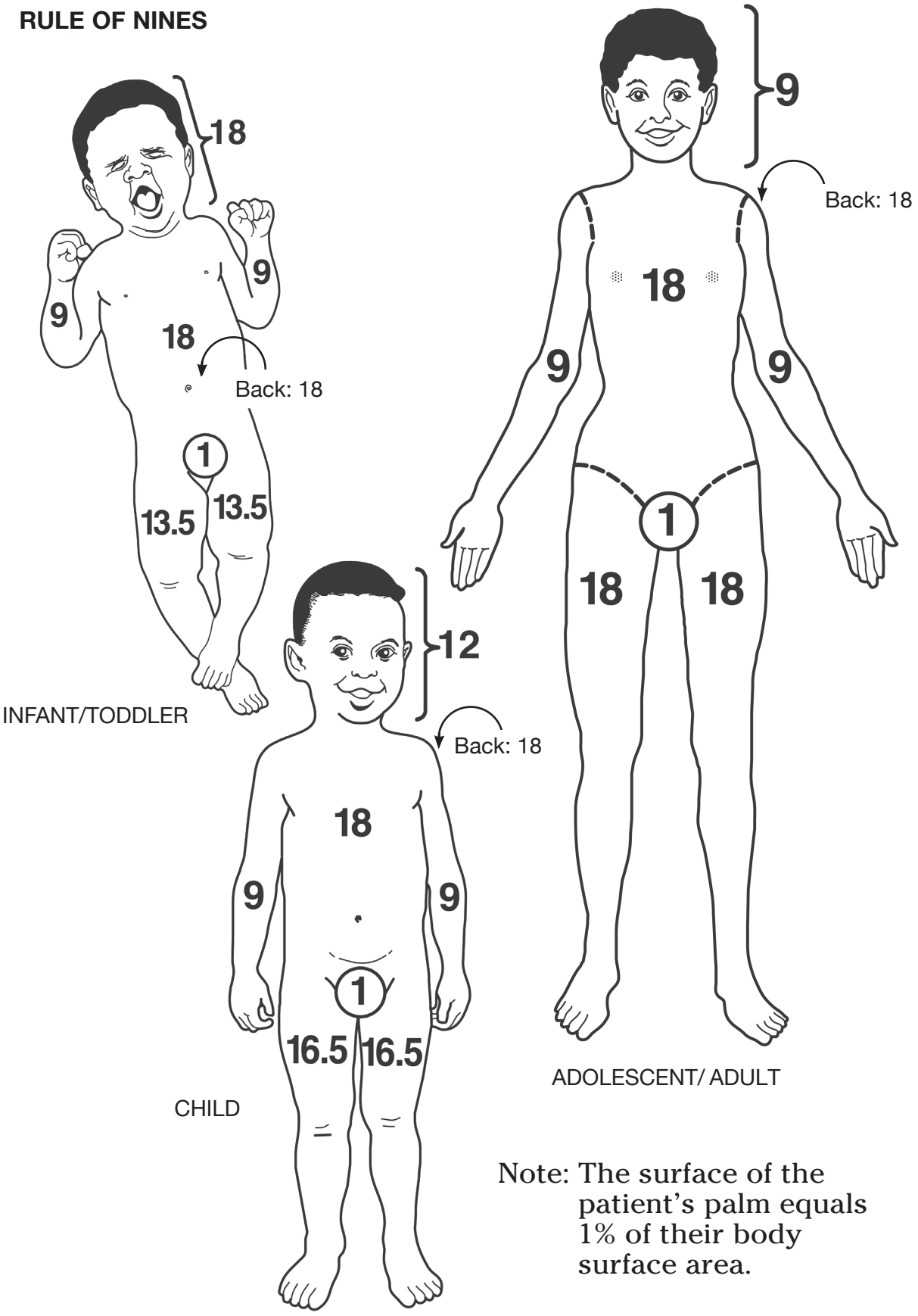
CONSIDER UTILIZING AEROMEDICAL RESOURCE IF PATIENT IS MORE THAN 30 MINUTES FROM A BURN CENTER/HYPERBARIC MEDICINE SPECIALTY CENTER BY GROUND.

j) Establish IV access with LR, if appropriate.
   (1) 10 mL/kg bolus.
   (2) For shock patients, administer a fluid bolus of 20 mL/kg LR followed by a second 20 mL/kg LR if needed. Titrate to a systolic pressure of 100 mmHg.
k) Administer opioid per Pain Management Protocol.
l)  Consider additional fluid administration. Maximum dose 2,000 mL without medical consultation.

m) Establish IV access with LR, if appropriate.
   (1) 10 mL/kg bolus.
   (2) If age-related vital signs and patient's condition indicate hypoperfusion, administer initial fluid bolus of 20 mL/kg LR IV/IO. If patient's condition does not improve, administer the second bolus of fluid at 20 mL/kg LR IV/IO.
n)  Third and subsequent fluid boluses at 20 mL/kg LR IV/IO.
o) Administer opioid per Pain Management Protocol.

4. Continue General Patient Care.

RULE OF NINES



Note: The surface of the patient's palm equals 1% of their body surface area.

WW. TRAUMA PROTOCOL: EYE TRAUMA

1. Initiate General Patient Care.

2. Presentation

   The patient may present with profuse bleeding, avulsions, lacerations, foreign objects, impaled objects, and/or soft tissue damage to the eye(s) and/or surrounding facial areas.

3. Treatment

NEVER APPLY PRESSURE TO THE EYEBALL OR GLOBE!

IF THE PATIENT HAS OTHER ASSOCIATED TRAUMA OR BURNS, TRANSPORT THE PATIENT TO THE APPROPRIATE TRAUMA OR BURN CENTER; OTHERWISE, TRANSPORT THE PATIENT TO THE NEAREST EYE TRAUMA CENTER, IF APPROPRIATE.

DO NOT USE CHEMICAL COLD PACKS ON THE FACE.

a) **Foreign objects NOT embedded in the eye(s):** Flush with copious amounts of water (preferably sterile), normal saline, or LR from the bridge of the nose outward.

b) **Injury to orbits (area around the eye):** Consider head stabilization and Spinal Protection Protocol.

c) **Lacerations/injuries to the eyeball or globe:** Shield affected eyeball and dress other eye to reduce movement and protect loss of fluids; consider head stabilization and spinal protection and elevate the head to decrease intraocular pressure.

d) **Impaled objects:** Stabilize object, shield affected eyeball, and dress other eye to reduce movement.

e) Establish IV access with LR, if appropriate.

f) Administer opioid per Pain Management Protocol.

g) **Foreign objects NOT embedded in the eye(s):** Flush with copious amounts of water (preferably sterile), normal saline, or LR from the bridge of the nose outward.

h) **Injury to orbits (area around the eye):** Consider head stabilization and Spinal Protection Protocol.

i) **Lacerations/injuries to the eyeball or globe:** Shield affected eyeball and dress other eye to reduce movement and protect loss of fluids; consider head stabilization and spinal protection and elevate the head to decrease intraocular pressure.

j) **Impaled objects:** Stabilize object, shield affected eyeball, and dress other eye to reduce movement.

k) Establish IV/IO access with LR, if appropriate.

l) Administer opioid per Pain Management Protocol.

4. Continue General Patient Care.

XX. TRAUMA PROTOCOL: HAND/UPPER/LOWER EXTREMITY TRAUMA

1. Initiate General Patient Care.

2. Presentation
   a) Patient may exhibit injuries to skeletal or soft tissue components of the hand or upper extremity at or below the level of the mid-humerus, including complete or incomplete amputations of the elements of the hand or upper extremity, crush or degloving injuries, and other trauma resulting in loss of perfusion or suspected nerve injury (e.g., compartment syndrome).

   Upper Extremity
   b) Indications for:
   Referral of adult patients to the Curtis National Hand Center at Union Memorial Hospital **or**

   Referral of pediatric patients to the nearest Pediatric Trauma Center (children who have **not** reached their 15th birthday)

   Stable patients with an isolated upper extremity injury at or below the mid-humerus

   (Hand Center and/or nearest appropriate trauma center)

   (1) Complete or incomplete hand or upper extremity amputation
   (2) Partial or complete finger or thumb amputation
   (3) Degloving, crushing, or devascularization injuries of hand or upper extremity
   (4) High-pressure injection injuries to hand or upper extremity
   (5) Complicated nerve, vessel, or compartment syndrome (excessive swelling and pain of extremity with possible evolving nerve deficit) injury of the forearm and hand

   Lower Extremity
   c) Indications for Referral to Pediatric or Adult Trauma Center: Patient may exhibit injuries to skeletal or soft tissue components with complete or incomplete amputation of ankle/foot lower extremity, complicated nerve, vessel, or compartment syndrome (excessive swelling and pain of extremity with possible evolving nerve deficit injury).

ALERT LIFE BEFORE LIMB.

TOE INJURIES FROM LAWN MOWER ARE NOT CANDIDATES FOR REIMPLANTATION AND PATIENTS SHOULD GO TO THEIR LOCAL MEDICAL FACILITY.

   d) Contraindications for referral to a Hand Center
      (1) Patients with unstable or abnormal vital signs
      (2) Patients with major and/or multiple system trauma

   e) Contraindication for referral to Pediatric or Adult Trauma Center
   Patients with toe amputation (partial or complete)

XX. TRAUMA PROTOCOL: HAND/UPPER/LOWER EXTREMITY TRAUMA (Continued)

3. Treatment

   a) Package amputated extremity in sealed plastic bag (keep dry) and place **on top** of ice to keep cool. **DO NOT FREEZE.**

ALERT

DO NOT SUBMERGE IN WATER OR FREEZE AMPUTATED PART.

USE TIME, DISTANCE, WEATHER, AND PROXIMITY TO DESIGNATED TRAUMA CENTER TO DETERMINE MODE OF TRANSPORT. IF ESTIMATED TRANSPORT TIME TO DESIGNATED HAND CENTER IS LESS THAN 30 MINUTES, USE GROUND TRANSPORT.

   b) Establish IV access with LR, if appropriate.

   c) Administer fluid bolus, if appropriate.
   20 mL/kg of LR IV
   Titrate to a systolic pressure of 100 mmHg.

   d) Administer analgesia per Pain Management Protocol.

   e) Consider additional fluid administration.
   Maximum dose 2,000 mL without medical consultation

   f) Establish IV/IO access with LR, if appropriate.

   g) If age-related vital signs and patient's condition indicate hypoperfusion, administer initial fluid bolus of 20 mL/kg LR IV/IO. If patient's condition does not improve, administer the second bolus of fluid at 20 mL/kg LR IV/IO.

   h) Third and subsequent fluid boluses at 20 mL/kg LR IV/IO.

   i) Administer analgesia per Pain Management Protocol.

4. Continue General Patient Care.

YY. TRAUMA PROTOCOL: MULTIPLE/SEVERE TRAUMA

1. Initiate General Patient Care.

2. Presentation

   The patient may present with hypovolemic or neurogenic shock, hypotension, hypertension, rapid or slow heart rate, unequal pupils, shallow or absent respirations, decreased distal pulses, decreased motor and sensory function in extremities, internal or external bleeding, fractures, or lacerations.

WHILE TIME, DISTANCE, AND PROXIMITY ARE ALL FACTORS TO BE CONSIDERED IN THE TRIAGE DECISION, THE TRAUMA DECISION TREE SHOULD BE USED TO DETERMINE WHO SHOULD BE TRANSPORTED TO THE NEAREST APPROPRIATE TRAUMA CENTER AND WHEN THE TRANSPORT SHOULD OCCUR.

CHILDREN WHO MEET INCLUSION BASED ON THE TRAUMA DECISION TREE AND WHO HAVE **NOT** REACHED THEIR 15TH BIRTHDAY SHOULD BE TRANSPORTED TO A PEDIATRIC TRAUMA CENTER.

3. Treatment

   a) Apply Spinal Protection Protocol for blunt trauma patients. Patients with isolated penetrating trauma should not have spinal immobilization performed.

   b) Control bleeding and immobilize patient, if blunt mechanism indicates. Spinal immobilization should not be performed on patients with isolated penetrating mechanism. If mechanism includes both blunt and penetrating trauma, apply Spinal Protection Protocol. Backboard may be used for patient transfer maneuvers.

   c) Hyperventilate the head-injured patient as follows:
   Adult/Adolescent (greater than 13 years of age): 20 breaths per minute
   Child (1-12 years of age): 30 breaths per minute
   Infant (less than 1 year of age): 35 breaths per minute
      (1) Who has signs of herniation such as unequal pupils, posturing, or paralysis **or**
      (2) Who is manifesting a rapidly decreasing GCS **or**
      (3) With on-line medical consultation

   d) Consider pelvic stabilization technique if indicated.

   e) Establish IV access with LR; administer 20 mL/kg bolus.
   Titrate to a systolic pressure of 100 mmHg.

   f)  Consider additional fluid administration.
   Maximum dose 2,000 mL without medical consultation

YY. TRAUMA PROTOCOL: MULTIPLE/SEVERE TRAUMA (Continued)

g) Apply Spinal Protection Protocol for blunt trauma patients. Patients with isolated penetrating trauma should not have spinal immobilization performed.

h) Control bleeding and immobilize patient, if blunt mechanism indicates. Spinal immobilization should not be performed on patients with isolated penetrating mechanism. If mechanism includes both blunt and penetrating trauma, apply Spinal Protection Protocol. Backboard may be used for patient transfer maneuvers.

i) Hyperventilate the head-injured patient as follows:
Adult/Adolescent (greater than 13 years of age): 20 breaths per minute
Child (1-12 years of age): 30 breaths per minute
Infant (less than 1 year of age): 35 breaths per minute

j) Who has signs of herniation such as unequal pupils, posturing, or paralysis **or**
(1) Who is manifesting a rapidly decreasing GCS **or**
(2) With on-line medical consultation

k) Establish IV/IO access with LR.

l) If age-related vital signs and patient's condition indicate hypoperfusion, administer initial fluid bolus of 20 mL/kg LR IV/IO. If patient's condition does not improve, administer the second bolus of fluid at 20 mL/kg LR.

m)  Third and subsequent fluid boluses at 20 mL/kg LR IV/IO.

4. Continue General Patient Care.

GLASGOW COMA SCALE

Eye Opening

Spontaneously	**4**
To Voice	**3**
To Pain	**2**
No Response	**1**

Motor Response

To Verbal Command	- Obeys	**6**
To Painful Stimulus	- Localizes Pain	**5**
	Flexion - Withdraw	**4**
	Flexion - Abnormal	**3**
	Extension	**2**
	No Response	**1**

Verbal Response

Less than 2 years old	**2–5 years old**	**Greater than 5 years old**	
5 SMILES/COOS/CRIES	APPROPRIATE WORDS	ORIENTED AND CONVERSES	**5**
4 CRIES	INAPPROPRIATE WORDS	DISORIENTED AND CONVERSES	**4**
3 INAPPROPRIATE CRIES/SCREAMS	CRIES/SCREAMS	INAPPROPRIATE WORDS	**3**
2 GRUNTS	GRUNTS	INCOMPREHENSIBLE SOUNDS	**2**
1 NO RESPONSE	NO RESPONSE	NO RESPONSE	**1**

Glasgow Coma Score **Total** **(3–15)**

ZZ. TRAUMA PROTOCOL: SEXUAL ASSAULT

1. Initiate General Patient Care.

2. Presentation
   Patient may present with no overt evidence of trauma, or may present with the following injuries:
   a) Abrasions, contusions, and/or bleeding
   b) Signs of forcible restraint
   c) Petechiae of the face and conjunctiva, secondary to strangulation
   d) Facial injuries, including eye injuries, broken teeth, swollen jaw, or cheekbone
   e) Vaginal or rectal bleeding or pain

PATIENTS MEETING THE SPECIALTY CENTER CRITERIA OR IN NEED OF TIME-SENSITIVE EMERGENT CARE SHOULD BE PREFERENTIALLY TRANSPORTED TO THE SPECIALTY CENTER OR NEAREST EMERGENCY DEPARTMENT FOR MANAGEMENT, EVEN IF THIS IS NOT A MARYLAND COALITION AGAINST SEXUAL ASSAULT (MCASA) RECOGNIZED FACILITY. MCASA RECOGNITION SHOULD NOT SUPERCEDE SPECIALTY CENTER NEEDS.

ALL HEALTH CARE PROVIDERS ARE OBLIGATED BY LAW TO REPORT CASES OF SUSPECTED CHILD OR VULNERABLE ADULT ABUSE AND/OR NEGLECT TO EITHER THE LOCAL POLICE OR ADULT/CHILD PROTECTIVE SERVICE AGENCIES. DO NOT INITIATE REPORT IN FRONT OF THE PATIENT, PARENT, OR CAREGIVER (MD CODE, FAMILY LAW, § 5-704). UNDER MARYLAND LAW, EMS PROVIDERS ARE PROTECTED FROM LIABILITY IF THEY MAKE A REPORT OF CHILD/VULNERABLE ADULT ABUSE AND NEGLECT IN GOOD FAITH (COURTS AND JUDICIAL PROCEEDINGS ARTICLE § 5-620).

3. Treatment

   a) If practical, allow patient to speak with a provider with whom they are most comfortable.
   b) Maintain non-judgmental, caring attitude.
   c) Preserve the crime scene and clothing articles, if practical.
   d) Do not perform an examination of the genitals or rectum unless necessary to stabilize the patient.
   e) Dress wounds (do not attempt to clean).
   f) Discourage any self-treatment (shower, washing, changing clothes, brushing teeth).
   g) Treat injuries according to presentation.

IF POSSIBLE, TRANSPORT THE PATIENT TO THE APPROPRIATE MARYLAND COALITION AGAINST SEXUAL ASSAULT (MCASA) RECOGNIZED FACILITY FOR THE SEXUAL ASSAULT FORENSIC EXAM (S.A.F.E.). PROVIDERS SHOULD USE THE TERM “SAFE PATIENT” WHEN NOTIFYING THE RECEIVING FACILITY OF THE TRANSPORT.

   h) Patients under **13** years of age should be transported to an MCASA-recognized pediatric facility for the Sexual Assault Forensic Exam.

4. Continue General Patient Care.

AAA. TRAUMA PROTOCOL: SPINAL PROTECTION

1. Initiate General Patient Care.

2. Presentation
   a) **"Full Spinal protection"** refers to the act of protecting the spinal cord from further injury.
   b) **"Spinal immobilization"** is the act of placing a patient on a backboard with cervical collar for the purpose of trying to prevent excessive movement of the spinal column.
   c) Indications for initiating spinal protection:
      (1) Patients who have a blunt trauma with a high-energy mechanism of injury that has potential to cause spinal cord injury or vertebral instability ***AND*** one or more the following should receive spinal protection:
         (a) Midline cervical, thoracic, or lumbar spinal pain, tenderness, or deformity
         (b) Signs and symptoms of new paraplegia or quadriplegia
         (c) Focal neurological deficit (sensory or motor)
         (d) Altered mental status or disorientation
         (e) Distracting injury: Any injury (e.g., fracture, chest, or abdominal trauma) associated with significant discomfort that could potentially distract from a patient's ability to accurately discern or define spinal column pain or tenderness.
      (2) Indications for referral to an Adult Specialty Spinal Center.
         (a) 15 years of age or older **AND**
         (b) Signs and symptoms of new paraplegia or quadriplegia in the presence of trauma **AND**
         (c) Patent airway **AND**
         (d) Hemodynamically stable
         If considering referral to Adult Specialty Spinal Center, consult with both the nearest Trauma Center and the Adult Spinal Specialty Center, when possible.

3. Treatment
   a) Initiate General Patient Care.
   b) All patients meeting the Spinal Protection Protocol shall have manual in-line cervical spine stabilization and application of a correctly sized cervical collar.
   c) Minimize flexion, extension, and rotation of the spinal column.
   d) Patients meeting the Spinal Protection Protocol who are with neurological deficit, or not able to ambulate on their own accord, **shall** be immobilized with cervical collar and a backboard.

AAA. TRAUMA PROTOCOL: SPINAL PROTECTION (Continued)

e) The following patients only need application of a cervical collar and do not need to be placed in full immobilization with a backboard:
   (1) Patients who are found by EMS providers to be standing or ambulatory,
   (2) Patients who have a GCS of 15 and are able to safely extricate themselves from the environment (e.g., vehicle seat) without gross movement (flexion, extension, or rotation) of the spinal column, and
   (3) Patients who do not have evidence of a neurological deficit.

f) Patients who are placed in a cervical collar without a need for immobilization on a backboard should be assisted in minimal movement to the EMS stretcher and allowed to lie down supine on their own accord.

g) Patients meeting Spinal Protection Protocol and not requiring immobilization with a backboard should be secured to the EMS stretcher in a supine position with the head elevated at 30 degrees.

h) Backboards may be used for patient extrication and patient transfer for patients not meeting Spinal Protection Protocol; however, other devices are preferred (e.g., sheet, Reeves sleeve, or scoop stretcher).

i) If the backboard is used for extrication from the scene to an ambulance, the patient should be removed from the backboard as soon as possible. The stretcher mattress will provide support in place of the backboard.

j) Interfacility transport patients who have already been removed from a backboard should not be placed back on the backboard prior to transport.

k) Helmet Removal
   (1) If patient is wearing a helmet, the goals are assessment and management of the airway, breathing, and circulation followed by protection of the spinal column by maintaining neutral alignment of the spinal column.
   (2) If patient is wearing helmet and no shoulder pads, removal of the helmet is indicated.
   (3) If patient is wearing helmet with shoulder pads, removal of the helmet is acceptable only with concurrent removal of shoulder pads. Under these conditions, removal of the helmet is indicated for management of the airway or other facial trauma.

l) Patients found with backboard applied before EMS arrival
   (1) If EMS providers find patient immobilized on a backboard applied prior to arrival, the principles of the Spinal Protection Protocol still apply.

AAA. TRAUMA PROTOCOL: SPINAL PROTECTION (Continued)

m) Establish IV/IO access with LR, if appropriate.

n) Administer fluid bolus, if appropriate.
20 mL/kg of LR IV
Titrate to a systolic blood pressure of 100 mmHg.

o) Consider dopamine.
2–20 **mcg**/kg/min IV/IO
Titrate to a systolic blood pressure of 100 mmHg.

p) Consider additional fluid administration.
Maximum dose 2,000 mL without medical consultation.

In children who have not reached their 15th birthday:
Indications for initiating spinal protection:

q) Patients who have a blunt trauma with a high-energy mechanism of injury that has potential to cause spinal cord injury or vertebral instability ***and*** the presence of or inability to assess one or more of the following should receive spinal protection.
   (1) Midline spinal pain, tenderness, or deformity
   (2) Signs and symptoms of new paraplegia or quadriplegia
   (3) Focal neurological deficit
   (4) Altered mental status or disorientation
   (5) Distracting injury
   (6) Neck pain or torticollis
   (7) High impact diving incident or high risk motor vehicle crash (i.e., head on collision, rollover, ejected from the vehicle, death in the same crash, or speed greater than 55 mph)
   (8) Substantial torso injury
   (9) Conditions predisposing to spine injury

Indications for referral to a Pediatric Trauma Center:
   (10) Patient is less than 15 years of age **AND**
   (11) Signs and symptoms of new paraplegia or quadriplegia in the presence of trauma **AND**
   (12) Patent airway **AND**
   (13) Hemodynamically stable

Consult with nearest Trauma Center and, when possible, the nearest Pediatric Trauma Center.

r) Initiate General Patient Care.

s) All patients meeting the Spinal Protection Protocol shall have manual in-line cervical spine stabilization and application of a correctly sized cervical collar.

AAA. TRAUMA PROTOCOL: SPINAL PROTECTION (Continued)

t) Minimize flexion, extension, and rotation of the spinal column.

u) Patients meeting the Spinal Protection Protocol who are with neurological deficit, not able to ambulate on their own accord, or who are unable to respond during assessment **shall** be immobilized with cervical collar and a backboard.

v) The following patients only need application of a cervical collar and do not need to be placed in full immobilization with a backboard:
   (1) Patients who are found by EMS providers to be standing or ambulatory
   (2) Patients who have a GCS of 15 and are able to safely extricate themselves from the environment (e.g., vehicle seat) without gross movement (flexion, extension, or rotation) of the spinal column, and
   (3) Patients who do not have evidence of a neurological deficit.

w) Patients who are placed in a cervical collar without a need for immobilization on a backboard should be assisted in minimal movement to the EMS stretcher and allowed to lie down supine on their own accord.

x) Patients meeting Spinal Protection Protocol and not requiring immobilization with a backboard should be secured to the EMS stretcher in a supine position with the head elevated at 30 degrees.

y) Backboards may be used for patient extrication and patient transfer for patients not meeting Spinal Protection Protocol; however, other devices are preferred (e.g., sheet, Reeves sleeve, or scoop stretcher).

z) If the backboard is used for extrication from the scene to an ambulance, the patient should be removed from the backboard as soon as possible. The stretcher mattress will provide support in place of the backboard.

aa) Interfacility transport patients who have already been removed from a backboard should not be placed back on the backboard prior to transport.

bb) Helmet Removal
   (1) If patient is wearing a helmet, the goals are assessment and management of the airway, breathing, and circulation followed by protection of the spinal column by maintaining neutral alignment of the spinal column.
   (2) If patient is wearing helmet and no shoulder pads, removal of the helmet is indicated.
   (3) If patient is wearing helmet with shoulder pads, removal of the helmet is acceptable only with concurrent removal of shoulder pads. Under these conditions, removal of the helmet is indicated for management of the airway or other facial trauma.

AAA. TRAUMA PROTOCOL: SPINAL PROTECTION (Continued)

cc) Patients found with backboard applied before EMS arrival
(2) If EMS providers find patient immobilized on a backboard applied prior to arrival, the principles of the Spinal Protection Protocol still apply.

dd) Establish IV/IO access with LR, if appropriate.

ee) Administer fluid bolus, if appropriate.
20 mL/kg of LR IV
Titrate to a systolic blood pressure of 100 mmHg.

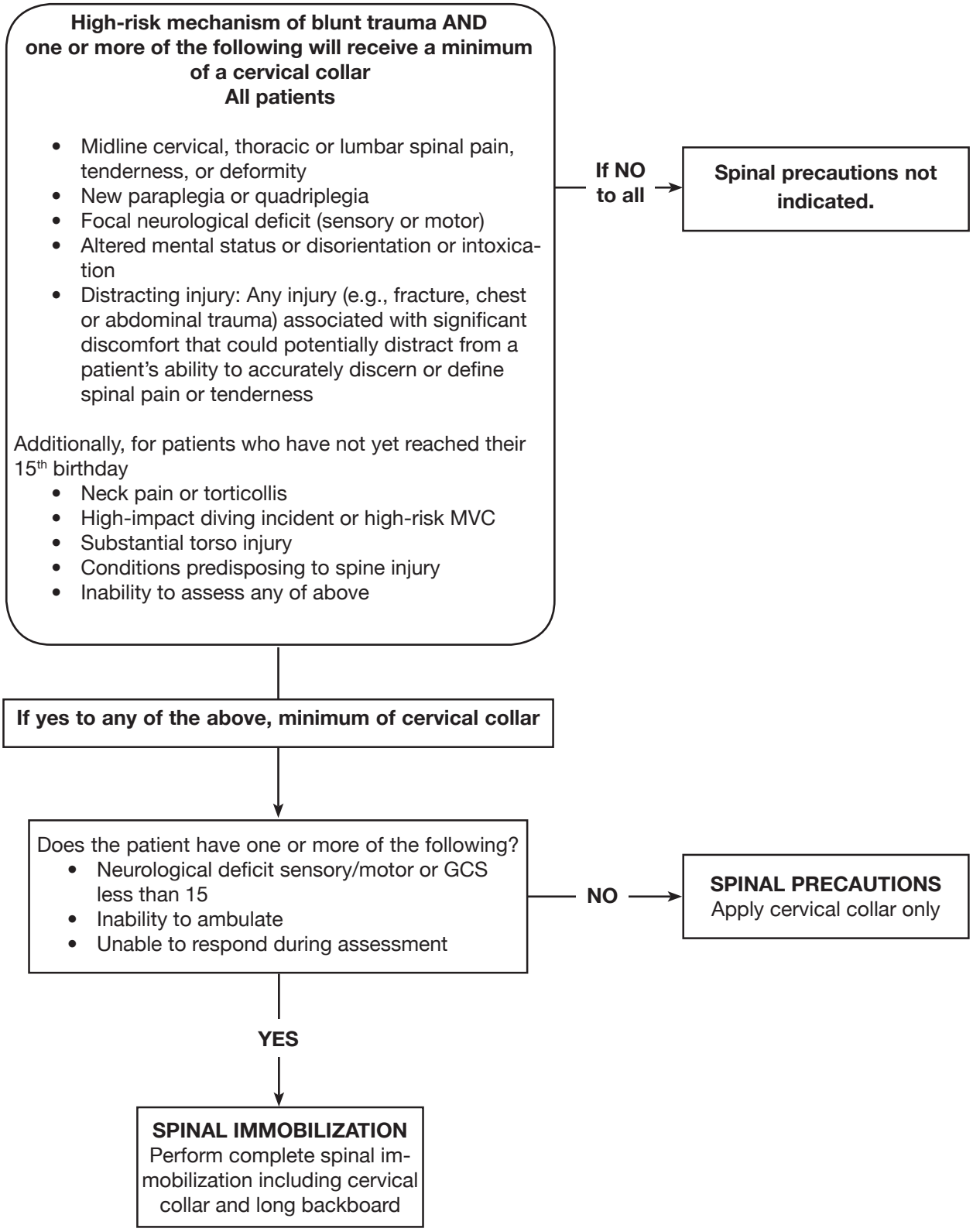
ff) Consider dopamine.
2–20 **mcg**/kg/min IV/IO
Titrate to a systolic blood pressure of 100 mmHg.

gg) Consider additional fluid administration.
Maximum dose 2,000 mL without medical consultation

4. Continue General Patient Care.

AAA. TRAUMA PROTOCOL: SPINAL PROTECTION (Continued)

SPINAL PROTECTION ALGORITHM



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BBB. TRAUMA PROTOCOL: TRAUMA ARREST

1. Initiate General Patient Care.
2. Presentation

   Early cardiac arrest secondary to trauma is usually due to severe hypoxia, neurologic injury, or massive hemorrhage. The patient is unresponsive, pulseless, and apneic.

3. Treatment
   a) Rapid assessment and extrication
   b) Determine if patient meets the criteria for termination of resuscitation for a patient in traumatic arrest. If patient meets criteria, discontinue resuscitation. If criteria are not met, continue resuscitation.
   c) Perform spinal immobilization for blunt trauma patients only. Patients with isolated penetrating trauma should not have spinal immobilization performed. If mechanism includes both blunt and penetrating trauma, perform spinal immobilization.
   d) CPR with high-quality chest compressions and minimal interruptions.
   e) Consider AED if arrest is believed to be medical in nature and the patient meets the criteria.
   f) Treat reversible causes of traumatic arrest.
      (1) Open airway and ensure adequate ventilation, insert necessary adjunct; consider the need for advanced airway earlier in the resuscitation of the trauma arrest patient.
      (2) Seal open chest wounds with occlusive dressings.
      (3) Control life-threatening external hemorrhage.

PENETRATING TRAUMA PATIENTS HAVE AN IMPROVED CHANCE OF SURVIVAL WITH THE IMMEDIATE APPLICATION OF HEMORRHAGE CONTROL AND ALS BILATERAL NEEDLE DECOMPRESSIONS WHILE PREPARING AND LOADING THE PATIENT FOR IMMEDIATE TRANSPORT. IF THE PENETRATING TRAUMA PATIENT IS FOUND IN A RHYTHM OTHER THAN ASYSTOLE, AND THE TRAUMA CENTER IS WITHIN 15 MINUTES, COMPLETE THE TREATMENTS FOR REVERSIBLE CONDITIONS AND TRANSPORT THE PATIENT. IF TRANSPORT TIME EXCEEDS 15 MINUTES, GO TO LOCAL EMERGENCY DEPARTMENT OR FREESTANDING EMERGENCY MEDICAL FACILITY. BLUNT TRAUMA ARREST SHOULD HAVE ALL THE REVERSIBLE CAUSES OF ARREST PERFORMED ON SCENE BEFORE TERMINATION OF RESUSCITATION OR TRANSPORT IF ROSC IS ACHIEVED.

   g) Establish IV/IO access with LR. Begin rapid administration of 20 mL/kg bolus of LR IV/IO.
   h) Treat reversible causes of traumatic arrest.
      (1) Open airway and ensure adequate ventilation, insert necessary adjunct; consider the need for advanced airway earlier in the resuscitation of the trauma arrest patient.
      (2) Seal open chest wounds with occlusive dressings.
      (3) Control life-threatening external hemorrhage.
      (4) Bilateral Needle Decompression Thoracostomy. Catheters should not be removed once placed.

BBB. TRAUMA PROTOCOL: TRAUMA ARREST (Continued)

(5) Establish IV/IO access with LR. Begin rapid administration of 20 mL/kg bolus of LR IV/IO.
(6) Identify rhythm and refer to appropriate algorithm.

ALERT EPINEPHRINE IS CONTRAINDICATED IN THE TREATMENT OF TRAUMATIC CARDIAC ARREST FOR ADULT PATIENTS. **(NEW '19)**

i) Rapid assessment and extrication
j) Perform spinal immobilization for blunt trauma patients only. Patients with isolated penetrating trauma should not have spinal immobilization performed. If mechanism includes both blunt and penetrating trauma, perform spinal immobilization.
k) CPR
l) Consider AED if arrest is believed to be medical in nature. (See Section IV, AED.)

ALERT A PATIENT IN CARDIOPULMONARY ARREST SECONDARY TO TRAUMA SHOULD BE TAKEN TO THE NEAREST APPROPRIATE PEDIATRIC TRAUMA CENTER. CONSIDERATION SHOULD BE GIVEN TO TRANSPORTING THE PATIENT TO THE NEAREST EMERGENCY DEPARTMENT OR ADULT TRAUMA CENTER IF THE PEDIATRIC TRAUMA CENTER IS MORE THAN 10 MINUTES ADDITIONAL TRANSPORT TIME!

m) Establish IV/IO access with LR.
n) If age-related vital signs and patient's condition indicate hypoperfusion, administer initial fluid bolus of 20 mL/kg LR IV/IO. If patient's condition does not improve, administer the second bolus of fluid at 20 mL/kg LR IV/IO.
o) If traumatic arrest is suspected due to multi-system blunt trauma, or due to penetrating neck, chest, or abdominal trauma, bilateral needle decompressions should be performed. Once manufacture assembled pneumothorax kit catheters are placed, **do not remove.**

4. Continue General Patient Care.

CCC. TRAUMA DECISION TREE

Measure vital signs and level of consciousness and assess for major injury

Category Alpha

- ❑ GCS less than or equal to 13
- ❑ Systolic BP less than 90 mmHg (Adult) less than 60 mmHg (Peds)
- ❑ Respiratory rate less than 10 or greater than 29 (less than 20 in infant age less than one year) or need for ventilatory support

YES → Transport to trauma center or specialty center per protocol; alert trauma team; consider helicopter transport if quicker and of clinical benefit (refer to GPC Section I).

NO → Assess for other injuries.

Category Bravo

- ❑ 2 or more proximal long-bone fractures
- ❑ Crushed, degloved, mangled, or pulseless extremity
- ❑ Pelvic fracture
- ❑ Amputation proximal to wrist or ankle
- ❑ Open or depressed skull fracture
- ❑ Paralysis (spine)
- ❑ Chest wall instability or deformity (e.g., flail chest)
- ❑ Penetrating injuries to head, neck, torso, or extremities proximal to elbow and knee

YES → Transport to trauma center or specialty center per protocol; alert trauma team; consider helicopter transport if quicker and of clinical benefit (refer to GPC Section I).

NO → Evaluate for evidence of mechanism of injury and high-energy impact.

Category Charlie

- ❑ High Risk Auto Crash
  - Intrusion (including roof) greater than 12 in. occupant site; greater than 18 in. any site
  - Ejection (partial or complete) from vehicle
  - Death in same passenger compartment
  - Vehicle telemetry data consistent with high risk of injury
  - Rollover without restraint
  - Auto v. pedestrian/bicyclist thrown, run over, or with significant (greater than 20 mph) impact
  - Motorcycle crash greater than 20 mph
- ❑ Falls
  - Adult: greater than 20 feet (one story is equal to 10 feet)
  - Pediatric: greater than 10 feet or 3 times the child's height
- ❑ Exposure to blast or explosion

YES → Transport to Trauma Center; alert trauma team. Patients within a **30-minute drive time** of the closest appropriate trauma/specialty center shall go by ground unless there are extenuating circumstances. Receiving Trauma Center medical consultation required when considering whether helicopter transport is of clinical benefit (refer to GPC Section I).

NO → Evaluate for other considerations.

Category Delta

- ❑ Older adults
  - Risk of injury/death increases after age 55
  - SBP less than 110 may indicate shock after age 65
  - Low-impact mechanisms (e.g., ground-level falls) may result in severe injury
- ❑ Children (Should be triaged to Pediatric Trauma Center)
- ❑ Burns
  - Without trauma mechanism, triage to Burn Center
  - With trauma mechanism, triage to Trauma Center
- ❑ Pregnancy greater than 20 weeks
- ❑ EMS provider judgment
- ❑ Anticoagulants and bleeding disorders (Patients with head injury are at high risk for rapid deterioration)

YES → Consider medical direction and transport to trauma center. Patients within a **30-minute drive time** of the closest appropriate trauma/specialty center shall go by ground unless there are extenuating circumstances. Receiving Trauma Center medical consultation required when considering whether helicopter transport is of clinical benefit (refer to GPC Section I).

NO → Transport according to protocol.