



# COURSE UNIT



## BACHELOR OF SCIENCE IN NURSING: NCMB 418 - CARE OF THE CLIENT WITH LIFE- THREATENING CONDITIONS, ACUTELY ILL / MULTI- ORGAN PROBLEMS, HIGH ACUITY AND EMERGENCY SITUATION

COURSE MODULE	COURSE UNIT	WEEK
3	11	13
Neurologic Emergencies - 1		

### CHECK LIST

- ✓ Comprehend the course unit objectives.
- ✓ Peruse through the study guide prior to class attendance.
- ✓ Analyze the required learning resources; refer to course unit terminologies for jargons.
- ✓ Proactively participate in classroom discussions.
- ✓ Participate in weekly discussion board (Canvas).
- ✓ Answer and submit course unit tasks on time.



### UNIT EXPECTED OUTCOMES (UEOs)

At the end of this unit, the students are expected to:

1. Trace the pathophysiologic responses of critically ill clients with brain injuries.
2. Analyze the health status/competence of critically ill clients with brain injuries.
3. Formulate a plan of care based on critically ill clients' priorities to brain injuries.
4. Institute appropriate corrective actions to prevent or minimize harm arising from adverse effects.
5. Apply safe and quality interventions to address the needs of critically ill clients with brain injuries.
6. Provide client health education using selected planning models as appropriate for critically ill clients with brain injuries.

- 
7. Document nursing care and services rendered and processes outcomes of the findings/ result of the client data.
  8. Ensure completeness, integrity, safety, accessibility, and security of information.
  9. Adhere to protocols of confidentiality in safekeeping and releasing of records and other information.
  10. Evaluate the health status / competence and/or expected outcomes of nurse-client working relationship of critically ill clients with brain injuries.

## **REQUIRED READINGS**

Burns, S. and Delgado, S. (2019). Essentials of Critical Care Nursing, 4th ed. USA: McGraw-Hill.

## **STUDY GUIDE**

Neurologic emergencies arise frequently and, if not diagnosed and treated quickly, can have devastating results, with high rates of long-term disability and death (Kottapally and Josephson, 2016).

### **Increased Intracranial pressure**

- A dynamic state that reflects the pressure of cerebrospinal (CSF) within the skull
- Increased ICP is described as pressure  $\geq 20$  mmHg

### Intracranial compliance

- The ability of the brain to tolerate increases in intracranial volume without adversely increasing ICP
- Monro-Kellie Hypothesis

### Intracranial elastance

- The ability of the brain to tolerate and compensate for an increase in intracranial volume through distention or displacement.
- CPP – a pressure gradient across the brain and is the difference between the arterial blood entering and the return of venous blood exiting the neurovascular system.



- CPP = MAP – ICP
- MAP = systolic BP + 2x diastolic BP

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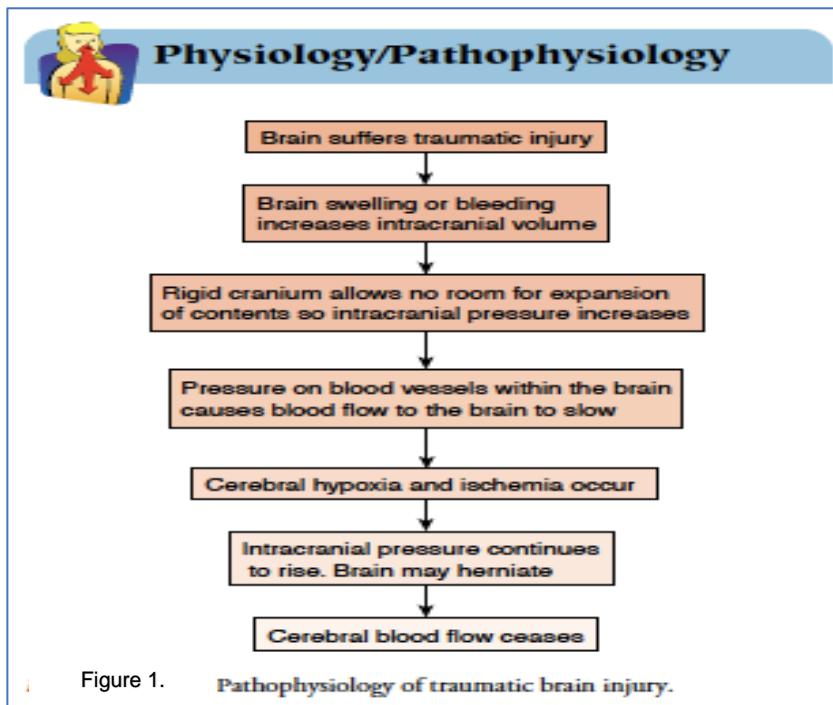
### Purposes of ICP and CPP Monitoring:



- To diagnose increased ICP
- Enable interventions
- Provide a tool for predicting the level of injury and patient outcome.

## **TRAUMATIC BRAIN INJURY**

- Head injury is injury to the scalp, skull, or brain
- 1. Primary injury
  - the initial damage to the brain that results from the traumatic event.
  - may include contusions, lacerations, torn blood vessels from impact, acceleration/deceleration, or foreign object penetration
- 2. Secondary injury
  - evolves over the ensuing hours and days after the initial injury and is due primarily to brain swelling or ongoing bleeding



## **Brain Injury**



- most important consideration in any head injury
- even seemingly minor injury can cause significant brain damage secondary to obstructed blood flow and decreased tissue perfusion (brain cannot store oxygen and glucose to any significant degree)
- irreversible brain damage and cell death may occur when the blood supply is interrupted for even a few minutes.

## ***Concussion***

- Temporary loss of neurologic function with no apparent structural damage
- Generally involves a period of unconsciousness lasting from a few seconds to a few minutes.
- Jarring of the brain may be so slight as to cause only dizziness and spots before the eyes ("seeing stars"), or it may be severe enough to cause complete loss of consciousness for a time.
- If the frontal lobe is affected = may exhibit bizarre irrational behavior
- If temporal lobe is affected = may produce temporary amnesia or disorientation

## ***Contusion***

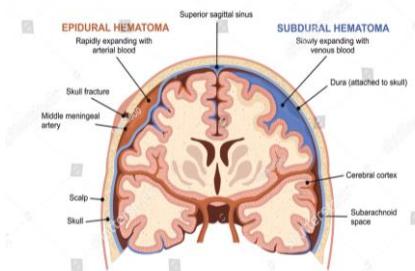
- A more severe injury; brain is bruised with possible surface hemorrhage

- May be unconscious for more than a few seconds or minutes
- Clinical signs and symptoms depend on the size of the contusion and the amount of associated cerebral edema
- Client may lie motionless, with a faint pulse, shallow respirations, and cool, pale skin; involuntary evacuation of the bowels and the bladder is often experienced
- Client may be aroused with effort but soon slips back into unconsciousness
- Vital signs: BP & temperature – subnormal (somewhat similar to that of shock)

## Intracranial Hemorrhage

- Hematomas (collections of blood) that develop within the cranial vault
- Most serious brain injuries (Norris, 2019)
- A hematoma may be:
  - a. epidural (above the dura)
  - b. subdural (below the dura)
  - c. intracerebral (within the brain)
- Major symptoms are frequently delayed until the hematoma is large enough to cause distortion of the brain and increased ICP; cerebral ischemia results from the compression by a hematoma
  - A. *Epidural Hematoma (Extradural Hematoma or Hemorrhage)* – blood collecting in the epidural (extradural) space between the skull and the dura
    - Cause: a skull fracture resulting to a rupture or laceration of the middle meningeal artery (the artery that runs between the dura and the skull inferior to a thin portion of temporal bone); hemorrhage from this artery causes rapid pressure on the brain
  - B. *Subdural Hematoma* – collection of blood between the dura and the brain (space is normally occupied by a thin cushion of fluid)
    - May be acute, subacute, or chronic, depending on the size of the involved vessel and the amount of bleeding present
    - Most common cause: trauma
    - Other causes: coagulopathies or rupture of an aneurysm

Figure 2. Epidural and Subdural Hematoma



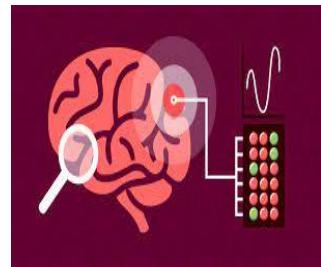
## Management of Brain Injuries

- Assessment and diagnosis of the extent of injury are accomplished by the initial physical and neurologic examinations, i.e. CT Scan, MRI, PET scan
- Any individual with a head injury is presumed to have a cervical spine injury until proven otherwise
- Move and transport client on a board with the head and neck aligned with the body
- Apply cervical collar and maintained until cervical spine x-rays have been obtained and the absence of cervical SCI documented

## Treatment of Increased Intracranial Pressure

As the damaged brain swells with edema or as blood collects within the brain, a rise in ICP occurs requiring aggressive treatment.

- If ICP remains elevated = CPP can decrease (ICP is monitored closely)
- Initial management – based on the principle of preventing secondary injury and maintaining adequate cerebral oxygenation.
- Surgery = for evacuation of blood clots, debridement and elevation of depressed fractures of the skull, and suture of severe scalp lacerations.
- Increased ICP:
  - ✓ Maintain adequate oxygenation, elevate the head of the bed, maintain normal blood volume



- ✓ Devices to monitor ICP or drain CSF (could be inserted during surgery or at the bedside using aseptic technique)

**Seizure** – a sudden, abnormal, excessive discharge of electrical activity within the brain that disrupts the brain's usual system for nerve conduction

Classification:

1. Absence (petit mal)
2. Atonic
3. Myoclonic
4. Clonic
5. Idiopathic (unclassified seizures)

Diagnostics:

1. Electroencephalography (EEG) – definitive test to diagnose seizure activity
2. SPECT scan – scan of choice for a diagnostic evaluation of certain types of CNS disorders

Treatment:

1. Medication therapy – hallmark of seizure management
2. Surgery – respective procedures or palliative corpus callosotomy
3. Seizure precautions
4. Oxygen and suction equipment at bedside
5. Re-orient client upon waking

**Status Epilepticus** – potential complication of all types of seizures. This is a seizure that lasts longer than 5 minutes, or more than 1 seizure within a 5-minute period, without returning to normal level of consciousness between episodes. Hence, this is a medical emergency that may lead to permanent brain damage or death.

- Causes: Stroke, low blood glucose levels, excessive alcohol, withdrawal symptoms
- Diagnostics: EEG, CT scan, MRI, LP

Principle of Management:

- Goal: control seizure as quickly as possible, preventing recurrence, maintaining patient safety and identifying the underlying cause.

Medications:

1. Lorazepam (Ativan) – induces respiratory depression
2. Flumazenil (Romazicon) – decrease respiratory depression
3. Phenytoin via central venous line
4. Phenobarbital (Luminal)

Patient education on DOs and DON'Ts



- ✓ Do not hold the person down or try to stop his or her movements.
- ✓ Do not put anything in the person's mouth. This can injure teeth or the jaw.
- ✓ Do not try to give mouth-to-mouth breaths (like CPR). People usually start breathing again on their own after a seizure.
- ✓ Do not offer the person water or food until he or she is fully alert
- ✓ Ease the person to the floor.
- ✓ Turn the person gently onto one side. This will help the person breathe.
- ✓ Clear the area around the person of anything hard or sharp. This can prevent injury.
- ✓ Put something soft and flat, like a folded jacket, under his or her head.
- ✓ Remove eyeglasses.
- ✓ Loosen ties or anything around the neck that may make it hard to breathe.

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- ✓ Note the duration of the seizure.

**Meningitis** – an inflammation of the membranes covering the brain and spinal cord

Causative agents:

- Bacterial - *Haemophilus influenza* or *Neisseria meningitidis*
- Fungal – *Cryptococcus neoformans* (most common)
- Neonatal – group B streptococcus or *Escherichia coli*
- Syphilitic – *Treponema pallidum*

Diagnostic: Lumbar puncture (LP) – use to diagnose most cases

Treatment:

1. Rifampin (Rifadin) is the first line and initial treatment for bacterial meningitis
2. Vaccines:
  - *Haemophilus influenza* type b (Hib) for meningococcal meningitis
  - Meningococcal conjugate vaccine [MCV4 (Menactra)] and meningococcal polysaccharide vaccine [MPSV4 (Menomune)] against *Neisseria meningitidis*

## TERMINOLOGIES

**Brain injury** - an injury to the skull or brain that is severe enough to interfere with normal functioning

**Brain injury, closed (blunt)** - occurs when the head accelerates and then rapidly decelerates or collides with another object and brain tissue is damaged, but there is no opening through the skull and dura

**Brain injury, open** - occurs when an object penetrates the skull, enters the brain, and damages the soft brain tissue in its path (penetrating injury), or when blunt trauma to the head is so severe that it opens the scalp, skull, and dura to expose the brain

**Concussion** - a temporary loss of neurologic function with no apparent structural damage to the brain

**Contusion** - bruising of the brain surface

**Increased ICP** – increased pressure inside the skull; a medical emergency

## FURTHER READINGS

Emergency Nurses Association. (2019). *Sheehy's Manual of Emergency Care*, 7th ed. St. Louis: Elsevier Mosby. pp 504-593

Torregrossa, F. Salli, M., and Grasso, G. (2020 August). Emerging Therapeutic Strategies for Traumatic Spinal Cord Injury, *World Neurosurgery*, vol. 140. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1878875020306707>

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## **UNIT TASKS**

**Short Case Analysis:** Read the scenario below and answer the questions that follow in 5-10 sentences only. Do not forget to cite your references to support/justify your answers.

You are caring for Tim, a 78-y/o man admitted with a neurologic problem. As you enter his room, he says, "Hi, you must be my son's friend. Come in. I'm Tim & this is my wife, Martha. I'm sorry our house is a mess. This year, 1968, isn't a good year for us."

1. How would you describe and document his mental status?
2. What may have contributed to this? Give at least three.
3. From your answer in #2, what will be your 3 topmost priority plans of care?

## **REFERENCES**

Burns, S. and Delgado, S. (2019). *Essentials of Critical Care Nursing*, 4th ed. USA: McGraw-Hill.

Centers for Disease Control and Prevention (CDC) (n.d.).  
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# COURSE UNIT



## BACHELOR OF SCIENCE IN NURSING: NCMB 418 - CARE OF THE CLIENT WITH LIFE- THREATENING CONDITIONS, ACUTELY ILL / MULTI- ORGAN PROBLEMS, HIGH ACUITY AND EMERGENCY SITUATION (ACUTE AND CHRONIC)

COURSE MODULE	COURSE UNIT	WEEK
3	12	14
Neurologic Emergencies		

### CHECK LIST

- ✓ Comprehend the course unit objectives.
- ✓ Peruse through the study guide prior to class attendance.
- ✓ Analyze the required learning resources; refer to course unit terminologies for jargons.
- ✓ Proactively participate in classroom discussions.
- ✓ Participate in weekly discussion board (Canvas).
- ✓ Answer and submit course unit tasks on time.



### UNIT EXPECTED OUTCOMES (UEOs)

At the end of this unit, the students are expected to:

1. Discuss the pathophysiologic responses of critically ill clients with cerebrovascular accident and spinal cord injuries.
2. Analyze the health status/competence of critically ill clients with cerebrovascular accident and spinal cord injuries.
3. Formulate a plan of care based on critically ill clients' priorities to address the cerebrovascular accident and spinal cord injuries.
4. Institute appropriate corrective actions to prevent or minimize harm arising from adverse effects.
5. Apply safe and quality interventions to address the needs of critically ill clients with cerebrovascular accident and spinal cord injuries.

- 
6. Offer client health education using selected planning models as appropriate for critically ill clients with cerebrovascular accident and spinal cord injuries.
  7. Document nursing care and services rendered and processes outcomes of the findings/ result of the client data.
  8. Ensure completeness, integrity, safety, accessibility, and security of information.
  9. Adhere to protocols of confidentiality in safekeeping and releasing of records and other information.
  10. Evaluate the health status / competence and/or expected outcomes of nurse-client working relationship of critically ill clients with cerebrovascular accident and spinal cord injuries.

## **REQUIRED READINGS**

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## **STUDY GUIDE**

Neurologic emergencies arise frequently and, if not diagnosed and treated quickly, can have devastating results, with high rates of long-term disability and death (Kottapally and Josephson, 2016).

### **SPINAL CORD INJURY (SCI)**



Damage to any part of the spinal cord or nerves at the end of the spinal canal often causes permanent changes in strength, sensation and other body functions below the site of the injury (Mayo Clinic, 2019); occurs when a force is exerted on the vertebral column, resulting in damage to the spinal cord.

**Pathophysiology:** Damage to the spinal cord ranges from transient concussion (from which the patient fully recovers) to contusion, laceration, and compression of the cord substance (either alone or in combination), to complete transection of the cord (which renders the patient paralyzed below the level of the injury).

#### **Categories:**

1. Primary injuries – the result of the initial insult or trauma and are usually permanent
2. Secondary injuries – usually the result of a contusion or tear injury; produces ischemia, hypoxia, edema, and hemorrhagic lesions, which in turn result in destruction of myelin and axons (these are believed to be the principal causes of spinal cord degeneration at the level of injury; now are thought to be reversible 4-6 hours after injury)

#### **Causes:**

- traumatic blow to the spine causing fractures, dislocation, crushing or compression of one or more of the vertebrae
- Penetrating gunshot or knife wound
- Diseases/Conditions: Arthritis, cancer, inflammation, infections or disk degeneration of the spine

#### **Severity Classification:**

1. Complete – if all sensory and all motor functions are lost below the spinal cord injury
2. Incomplete – if some motor or sensory functions below the affected area are still present; there are varying degrees of incomplete injury.

#### **Emergency signs and symptoms**

1. Impaired breathing after injury
-

- 
- 2. An oddly positioned or twisted neck or back
  - 3. Extreme back pain or pressure in your neck, head or back
  - 4. Weakness, incoordination or paralysis in any part of your body
  - 5. Numbness, tingling or loss of sensation in your hands, fingers, feet or toes
  - 6. Loss of bladder or bowel control
  - 7. Difficulty with balance and walking



**IMPORTANT!** For suspected back or neck injury, **DO NOT** move the injured person (permanent paralysis and other serious complications may result).

#### Management:

Goal – prevent secondary injury (immobilization of spine)

- Assess ABCs and neurologic status (i.e. observe for progressive neurologic deficits, adequate oxygenation and airway)
- Steroid therapy
- Halo vest - a lightweight vest with an attached halo that stabilizes the cervical spine
- Surgery:
  - o Indications: cord compression, unstable vertebral body, wound penetrates the cord, bony fragments in canal, deterioration of neurologic status; tumor
  - o Skeletal fracture reduction and traction

#### **ACUTE ISCHEMIC STROKE**

The brain cannot store oxygen or glucose and therefore requires a constant flow of blood to supply these nutrients. The blood supply to the brain can be altered through several different processes. The pathophysiology of stroke varies based on the precipitating event.

- Etiology: embolism, thrombosis, hemorrhage, and compression or spasm of the vessels
- Stroke is a medical emergency and is treated with the same urgency as acute MI

#### *Risk factors:*

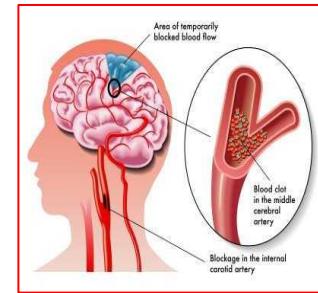
- 1. Hypertension
- 2. Diseases:
  - ✓ Cardiac disease (CAD, heart failure, atrial fibrillation, endocarditis, patent foramen ovale, MI, carotid artery disease),
  - ✓ Diabetes
  - ✓ Hypercoagulability (cancer, pregnancy, high RBCs, sickle cell)
- 3. Dyslipidemia
- 4. Hormone therapy
- 5. Increased age, race (African American), male
- 6. Prior stroke and/or family history
- 7. Smoking, alcohol or illicit drugs
- 8. Obesity / Physical inactivity

#### *Transient ischemic attack (TIA)*

- An important warning sign for stroke
  - Development of stroke symptoms that resolve without tissue infarction
  - Most resolve within minutes (but still needs extensive workup to identify treatable causes)
-

## *Ischemic stroke*

- Accounts for approximately 85% of all strokes
- Edema occurs in the area of ischemic or infarcted tissue (contributes to further neuronal cell death)
- If ischemia is not reversed, neuronal cell death and infarction of brain tissue occurs
- Causes:
  1. Embolism – refers to the occlusion of a cerebral vessel, most often by a blood clot (i.e. infectious particles, fat, air, or tumor fragments)
    - often associated with heart disease (bacterial vegetations or blood clots)
    - Common causes: chronic atrial fibrillation, valvular disease, prosthetic valves, cardiomyopathy, atherosclerotic lesions of the proximal aorta
    - Onset = rapid, with symptoms that develop without warning
  2. Thrombus formation – most common cause of ischemic stroke (atherosclerosis)
    - ✓ Thrombosis due to atherosclerosis of large cerebral vessels results in large areas of infarct (significant functional deficits are common)
    - ✓ If thrombus forms in a smaller branching artery, a lacunar infarct develops (lacunar infarcts result in smaller areas of neuronal cell death)
    - ✓ Thrombotic strokes tend to develop during periods of sleep or inactivity, when blood flow is less brisk



**Penumbra** – an area of tissue surrounding the core ischemic area.

The penumbra receives some blood flow from adjacent vessels but perfusion is marginal. If CBF is improved, the penumbra may recover.

## *Signs and Symptoms*

- range from very mild to significant loss of functional abilities; based on the area of ischemia or infarction
  1. weakness in an extremity or on one side of the body
  2. sensory changes
  3. difficulty speaking or understanding speech
  4. facial droop
  5. headache
  6. visual changes

## *Diagnostic Tests*

Goal of initial diagnostic testing in acute stroke = to rule out intracranial hemorrhage (treatments for hemorrhagic and ischemic stroke differ significantly)

1. Noncontrast head CT scan – available at most hospitals,
  - o can be performed quickly
  - o an excellent tool for detecting intracranial bleeding
  - o evidence of ischemia may not appear or may be very subtle on standard CT scanning until 12 to 24 hours after symptom onset
2. Specialized MRI scans (diffusion-weighted imaging, perfusion-weighted imaging) – can detect areas of ischemia before they are apparent on CT
3. MRA – detects areas of vascular abnormality
4. Cerebral angiography and carotid ultrasound
5. Transthoracic or transesophageal echocardiography – to assess cardiac causes of stroke



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6. ECG – for cardiac monitoring for at least 24 hours
  7. Cardiac biomarkers – there is a correlation between cerebrovascular and cardiovascular disease

### **Principles of Management of Acute Ischemic Stroke - “time is brain” when cerebral ischemia occurs**



- Goals of treatment:
  - ✓ restore circulation to the brain when possible
  - ✓ stop the ongoing ischemic process, and
  - ✓ prevent secondary complications

1. Evaluation of Conditions That Mimic Acute Ischemic Stroke
  - hypoglycemia – may cause stroke-like symptoms (easily detected by checking blood glucose)
  - toxic or metabolic disorders
  - migraines, seizures
  - mass lesions such as brain tumors or abscesses
  - psychological disorders
2. Fibrinolytic Therapy
  - Administered in an attempt to restore perfusion to the affected area
  - IV rtPA = within 3 hours of the onset of symptoms (recommended dose = 0.9 mg/kg, with 10% of the total dose given as a bolus over 1-2mins followed by the remainder of the dose as an infusion over 1 hour)
  - Vital signs and neurologic checks = every 15 minutes for the first 2 hours, then every 30 minutes for 6 hours, and then hourly until 24 hours following initial treatment
3. Endovascular Treatment
4. Blood pressure management
5. Management of increase intracranial pressure
6. Glucose management
7. Preventing and treating secondary complications
8. Preventing recurrent stroke

**Seizure** – a sudden, abnormal, excessive discharge of electrical activity within the brain that disrupts the brain's usual system for nerve conduction

**Classification:**

1. Absence (petit mal)
2. Atonic
3. Myoclonic
4. Clonic
5. Idiopathic (unclassified seizures)

**Diagnostics:**

1. Electroencephalography (EEG) – definitive test to diagnose seizure activity
2. SPECT scan – scan of choice for a diagnostic evaluation of certain types of CNS disorders

**Treatment:**

1. Medication therapy – hallmark of seizure management
  2. Surgery – respective procedures or palliative corpus callosotomy
  3. Seizure precautions
  4. Oxygen and suction equipment at bedside
  5. Re-orient client upon waking
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- Causes: Stroke, low blood glucose levels, excessive alcohol, withdrawal symptoms
- Diagnostics: EEG, CT scan, MRI, LP

Principle of Management:

- Goal: control seizure as quickly as possible, preventing recurrence, maintaining patient safety and identifying the underlying cause.

Medications:

1. Lorazepam (Ativan) – induces respiratory depression
2. Flumazenil (Romazicon) – decrease respiratory depression
3. Phenytoin via central venous line
4. Phenobarbital (Luminal)

Patient education on DOs and DON'Ts



- ✓ Do not hold the person down or try to stop his or her movements.
- ✓ Do not put anything in the person's mouth. This can injure teeth or the jaw. A person having a seizure cannot swallow his or her tongue.
- ✓ Do not try to give mouth-to-mouth breaths (like CPR). People usually start breathing again on their own after a seizure.
- ✓ Do not offer the person water or food until he or she is fully alert
- ✓ Ease the person to the floor.
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- ✓ Remove eyeglasses.
- ✓ Loosen ties or anything around the neck that may make it hard to breathe.
- ✓ Note the duration of the seizure.

**Meningitis** – an inflammation of the membranes covering the brain and spinal cord

Causative agents:

- Bacterial - *Haemophilus influenza* or *Neisseria meningitidis*
- Fungal – *Cryptococcus neoformans* (most common)
- Neonatal – group B streptococcus or *Escherichia coli*
- Syphilitic – *Treponema pallidum*

Diagnostic: Lumbar puncture (LP) – use to diagnose most cases

Treatment:

1. Rifampin (Rifadin) is the first line and initial treatment for bacterial meningitis
2. Vaccines:
  - *Haemophilus influenza* type b (Hib) for meningococcal meningitis
  - Meningococcal conjugate vaccine [MCV4 (Menactra)] and meningococcal polysaccharide vaccine [MPSV4 (Menomune)] against *Neisseria meningitidis*

## **TERMINOLOGIES**

**Complete spinal cord lesion** - a condition that involves total loss of sensation and voluntary muscle control below the lesion

**Incomplete Spinal cord lesion** - a condition where there is preservation of the sensory or motor fibers, or both, below the lesion

**Spinal cord injury (SCI)** – an insult to the spinal cord resulting to temporary or permanent changes in the cord's normal motor, sensory, or autonomic functions; an injury to the spinal cord, vertebral column, supporting soft tissue, or intervertebral disks caused by trauma

**Neurogenic bladder** - bladder dysfunction that results from a disorder or dysfunction of the nervous system; may result in either urinary retention or bladder overactivity

**Paraplegia** - paralysis of the lower extremities with dysfunction of the bowel and bladder from a lesion in the thoracic, lumbar, or sacral regions of the spinal cord

**Quadriplegia (tetraplegia)** - paralysis of both arms and legs, with dysfunction of bowel and bladder from a lesion of the cervical segments of the spinal cord

**Transection** - severing of the spinal cord itself; transection can be complete (all the way through the cord) or incomplete (partially through)

## **FURTHER READINGS**

Emergency Nurses Association. (2019). *Sheehy's Manual of Emergency Care*, 7th ed. St. Louis: Elsevier Mosby. pp 504-593

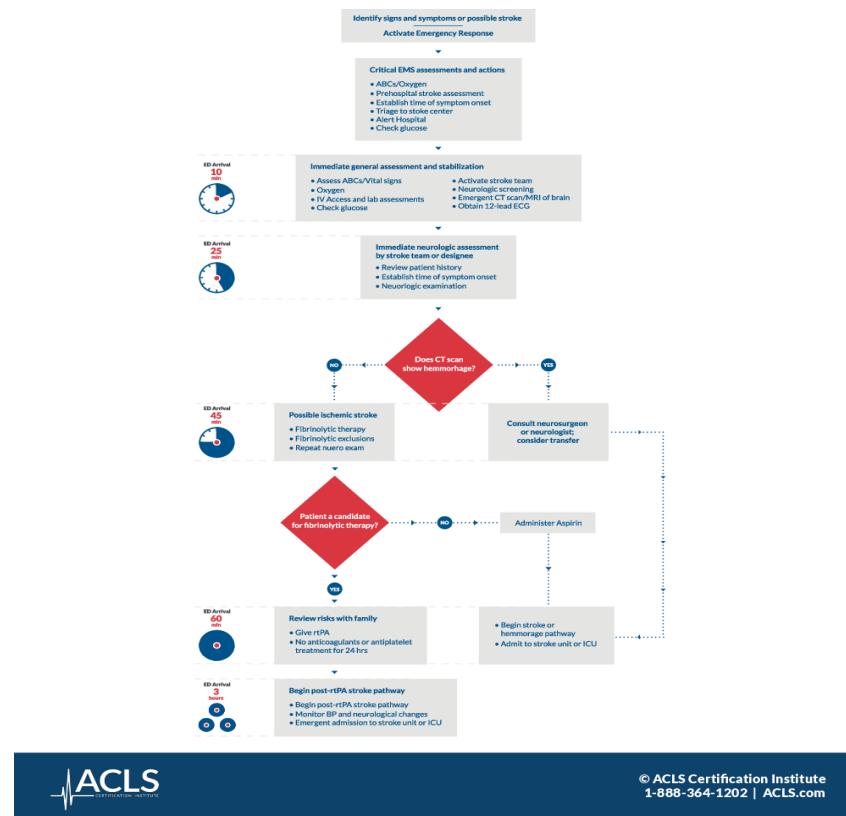
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## **UNIT TASKS**

Although stroke is easily preventable, it remains the second leading cause of death and a first leading cause of acquired disability in adults worldwide currently.

From the stroke algorithm shown below (<https://resources.acls.com/free-resources/acls-algorithms/suspected-stroke>) give and explain the rationale for each of the action(s) stated inside the Gray Boxes. Make sure to indicate and cite your source(s) accordingly.

## SUSPECTED STROKE



© ACLS Certification Institute  
1-888-364-1202 | [ACLS.com](http://ACLS.com)

## REFERENCES

ACLS Certification Institute. (2020, March 3). Suspected stroke algorithm [article]. <https://resources.acls.com/free-resources/acls-algorithms/suspected-stroke>

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# COURSE TOPIC

## BACHELORE OF SCIENCE IN NURSING

### NCMB 418 - CARE OF THE CLIENT WITH LIFE-THREATENING CONDITIONS, ACUTELY ILL / MULTI-ORGAN PROBLEMS, HIGH ACUITY AND EMERGENCY SITUATION

COURSE MODULE	COURSE UNIT	WEEK
3	13	15
Assessment of Critically Ill Clients with Shock and MODS		

## **CHECK LIST**

- ✓ Comprehend the course unit objectives.
- ✓ Peruse through the study guide prior to class attendance.
- ✓ Analyze the required learning resources; refer to course unit terminologies for jargons.
- ✓ Proactively participate in classroom discussions.
- ✓ Participate in weekly discussion board (Canvas).
- ✓ Answer and submit course unit tasks on time.



## **LEARNING OBJECTIVES**

At the end of the end of this unit, the students are expected to:

1. Recognize and examine the client with life-threatening conditions, acutely ill/ multi-organ problems, high acuity and emergency situation.
2. Determine a client's the health status/ competence and or expected outcomes of nurse – client working relationship.
3. Record client's responses/ nursing care services rendered and processes/ outcomes of the nurse client working relationship.

- 
- 4. Ensure completeness, integrity, safety, accessibility, and security of information.
  - 5. Adhere to protocols of confidentiality in safekeeping and releasing of records and other information.
  - 6. Evaluate the client's health status / competence and/or expected outcomes of nurse-client working relationship.

## REQUIRED READINGS

Burns, S. and Delgado, S. (2019). Essentials of Critical Care Nursing, 4th ed. USA: McGraw-Hill.

## STUDY GUIDE

### A. Cardiogenic Shock

- A special kind of shock during which the heart does not adequately pump enough blood to the body's tissues (blood flow to tissues decreases and oxygen delivery falls)
- Due to decreased functioning of the heart leading to decreased forward flow of oxygenated blood to the tissues
- Most common cause – heart attack (myocardial infarction) that can damage 40% or more of the ventricle

Recall:

- 1. Stroke volume – the amount of blood pumped out of the heart during each contraction or heartbeat.
- 2. CO – the amount of blood pumped out of the heart every minute



**IMPORTANT!** As stroke volume and CO decrease, blood builds up in the heart and the left ventricular end diastolic volume (LVEDV) increases. This increases the oxygen demand. An increased LVEDV also decreases the amount of blood that flows through the coronary arteries because the blood in the ventricle increases the pressure in the heart muscle (decreased oxygen delivery to the heart can lead to cardiac hypoxia)

Risk Factors:

- Acute myocardial infarction (ST segment elevation MIs- STEMIs)
  - Atrial thrombus
  - Cardiac tamponade
  - Cardiac tumor
  - Cardiomyopathic conditions
  - Cardiopulmonary arrest
  - Dysrhythmias
  - Endocarditis
-

- Myocarditis
- Open heart surgery
- Pheochromocytoma
- Pneumothorax
- Pulmonary embolus
- Septic shock
- Valvular dysfunction (mitral or aortic regurgitation, mitral stenosis)
- Ventricular aneurysm

#### Clinical Manifestations:

- depend on the severity of the shock, other underlying conditions, and the cause of the pump failure.
- Some clinical manifestations are a result of the pump's failure, whereas others are the result of the body's response to the shock.
- Cardiovascular signs – low systolic BP (< 90 mmHg), tachycardia (in response to the low BP and decreased CO of < 2.2 L/min), pulses “weak and thready”
- Capillary refill – sluggish
- Ischemic changes on an ECG – ST segment changes or PVCs
- Chest pain or tightness
- If with severe hypoxia – dark-colored nail beds and mucous membranes
- Anxiety, confusion, lethargy, and coma (the first sign is often a change in mental status)
- Nausea
- Decreased bowel sounds and decreased urine output

#### B. Hypovolemic shock

- The most common form of shock
- Cause – inadequate circulating blood volume in the intravascular bed (circulating oxygenated blood flow to the body organs decreases) leading to inadequate tissue perfusion, causing cellular hypoxia, organ failure, and death.
- Causes
  1. Absolute hypovolemia – occurs as a result of fluid loss from the intravascular space (external fluid loss, internal fluid shifting a.k.a. third spacing)
  2. Relative hypovolemia – occurs as a result of vasodilation and an increase in vascular capacitance in comparison to the amount of circulating volume

**IMPORTANT!** As the circulating blood volume decreases, the venous return to the right side of the heart decreases leading to a decrease in cardiac filling pressure and volume (preload or the end-diastolic volume). The fibers of the sympathetic nervous system (SNS), as well as the medullary portion of the adrenal glands, release two neurotransmitter substances— epinephrine and norepinephrine.



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## Clinical Manifestations

- depend on the severity and rate of volume loss, the patient's ability to compensate, the patient's age, and the presence of preexisting illnesses
1. The reversible, compensatory stage occurs with a fluid loss of 15% to 30% or up to 1500mL.
    - ✓ Goal: to restore oxygenation and perfusion to the cells
    - ✓ May exhibit normal BP readings and narrowed pulse pressure
    - ✓ Tachycardia, tachypnea (creating a respiratory alkalosis)
    - ✓ Hypoxia
    - ✓ Decreased urinary output
    - ✓ Thirst
    - ✓ Pale and cool skin, delayed capillary refill (less than 2 seconds)
    - ✓ Changes in the LOC (e.g., confusion, restless, anxiousness)
  2. The progressive stage of shock – begins with a fluid loss of 30% to 40% or up to 2000 mL
    - ✓ Compensatory mechanisms begin to fail and tissue perfusion becomes ineffective for the body organs to function, organs become dysfunctional and all body systems are affected (as one organ system fails, the others eventually become dysfunctional, leading to multiorgan dysfunction syndrome or MODS).
    - ✓ Increased heart rate
    - ✓ Cardiac dysrhythmias develop
    - ✓ CO, cardiac index, right atrial pressure, and pulmonary artery wedge pressures decrease
    - ✓ Increased SVR – as a result of the continued vasoconstriction of the arterial system
    - ✓ Hypotension with a narrowed pulse pressure
    - ✓ LOC changes: lethargic, confused, and eventually comatose

## C. Anaphylactic Shock

- Hemodynamic compromise of cardiac function, decreased SVR, decreased stroke volume, decreased afterload, decreased end-diastolic volume, and decreased mixed venous oxygenation saturation leading to decrease CO with ineffective tissue perfusion

## D. Septic Shock

- an inflammatory response
- a distributive shock characterized by tachycardia, hyperthermia or hypothermia, and hypotension caused by decreased SVR
- initiated by the launch of immune mediators that are part of the inflammatory reaction.
- Systemic inflammatory response syndrome (SIRS) – a host's response to a variety of clinical insults, both infectious and noninfectious, and is part of the acute sepsis process.

## Risk Factors:

- Very young children
  - Older adults
  - Immunocompromised individuals
  - Chronically ill patients
-

- Patients with malignancies

#### Clinical Manifestations:

1. Early sepsis – manifestations are subtle; therefore, careful monitoring is essential (identifying the patients who are at the greatest risk is important
  - A decline in SVR is one of the first indications of shock
  - Along with a documented or suspected infection, at least two or more of the following signs and symptoms characterize sepsis:
    - Temperature  $> 38.3^{\circ}$  or  $< 36^{\circ}$  C;  $> 100.9$  or  $< 96.8^{\circ}$  F
    - Tachypnea
    - Tachycardia
    - Altered mental status
    - Positive fluid balance ( $>20$  mL/kg over 24 hours)
    - Hyperglycemia ( $>120$  mg/dl) in the absence of diabetes
    - Hypotension (SBP  $< 90$  mm Hg, MAP  $< 70$  mm Hg)
    - $SvO_2 > 70\%$
    - Cardiac index  $> 3.5$  L/min/m<sup>2</sup>
    - White blood cell count (WBC)  $> 12,000$  cells/mm<sup>3</sup>
    - WBC  $< 4000$  cells/mm<sup>3</sup>, or differential  $> 10\%$  bands
    - Elevated C-reactive protein
    - Elevated procalcitonin
2. Compensatory mechanisms include baroreceptor reflex, which causes an increased heart rate and vasomotor tone.



**IMPORTANT!** Once sepsis is present, the stage is set for progression to septic shock. Therefore, diligence must be taken to identify sepsis early and begin early goal-directed treatment and monitoring.

#### Complications:

- May exhibit skin lesions that are most often located on the lower extremities (can be associated with the development of DIC)
- Toxic shock syndrome (TSS) can produce a profound septic shock and has a very distinctive cutaneous component (*staphylococcus aureus* or a severe streptococcal infection causes TSS)

#### **Systemic Inflammatory Response Syndrome (SIRS)**

- ✓ The body's response to an infectious or noninfectious insult affecting the whole body
- ✓ Although the definition refers to it as an "inflammatory" response, it actually has pro- and anti-inflammatory components.

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Criteria of SIRS: at least two of the following:

- Temperature : hyperthermia  $> 38^{\circ}\text{C}$  or hypothermia  $< 36.0^{\circ}\text{C}$
- Heart Rate : tachycardia  $> 90$  beats/minute
- Respiratory Rate : tachypnea  $> 20$  breaths/min
- White Blood Cells : leukocytosis  $> 12 \times 10^9/\text{l}$  or leucopenia  $< 4 \times 10^9/\text{l}$

### **Multiorgan Dysfunction Syndrome**

- A progressive dysfunction of more than one organ in patients who are critically ill or injured
- The leading cause of death in ICUs

Risk Factors:

- Patients with systemic infection (particularly, a gram-negative sepsis)
- Extensive burns
- End-organ failure
- Pancreatitis
- Hypovolemia
- Cardiogenic shock
- Human immunodeficiency virus (HIV)
- Aspiration
- Multiple blood transfusions
- Trauma

Causes:

The initial insult that stimulates MODS can result from:

1. extensive burns
2. trauma
3. cardiorespiratory failure
4. multiple blood transfusions
5. systemic infection (most common)

Prognosis:

- Although the mortality is high, patients can recover
- Potential for recovery depends on the severity of illness or injury, underlying organ reserve, the speed of instituting effective treatment, the adequacy of treatment, and the number and severity of subsequent injuries and complications. If treatment is unsuccessful, death usually occurs between 21 and 28 days after the initial insult.

## **TERMINOLOGIES**

**Distributive shock** – this is also called circulatory shock, the primary cause of decreasing BP is massive vasodilation and pooling of blood into the peripheral vessels. Anaphylactic, Septic and Neurogenic shock are distributive shock

**Shock** – inadequate tissue perfusion

**Systemic Inflammatory Response Syndrome (SIRS)** – the body's response to an infectious or noninfectious insult affecting the whole body

## **FURTHER READINGS**

Burns, S. (2018) AACN Essentials of Critical Care Nursing. Mc Graw Hill Education.

Hinckle, J (2018) Brunner and Suddarth's Textbook of Medical and Surgical Nursing, Lippincott, Williams and Wilkins

## **COURSE TASKS**

Tabulate the stages of shock and their clinical manifestations.

Follow the pattern below:

Manifestations	Compensatory	Progressive	Irreversible
BP			
HR			
RR			
Urine output			
Skin			
Mentation			

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## REFERENCES

Burns, S. and Delgado, S. (2019). *Essentials of Critical Care Nursing*, 4th ed. USA: McGraw-Hill.

Hinkle, J. and Cheever, K. (2017). *Brunner & Suddarth's Textbook of Medical-Surgical Nursing*, 14<sup>th</sup> ed. USA: Wolters Kluwer

Norris, T. (2019). *Porth's Pathophysiology: Concepts of Altered Health States*, 9<sup>th</sup> ed. USA: Wolters-Kluwer





# COURSE UNIT



## BACHELOR OF SCIENCE IN NURSING:

### NCMB 418: CARE OF THE CLIENT WITH LIFE-THREATENING CONDITIONS, ACUTELY ILL / MULTI-ORGAN PROBLEMS, HIGH ACUITY AND EMERGENCY SITUATION

COURSE MODULE	COURSE UNIT	WEEK
3	14	16
Nursing Care of Clients in Emergency Situations 1: ABCs		

## CHECK LIST

- ✓ Comprehend the course unit objectives.
- ✓ Peruse through the study guide prior to class attendance.
- ✓ Analyze the required learning resources; refer to course unit terminologies for jargons.
- ✓ Proactively participate in classroom discussions.
- ✓ Participate in weekly discussion board (Canvas).
- ✓ Answer and submit course unit tasks on time.



## UNIT EXPECTED OUTCOMES (UEOs)

At the end of the end of this unit, the students are expected to:

1. Recognize and examine the client with life-threatening conditions, acutely ill/ multi-organ problems, high acuity and emergency situation.
2. Determine a client's the health status/ competence and or expected outcomes of nurse – client working relationship.
3. Record client's responses/ nursing care services rendered and processes/ outcomes of the nurse client working relationship.
4. Ensure completeness, integrity, safety, accessibility, and security of information.
5. Adhere to protocols of confidentiality in safekeeping and releasing of records and other information.

- 
- 6. Evaluate the client's health status / competence and/or expected outcomes of nurse-client working relationship.

## REQUIRED READINGS

Crouch, R., Charters, A., Dawood, M., & Bennett, P. (2017). *Oxford handbook of emergency nursing*. Oxford, United Kingdom: Oxford University Press.

Burns, S. M., & Delgado, S. A. (2019). *AACN essentials of critical care nursing*. New York: McGraw-Hill Education.

## STUDY GUIDE

### **AIRWAY OBSTRUCTION**

- A life-threatening medical emergency. The airway may be partially or completely occluded. If the airway is completely obstructed, permanent brain damage or death will occur within 3 to 5 minutes secondary to hypoxia. Partial obstruction of the airway can lead to progressive hypoxia, hypercarbia, and respiratory and cardiac arrest.

#### **Causes:**

- Aspiration of foreign bodies
- ✓ Aspiration of a bolus of meat – most common cause of airway obstruction in adults
- ✓ Aspiration of food, small toys, buttons, coins, and other objects – common in children
  - Anaphylaxis
  - Viral or bacterial infection
- ✓ Peritonsillar abscesses, epiglottitis, and other acute infectious processes of the posterior pharynx
- Trauma
- Inhalation or chemical burns.

#### **Clinical Manifestations**

- Choking
- Apprehensive appearance
  - ✓ Inspiratory and expiratory stridor, labored breathing, use of accessory muscles (suprasternal and intercostal retraction), flaring nostrils
- Increasing anxiety, restlessness, and confusion
- Cyanosis and loss of consciousness develop as hypoxia worsens.

#### **Assessment and Diagnostic Findings**

- Simply asking the person whether he or she is choking and requires help may be helpful. If the person is unconscious, inspection of the oropharynx may reveal the offending object.
- X-rays, laryngoscopy, or bronchoscopy also may be performed.

#### **Management**

- Establishing an airway
  - ✓ may be as simple as repositioning the patient's head to prevent the tongue from obstructing the pharynx.

- ✓ Abdominal thrusts, the head-tilt–chin-lift maneuver, the jaw-thrust maneuver, or insertion of specialized equipment may be needed to open the airway, remove a foreign body, or maintain the airway (the cervical spine must be protected from injury at all times)

➤ **HEAD-TILT–CHIN-LIFT MANEUVER**

1. The client is placed supine on a firm, flat surface. (If the client is lying face down, the body is turned as a unit so that the head, shoulders, and torso move simultaneously with no twisting.)
2. The airway is opened by placing one hand on the individual's forehead, and firm backward pressure is applied with the palm to tilt the head back.
3. The fingers of the other hand are placed under the bony part of the lower jaw near the chin and lifted up.
4. The chin and the teeth are brought forward almost to occlusion to support the jaw.

**Figure 1: Head-tilt-chin-lift Maneuver**



Source: Sampson, 2021

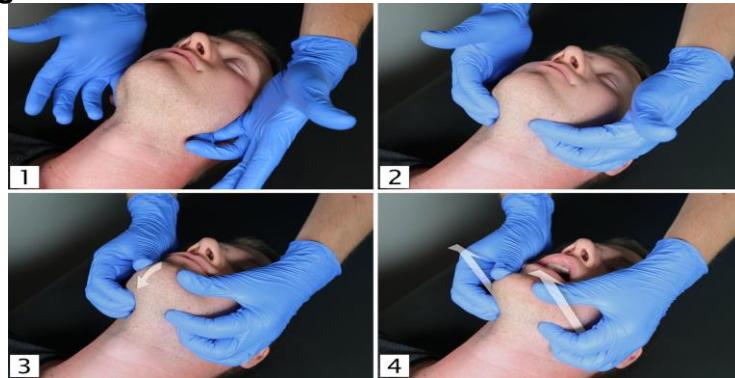


**IMPORTANT!** This maneuver should only be used if it is determined that the client's cervical spine is NOT injured.

➤ **JAW-THRUST MANEUVER**

1. The client is placed supine on a firm, flat surface. (If the client is lying face down, the body is turned as a unit so that the head, shoulders, and torso move simultaneously with no twisting.)
2. Hands are placed on each side of the client's jaw, the angles of the victim's lower jaw are grasped and lifted, displacing the mandible forward. This is a safe approach to opening the airway of a victim with suspected neck injury because it can be accomplished without extending the neck.

**Figure 2: Jaw-thrust Maneuver**



Source: amboss.com, 2020

## PULMONARY INJURY

- Damage to the lower airways and lung tissue due to inhalation of the chemical by-products of combustion, resulting in atelectasis, reduced ciliary clearance, and loss of surfactant (e.g. Carbon monoxide poisoning can result from inhalation injury, leading to severe hypoxia and brain injury)
- Predisposes the client to infection and sepsis
- Associated with significant morbidity and mortality (can be present even without signs of any burns to the skin)
- Intensive care treatment is required and is mainly supportive (aimed at preventing hypoxia, infection, and atelectasis)

## CARDIAC ARREST

- Failure of the heart to function
- Mechanisms:
  1. Failure of the oxygen supply causes asystole (or extreme bradycardia). There is no electrical activity and no pumping.
  2. Failure of electrical control causes ventricular fibrillation (VF) or pulseless ventricular tachycardia (VT). There is no effective electrical activity and no effective pumping.
  3. Failure of the pump mechanism causes pulseless electrical activity (PEA) (formerly known as electromechanical dissociation or EMD). There is electrical activity but no pumping.
- Three arrest rhythms:
  1. Asystole – the final rhythm in all cardiac arrest cases
    - the heart slows and stops when deprived of its power supply
    - Causes: hypoxia and/or any condition leading to hypoxia (e.g. hypovolemia)
      - Tachycardia during hypoxia is the result of the influence of the autonomic nervous system. Left to its own devices, the hypoxic heart contracts more slowly (terminal bradycardia) and then arrests in asystole.
  2. Ventricular fibrillation (V-fib) – considered the most serious cardiac rhythm disturbance (AHA, 2016); due to direct damage or irritation of the heart and may be because of:
    - myocardial ischemia or infarction
    - poisoning
    - gross electrolyte imbalance
    - hypothermia and near drowning
    - electrocution
    - penetrating trauma
    - iatrogenic causes (e.g. cardioversion and cardiac catheterization)



In adults, V-fib is most commonly seen in patients with ischemic heart disease whereas, in children, poisoning with tricyclic antidepressants should always be considered. Pulseless V-tach is a similar condition to V-fib in both causation and treatment.

3. Pulseless electrical activity (PEA) – a state when the myocardium is unable to function despite a relatively normal electrical stimulus.
  - Causes: Primary damage to the cardiac muscle:
    - extensive myocardial infarction
    - ruptured cardiac aneurysm
    - papillary muscle rupture

- extreme direct trauma
- Causes: Secondary (some of which may be treatable):
  - tension pneumothorax
  - cardiac tamponade
  - pulmonary embolism (PE)
  - hypovolemia
  - hypothermia
  - poisoning
  - electrolyte imbalance



In adults, myocardial infarction (MI) is the most common cause of PEA, whereas hypovolemia should be suspected in children. PEA should not be confused with an agonal rhythm. Many clients with a diagnosis of PEA have a very low output state rather than a complete circulatory arrest.

### Causes of cardiac arrest

The most common cause of adult cardiac arrest is thromboemboli (AMI/ PE), but the 'four Hs and four Ts' should be considered in all cardiac arrests. These cause cardiac arrest, and not just non- V-tach / V-fib, as it is possible to have a tension pneumothorax presenting in V-fib.

**Figure 3. Contributing Factors to Pulseless Arrest**

The four Hs and four Ts	
<ul style="list-style-type: none"> <li>• Hypoxia</li> <li>• Hypovolaemia</li> <li>• Hyper-/hypokalaemia/metabolic disorders</li> <li>• Hypothermia</li> </ul>	<ul style="list-style-type: none"> <li>• Tension pneumothorax</li> <li>• Tamponade</li> <li>• Toxins</li> <li>• Thrombosis (coronary or pulmonary)</li> </ul>

Source: acls-algorithms.com, 2021

### Cardiac arrest in special circumstances:

1. *Pregnancy* – rare but requires significant modification to BLS.
  - Physiological changes during pregnancy result in high risk of aspiration, increase difficulties in airway management, and difficulty in performing chest compressions.
  - All visibly pregnant patients need to be resuscitated, whilst tilted 15° to the left to displace the uterus and ease caval compression.
  - Higher hand positions may be required to adjust for the displacement of the internal organs.



**IMPORTANT!** ALS remains the same, including ABCDE / early defibrillation with consideration of early intubation. Emergency Cesarean section, ideally within 5min (>23weeks to maximize mother / fetal survival), should also be considered. At <20weeks, the uterus is unlikely to compromise maternal cardiac output.

2. *Poisoning / Drug overdose*
  - May be accidental or deliberate.
  - Consider the agent. Some are toxic to the rescuer (e.g. cyanides, organophosphates).
  - The ABCDE approach should be followed to prevent cardiopulmonary arrest.
  - Effective compressions and ventilations (early intubation) are the principal treatment during resuscitation secondary to poisoning.

- 
- Success following a prolonged cardiac arrest is reported, regardless of the presenting rhythm, utilizing the 'four Hs and four Ts' approach.
  - Identification of the poison may enable the use of an appropriate antidote (e.g. naloxone for opioids).
3. *Trauma*
    - Cardiac arrest secondary to blunt trauma has a poor outcome
    - Use the ABCDE approach with aggressive and prompt treatment of injuries (these may encompass intubation, bilateral needle decompression and bilateral chest drain placement, fluid bolus [O negative blood], with compressions supported by adrenaline)
    - Thoracotomy should be considered where there is a history of penetrating trauma
  4. *Electrocution*
    - Relatively infrequent, but potentially devastating multisystem injury.
    - ABCDE approach should be utilized, with early defibrillation as required
    - Removal of clothing – to reduce further electrical burn injuries and allow full inspection for tissue damage / burns / compartment syndrome and secondary injuries from falls, etc.
    - Consider IV fluid if extensive tissue damage.
  5. *Asthma*
    - Cardiac arrest as a result of a severe asthma attack is often a terminal event (linked to bronchospasm, mucus plugging, tension pneumothorax, and arrhythmias)
    - Dehydration is also common.
    - The ABCDE / early defibrillation approach should be followed, using the four Hs and four Ts to guide management.
    - Ventilation/ compressions may be ineffective due to i airway pressures.
    - Early intubation assists with oxygenation
    - In tension pneumothorax, needle decompression, if required, should be followed with a definitive chest drain.

## **HEMORRHAGE**

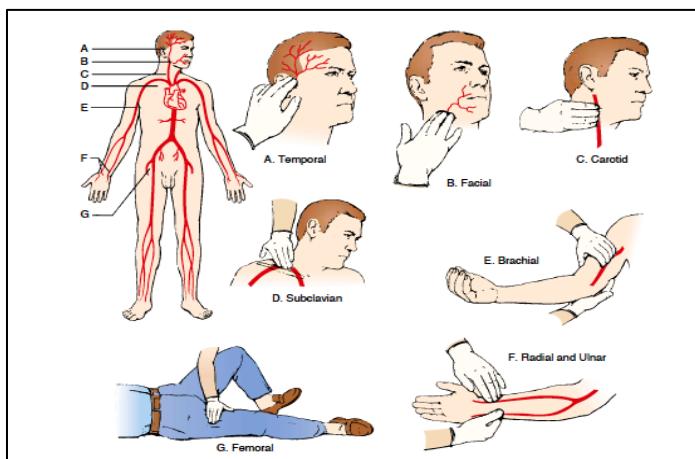
- Hemorrhage resulting to the reduction of circulating blood volume – primary cause of shock
- Obstructed airway or a sucking wound of the chest takes precedence over the immediate control of hemorrhage.
- Stop the bleeding – essential to the care and survival of clients in an emergency or disaster situation
- Minor bleeding (usually venous) generally stops spontaneously unless the client has a bleeding disorder or has been taking anticoagulants
- Clients are assessed for signs and symptoms of shock: cool, moist skin (resulting from poor peripheral perfusion), falling blood pressure, increasing heart rate, delayed capillary refill, and decreasing urine output (late sign)
- Goals: to control the bleeding, maintain an adequately circulating blood volume for tissue oxygenation, and prevent shock
- Risks: cardiac arrest caused by hypovolemia with secondary anoxia

## **Management:**

1. Fluid Replacement – a loss of circulating blood results in a fluid volume deficit and decreased cardiac output

- administered as prescribed, depending on clinical estimates of the type and volume of fluid lost
  - IVF: Isotonic solutions (lactated Ringer's, normal saline) and/or colloids
  - Blood component therapy
    - ✓ PRBCs – for massive blood loss
    - ✓ O-negative (in emergencies)
      - ❖ for women of childbearing age, for men, and for postmenopausal women (no time for blood typing and cross-matching in emergent situations)
      - ❖ provides safe administration of blood immediately without sensitizing an Rh-negative woman to Rh-positive blood (sensitization can result in difficulties later during pregnancy)
2. Control of External Hemorrhage

**Figure 4. Pressure Points for Control of Hemorrhage**



Source: Hinkle & Cheever, 2017

## TERMINOLOGIES

**Cardiac arrest** – sudden cessation of the beating of the heart cutting off blood flow to the brain and other organs; an emergency and fatal if not treated immediately

**Drug overdose** – a condition when one ingests / administers a certain medication more than the medically recommended dose

**Electrocution** – electric shock; occurs when a person comes into contact with a high voltage electrical energy source

**Emergency** – a serious, unexpected, and often dangerous situation requiring immediate action.

**Poisoning** – an injury or death due to swallowing / ingestion, inhaling, touching or injecting various drugs, chemicals, venoms or gases.

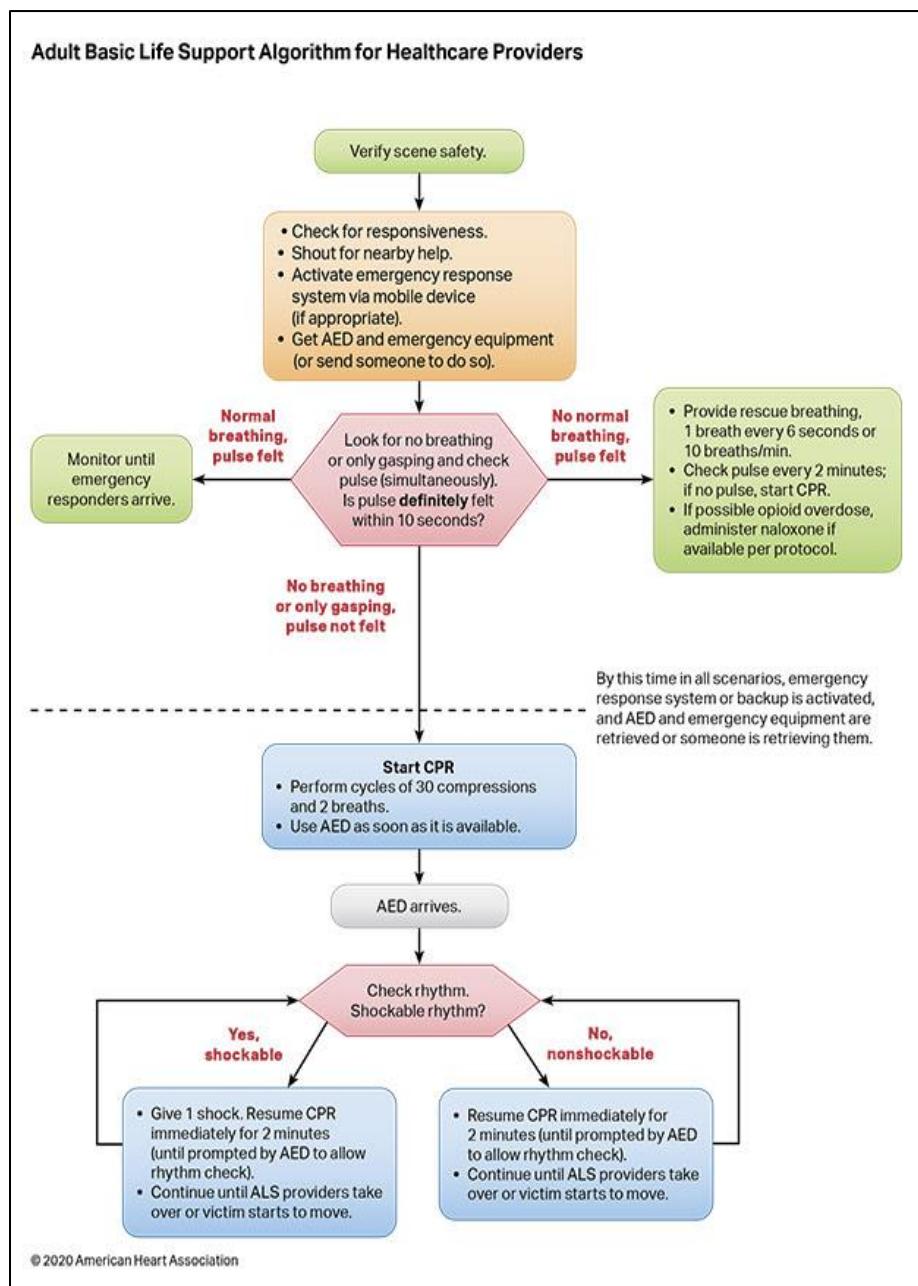
**Trauma** – a serious or life-threatening injury as a result of an event such as a car accident, gunshot wound or fall

## FURTHER READINGS

Emergency Nurses Association. (2019). *Sheehy's Manual of Emergency Care*, 7<sup>th</sup> ed. St. Louis: Elsevier Mosby.

## UNIT TASKS

From the CPR algorithm shown below, give and explain the rationale for each of the action(s) stated inside the Boxes. Make sure to indicate and cite your source(s) accordingly.



---

## REFERENCES

- Amboss.com (2020). Airway management. [https://www.amboss.com/us/knowledge/Airway\\_management/](https://www.amboss.com/us/knowledge/Airway_management/)
- American Heart Association (2016). Health topics: Arrhythmias. Baid, H., Creed, F., & Hargreaves, J. (2016). *Oxford handbook of critical care nursing*. Oxford, United Kingdom: Oxford University Press.
- Baid, H., Creed, F., & Hargreaves, J. (2016). *Oxford handbook of critical care nursing*. Oxford, United Kingdom: Oxford University Press.
- Burns, S. and Delgado, S. (2019). *Essentials of Critical Care Nursing*, 4th ed. USA: McGraw-Hill
- Emergency Nurses Association. (2019). *Sheehy's Manual of Emergency Care*, 7th ed. St. Louis: Elsevier Mosby.
- Hinkle, J. and Cheever, K. (2017). *Brunner & Suddarth's Textbook of Medical-Surgical Nursing*, 14<sup>th</sup> ed. USA: Wolters Kluwer
- Sampson, Michael. (2021). A guide to airway management. *British Journal of Cardiac Nursing*. 16. 1-13. 10.12968/bjca.2020.0093.





# COURSE UNIT

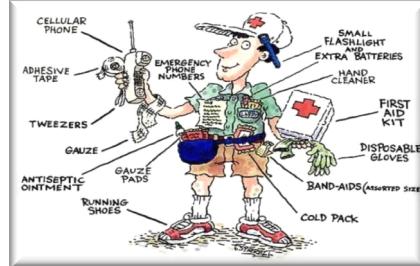


## BACHELOR OF SCIENCE IN NURSING: EMERGENCY AND DISASTER NURSING

COURSE MODULE	COURSE UNIT	WEEK
3	15	17
Nursing Care of Clients in Emergency Situations 2 : Triage and Severity Indices		

### CHECK LIST

- ✓ Read course and unit objectives
- ✓ Read study guide prior to class attendance
- ✓ Read required learning resources; refer to unit terminologies for jargons
- ✓ Proactively participate in classroom discussions
- ✓ Participate in weekly discussion board (Canvas)
- ✓ Answer and submit course unit tasks on time



### UNIT EXPECTED OUTCOMES (UEOs)

At the end of this unit, the students are expected to:

#### Cognitive:

1. Discuss the methods of triage and measures to deal with the victims of a disaster.
2. Apply the principles of triage and severity indices in various nursing management that can be instituted in the emergency environment.

#### Affective:

1. Listen attentively during class discussions
2. Demonstrate tact and respect when challenging other people's opinions and ideas
3. Accept comments and reactions of classmates on one's opinions openly and graciously.

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### **Psychomotor:**

1. Participate actively during class discussions
2. Confidently express personal opinion and thoughts in front of the class

## **REQUIRED READINGS**

Veenema, T. G. (2018). *Disaster Nursing and Emergency Preparedness: for Chemical, Biological, and Radiological Terrorism and Other Hazards*, 4<sup>th</sup> ed. NY: Springer Publishing Company, LLC

## **STUDY GUIDE**

A serious medical emergency is stressful and traumatic, and it is important to receive quality care when needed most as this could mean the difference between life and death. Healthcare professionals have the skills and equipment necessary to resuscitate, diagnose and treat most emergencies. The initial assessment process is referred to as triage.



**Triage** – derived from Old French word “trier” which means “to sort” and known as the process of determining the priority of patients' treatments based on the severity of their condition.

- A process for sorting injured people into groups based on their need for or likely benefit from immediate medical treatment; an ongoing process done many times
- Used in hospital emergency rooms, on battlefields, and at disaster sites when limited medical resources must be allocated
- Focus: To do as little as possible for the greatest number in the shortest period of time (Famorca, 2013); 75-85% of fatalities occur within first 20 minutes

NOTE: Before performing a triage

- ✓ Evaluate every situation before acting; perform quick incident scene survey
- ✓ Determine scene hazards
- ✓ Use appropriate PPE
- ✓ Remain in appropriate zone

**Casualty** – a person severely affected by an event or situation, victim

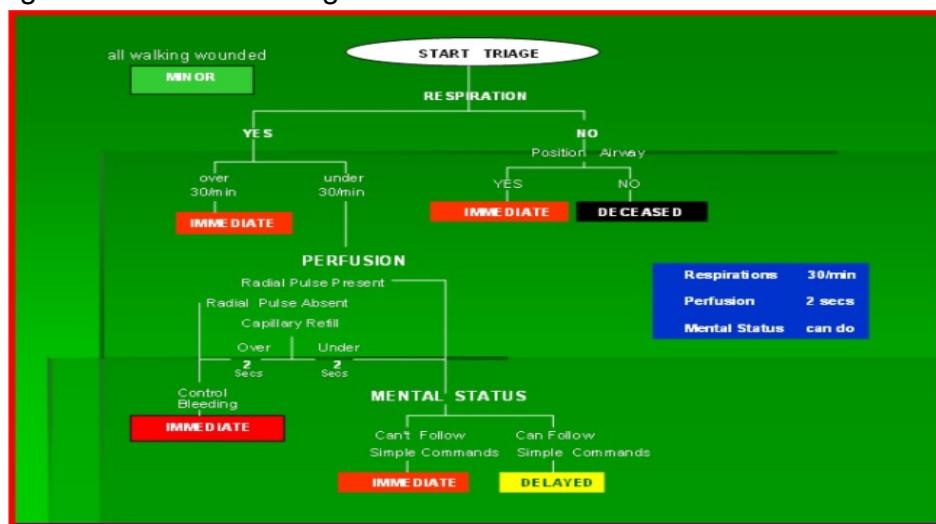
- Multiple – number of victims is < 100
- Mass – number of victims is > 100
  - MCI (Mass Causality Incident) is an event that exceeds the health care capabilities of the response
- Direct Victim – an individual who is immediately affected by the event
- Indirect Victim – may be a family member or friend of the victim or a first responder

- Displaced – those who have to evacuate their home, school or business as a result of the disaster
- Refugees – a group of people who have fled their home or even their country as a result of famine, drought, natural disaster, war or civil unrest

### *Disaster Triage Methods*

1. M.A.S.S. – Move, Assess, Sort, Send
  - Starts the process by clearing the ‘walking wounded’ using verbal instructions
2. S.A.L.T. – Sort, Assess. Life-threatening intervention(s), Treat and Transport
3. S.T.A.R.T. – Simple Triage and Rapid Treatment (Jump START for Pediatrics)
  - Rapid approach to triaging large numbers of causalities
  - Occurs just inside the warm zone prior to decontamination to assess the victims and their injuries
  - Fast, easy to use and to remember
  - Allows the most good for the most patients with the least amount of resources
  - RPM = 30-2-Can Do

Figure 1. The START Algorithm



Source: WHO, 2020

### *Triage Tagging*

1. Black = expectant (deceased)
2. Red = immediate – client needs immediate treatment within the hour but has a chance of survival
3. Yellow = delayed – client not in immediate danger; treatment may be delayed for an hour
4. Green = minor - “walking wounded”



ID-ME: Immediate = red  
 Delayed = yellow  
 Minimal = green  
 Expectant = black

## *Emergency Severity Rating Systems*

- Emergency department triage has several functions:
    1. Identification of patients who should not wait to be seen, and
    2. Prioritization of incoming patients
  - Accomplished by determining the patient's illness/injury severity or acuity (the degree to which the patient's condition is life- or limb-threatening and whether immediate treatment is needed to alleviate symptoms)
  - Means of scoring an individual's severity of condition and analyzes outcomes of trends in hospital stay and hospital rates

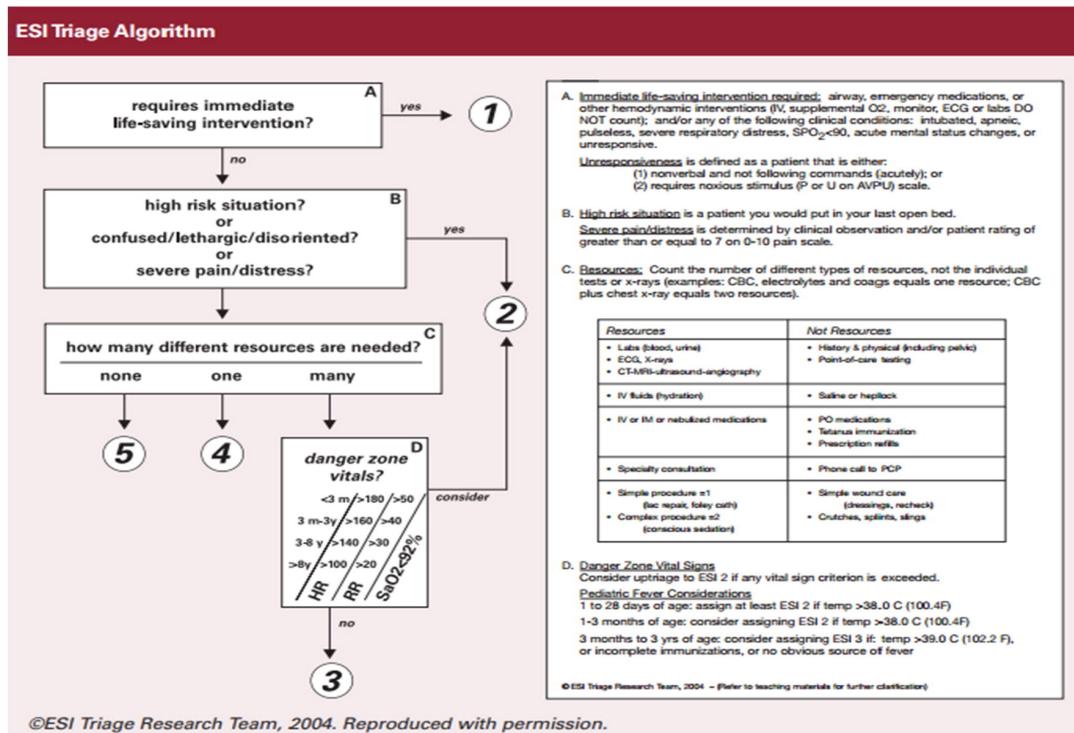
## Characteristics: Validity & Reliability Systems: 2-5-level triaging

- ❖ 2- level = sick / not sick
  - ❖ 3-level = Emergent/Urgent/Non-urgent
  - ❖ 4-level = life-threatening/Emergent/Urgent/Non-urgent
  - ❖ 5-level = most acute/Emergent/Urgent/Non-urgent /least acute

## Emergency Severity Index (ESI)

- ❖ A – intubated, pulseless, apneic, unresponsive = unstable
  - ❖ B – high risk situation (confused, lethargic, or disoriented; in severe pain or distress) = threatened = stable in less than 60 minutes
  - ❖ C – number of resources needed = could be delayed
  - ❖ D – danger zone = reclassify based on vital signs

Figure 2. ESI Triage Algorithm



## Quick Assessment Components

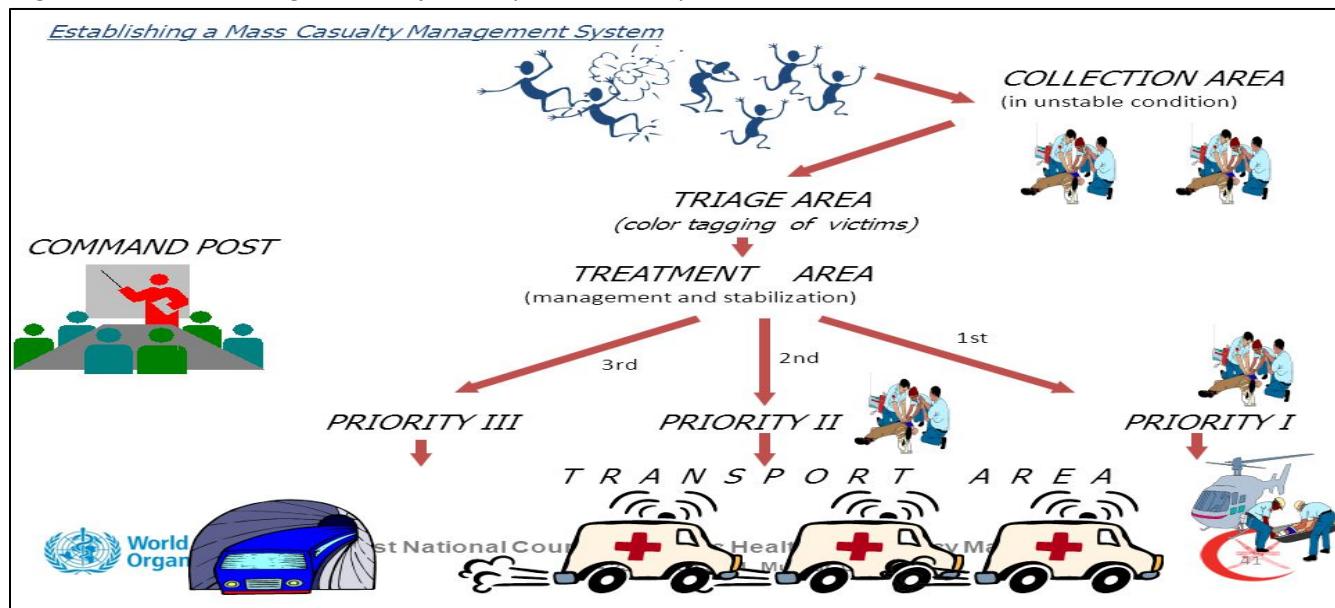
### A. For Adults (AMPLE)

- ✓ Allergies
- ✓ Medication(s) taken
- ✓ Past medical history
- ✓ Last mealtime
- ✓ Event/environment

### B. For Pediatric Clients (CIAMPEDS)

- ✓ Chief complaint
- ✓ Immunizations
- ✓ Allergies
- ✓ Medication(s) taken
- ✓ Past medical history
- ✓ Event/environment
- ✓ Diet and diapers
- ✓ Signs and symptoms present (include onset)

Figure 1. MCI Management System (WHO, 2020)



## ENVIRONMENTAL EMERGENCIES

### Heat Stroke

= is an acute medical emergency caused by failure of the heat-regulating mechanisms of the body. It usually occurs during extended heat waves, especially when they are accompanied by high humidity. People at risk are those not acclimatized to heat, elderly and very young people, those unable to care for themselves, those with chronic and debilitating diseases, and those taking certain medications (eg, major tranquilizers, anticholinergics, diuretics, beta-adrenergic blocking

agents). Exertional heat results because of inadequate heat loss. This type of heat stroke can also cause death.

### **Assessment and Diagnostic Findings**

Heat stroke causes thermal injury at the cellular level, resulting in widespread damage to the heart, liver, kidney, and blood coagulation. Recent patient history reveals exposure to elevated ambient temperature or excessive exercise during extreme heat. When assessing the patient, the nurse notes the following symptoms:

1. profound central nervous system (CNS) dysfunction (manifested by confusion, delirium, bizarre behavior, coma);
2. elevated body temperature ( $40.6^{\circ}\text{C}$  [ $105^{\circ}\text{F}$ ] or higher); hot, dry skin; and usually anhidrosis (absence of sweating), tachypnea, hypotension, and tachycardia.

### **Management**

The primary goal is to reduce the high temperature as quickly as possible, because mortality is directly related to the duration of hyperthermia. Simultaneous treatment focuses on stabilizing oxygenation using the ABCs of basic life support. After the patient's clothing is removed, the core (internal) temperature is reduced to  $39^{\circ}\text{C}$  ( $102^{\circ}\text{F}$ ) as rapidly as possible. One or more of the following methods may be used as directed:

- Cool sheets and towels or continuous sponging with cool water
- Ice applied to the neck, groin, chest, and axillae while spraying with tepid water
- Cooling blankets
- Iced saline lavage of the stomach or colon if the temperature does not decrease
- Immersion of the patient in a cold water bath (if possible)

During cooling, the patient is massaged to promote circulation and maintain cutaneous vasodilation. An electric fan is positioned so that it blows on the patient to augment heat dissipation by convection and evaporation. The patient's temperature is constantly monitored with a thermistor placed in the rectum, bladder, or esophagus to evaluate core temperature. Caution is used to avoid hypothermia and to prevent hyperthermia, which may recur spontaneously within 3 to 4 hours.

### **Near-Drowning**

= is survival for at least 24 hours after submersion. The most common consequence is hypoxemia. Drowning is one of the leading causes of unintentional death in children younger than 14 years of age.

Factors associated with drowning and near-drowning include;

1. alcohol ingestion
2. inability to swim
3. diving injuries
4. hypothermia
5. exhaustion.

Efforts to save the victim should not be abandoned prematurely. Successful resuscitation with full neurologic recovery has occurred in near-drowning victims after prolonged submersion in cold

water. This is possible because of a decrease in metabolic demands or the diving reflex. After resuscitation, hypoxia and acidosis, the primary problems of a victim who has nearly drowned, require immediate intervention in the ED. Resultant pathophysiologic changes and pulmonary injury depend on the type of fluid (fresh or salt water) and the volume aspirated. Fresh water aspiration results in a loss of surfactant, hence an inability to expand the lungs. Salt water aspiration leads to pulmonary edema from the osmotic effects of the salt within the lung. After a person survives submersion, acute respiratory distress syndrome resulting in hypoxia, hypercarbia, and respiratory or metabolic acidosis can occur.

### **Management**

Therapeutic goals include maintaining cerebral perfusion and adequate oxygenation to prevent further damage to vital organs. Immediate cardiopulmonary resuscitation is the factor with the greatest influence on survival.

The treatment goal, prevention of hypoxia, is accomplished by ensuring an adequate airway and respiration, thus improving ventilation (which helps to correct respiratory acidosis) and oxygenation.

1. Arterial blood gas analyses are performed to evaluate oxygen, carbon dioxide, and bicarbonate levels and pH. These parameters determine the type of ventilatory support needed.
2. Endotracheal intubation with positive pressure ventilation (with PEEP) improves oxygenation, prevents aspiration, and corrects intrapulmonary shunting and ventilation – perfusion abnormalities (caused by aspiration of water).
3. Rectal probe is used to determine the degree of hypothermia.
4. Rewarming procedures (eg, extracorporeal warming, warmed peritoneal dialysis, inhalation of warm aerosolized oxygen, torso warming) are started during resuscitation. The choice is determined by the severity and duration of hypothermia and available resources.
5. Intravascular volume expansion and inotropic agents are used to manage hypotension and impaired tissue perfusion.
6. ECG monitoring is initiated, because dysrhythmias frequently occur.
7. Indwelling urinary catheter is inserted to measure urine output.
8. Nasogastric intubation is used to decompress the stomach and to prevent the patient from aspirating gastric contents.

### **Complications:**

1. hypoxic or ischemic cerebral injury
2. acute respiratory distress syndrome
3. pulmonary damage secondary to aspiration
4. life threatening cardiac arrest.

## **ANAPHYLACTIC REACTION**

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= is an acute systemic hypersensitivity reaction that occurs within seconds or minutes after exposure to certain foreign substances, such as;

1. medications (eg, penicillin, iodinated contrast material)
2. agents, such as insect stings (eg, bee, wasp, yellow jacket, hornet)
3. foods (eg, eggs, peanuts).
4. repeated administration of parenteral or oral therapeutic agents (eg, repeated exposures to penicillin)

= the result of an antigen–antibody interaction in a sensitized individual who, as a consequence of previous exposure, has developed a special type of antibody (immunoglobulin) that is specific for that particular allergen.

= the antibody immunoglobulin E (IgE) is responsible for most of the immediate type of human allergic responses. The individual becomes sensitive to a particular antigen after production of IgE to that antigen. A second exposure to the same antigen results in a more severe and more rapid response.

### Clinical manifestations

1. respiratory symptoms (difficulty breathing and stridor secondary to laryngeal edema)
2. fainting, itching, swelling of mucous membranes
3. sudden drop in blood pressure secondary to massive vasodilation

### Management

With an anaphylactic reaction, establishing a patent airway and ventilation is essential.

1. Epinephrine
  - = Subcutaneous
  - = Intramuscular
  - = Intravenous
2. Antihistamine to block further histamine binding at target cells
  - Aminophylline by slow intravenous infusion for severe bronchospasm and wheezing refractory to other treatment
3. Early endotracheal tube intubation
  - = essential to avoid loss of the airway, and oropharyngeal suction may be necessary to remove excessive secretions. Resuscitative measures are used, especially for patients with stridor and progressive pulmonary edema.
4. Cricothyroidotomy
  - = is used to provide an airway if glottal edema occurs
5. Additional treatments:
  - a. Antihistamines to block further histamine binding at target cells
  - b. Aminophylline by slow intravenous infusion for severe bronchospasm and wheezing refractory to other treatment
  - c. Albuterol inhalers or humidified treatments to decrease bronchoconstriction; crystalloids, colloids, or vasopressors to treat prolonged hypotension

- d. Isoproterenol or dopamine for reduced cardiac output; oxygen to enhance tissue perfusion
- e. Intravenous benzodiazepines for control of seizures, and corticosteroids for prolonged reaction with persistent hypotension or bronchospasm

## **INJECTED POISONS:**

### **Stinging Insects**

A person may have an extreme sensitivity to the venoms of the Hymenoptera (bees, hornets, yellow jackets, fire ants, and wasps). Venom allergy is thought to be an IgE-mediated reaction, and it

constitutes an acute emergency. Although stings in any area of the body can trigger anaphylaxis, stings of the head and neck are especially serious.

### **Clinical manifestations**

- 1. generalized urticaria
- 2. itching
- 3. malaise
- 4. anxiety due to laryngeal edema to severe bronchospasm, shock, and death.

Note: Generally, the shorter the time between the sting and the onset of severe symptoms, the worse the prognosis.

### **Management**

- 1. stinger removal if the bite is from a bee
  - = the venom is associated with sacs around the barb of the stinger itself.
- 2. Wound care with soap and water is sufficient for stings.
  - ( Scratching is avoided because it results in a histamine response)
- 3. Ice application
  - = reduces swelling and also decreases venom absorption.
- 4. Oral antihistamine and analgesic
  - = decrease theitching and pain
- 5. Epinephrine
  - = in the case of an anaphylactic or severe allergic response
  - = epinephrine (aqueous) is injected subcutaneously (not intravenously)
  - = injection site is massaged to hasten absorption.
- 6. Monitor for signs and symptoms of anaphylactic reaction and treated as necessary
- 7. Desensitization therapy
  - = to people who have had systemic or significant local reactions.
- 8. Patient and family education is an important measure in preventing exposure to stinging insects.

## **Snake Bites**

Children between the ages of 1 and 9 years are the most likely victims. The greatest number of bites occur through the **daylight hours** into early evening during summer months. The most frequent poisonous snakebite occurs from **pit vipers**. The most common site is the **upper extremity**. Of these bites, only 20% to 25% result in **envenomation** (injection of a poisonous material by sting, spine, bite, or other means). Venomous snake bites are medical emergencies and nurses should be familiar with the types of snakes that are common to the geographic region in which they practice. Snake venom consists primarily of proteins with a broad range of physiologic effects. Multiple organ systems, especially the neurologic, cardiovascular, and respiratory systems, may be affected.

## **Management**

Initial first aid at the site of the snake bite includes having the victim lie down, removing constrictive items such as rings, providing warmth, cleansing the wound, covering the wound with a light sterile dressing, and immobilizing the injured body part below the level of the heart. Ice or a tourniquet is not applied. Initial evaluation in the ED is performed quickly and includes information about the following:

- Whether the snake was venomous or nonvenomous; if the snake is dead, it should be transported to the ED with the patient for identification
- Where and when the bite occurred and the circumstances of the bite
- Sequence of events, signs and symptoms (fang punctures, pain, edema, and erythema of the bite and nearby tissues)
- Severity of poisonous effects
- Vital signs
- Circumference of the bitten extremity or area at several points; the circumference of the extremity that was bitten is compared with the circumference of the opposite extremity
- Laboratory data (complete blood count, urinalysis, and clotting studies)

There is no one specific protocol for treatment of snake bites. Generally,

1. Ice
2. Tourniquets
3. Heparin
4. Corticosteroids are not used during the acute stage
  - = contraindicated in the first 6 to 8 hours after the bite, because they may depress antibody production and hinder the action of antivenin (antitoxin manufactured from the snake venom and used to treat snake bites).
5. Parenteral fluids may be used to treat hypotension.
6. Vasopressors are used to treat hypotension, their use should be short-term.
7. Close observation for at least 6 hours
  - = patient is never left unattended.

## **ADMINISTRATION OF ANTIVENIN (ANTITOXIN)**

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1. An assessment of progressive signs and symptoms which is most effective if administered within 12 hours after the snake bite. Children may require more antivenin than adults because their smaller bodies are more susceptible to toxic effects of venom.
2. A skin or eye test should be performed before the initial dose to detect allergy to the antivenin.
3. Before administering antivenin and every 15 minutes thereafter, the circumference of the affected part is measured proximally.
4. Premedication with **diphenhydramine** and **cimetidine** decreases the allergic response to antivenin.
5. Antivenin is administered as an intravenous infusion whenever possible, although intramuscular administration can be used.
6. The antivenin is diluted in 500 to 1000 mL of normal saline solution; the fluid volume may be reduced for children.
7. The infusion is started slowly, and the rate is increased after 10 minutes if there is no reaction.
8. The total dose should be infused during the first 4 to 6 hours after poisoning.
9. The initial dose is repeated until symptoms decrease. After the symptoms decrease, the circumference of the affected part should be measured every 30 to 60 minutes for the next 48 hours to detect symptoms of compartment syndrome (swelling, loss of pulse, increased pain, and paresthesias).
10. The most common cause of allergic reaction to the antivenin is its too-rapid infusion, although about 3% of patients with negative active skin test results develop reactions not related to infusion rate.
11. Reactions may consist of a feeling of fullness in the face, urticaria, pruritus, malaise, and apprehension. These symptoms may be followed by tachycardia, shortness of breath, hypotension, and shock.
12. Intravenous diphenhydramine (Benadryl)
13. Vasopressors are used for patients in shock
14. Resuscitation equipment must be on standby while antivenin is infusing.

## Poisoning

= is any substance that, when ingested, inhaled, absorbed, applied to the skin, or produced within the body in relatively small amounts, injures the body by its chemical action. Poisoning from inhalation and ingestion of toxic materials, both intentional and unintentional, constitutes a major health hazard and an emergency situation.

Emergency treatment is initiated with the following goals:

- To remove or inactivate the poison before it is absorbed
- To provide supportive care in maintaining vital organ systems
- To administer a specific antidote to neutralize a specific poison
- To implement treatment that hastens the elimination of the absorbed poison

## INGESTED (SWALLOWED) POISONS

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Corrosive poisons include alkaline and acid agents that can cause tissue destruction after coming in contact with mucous membranes

1. Alkaline agents

= lye, drain cleaners, toilet bowl cleaners, bleach, non phosphate detergents, oven cleaners, and button batteries (batteries used to power watches, calculators, or cameras)

2. Acid products

= toilet bowl cleaners, pool cleaners, metal cleaners, rust removers, battery acid.

### Management:

- Control of the airway, ventilation, and oxygenation are essential.
- Measures are instituted to stabilize cardiovascular and other body functions.
- ECG, vital signs, and neurologic status are monitored closely for changes.
- Shock, which may result from the cardio depressant action of the substance ingested, from venous pooling in lower extremities, or from reduced circulating blood volume resulting from increased capillary permeability, is treated.
- An indwelling urinary catheter is inserted to monitor renal function.
- Blood specimens are obtained to test for concentration of drug or poison.
- Efforts are initiated to determine what substance was taken;
  - the amount;
  - time since ingestion;
  - signs and symptoms, such as
    - pain or burning sensations
    - evidence of redness or burn in the mouth or throat
    - pain on swallowing or an inability to swallow,
    - vomiting, or drooling; age and weight of the patient
    - pertinent health history
- Measures are instituted to remove the toxin or decrease its absorption.
- The patient who has ingested a corrosive poison is given water or milk to drink for dilution
- However, dilution is not attempted if the patient has acute airway edema or obstruction or if there is clinical evidence of esophageal, gastric, or intestinal burn or perforation.
- Gastric emptying procedures may be used as prescribed:
  - Syrup of ipecac to induce vomiting in the alert patient
  - Gastric lavage for the obtunded patient Gastric aspirate is saved and sent to the laboratory for testing (toxicology screens)
  - Activated charcoal administration if poison is one that is absorbed by charcoal
  - Cathartic, when appropriate



**NURSING ALERT** Vomiting is never induced after ingestion of caustic substances (acid or alkali) or petroleum distillates.

## **INHALED POISONS: CARBON MONOXIDE POISONING**

- = may occur as a result of industrial or household incidents or attempted suicide
- = is implicated in more deaths than any other toxin except alcohol
- = exerts its toxic effect by binding to circulating hemoglobin and thereby reducing the oxygen-carrying capacity of the blood.
- = Carboxyhemoglobin (carbon monoxide-bound hemoglobin) absorbs carbon monoxide 200 times more readily than it absorbs oxygen and does not transport oxygen.

### Clinical Manifestations:

1. Appears intoxicated (from cerebral hypoxia)
  2. Headache
  3. muscular weakness
  4. palpitation
  5. dizziness
  6. confusion
  7. coma
  8. Skin color - pink or cherry-red to cyanotic and pale, is not a reliable
  9. Pulse oximetry is also not valid, because the hemoglobin is well saturated. It is not saturated with oxygen, but the pulse oximeter reads the saturation as such and presents the false impression that the patient is well oxygenated and in no danger.
- Exposure to carbon monoxide requires immediate treatment.

### **Management**

Goals of management are to reverse cerebral and myocardial hypoxia and to hasten elimination of carbon monoxide. Whenever a patient inhales a poison, the following general measures apply:

- Carry the patient to fresh air immediately
- Open all doors and windows.
- Loosen all tight clothing
- Initiate cardiopulmonary resuscitation if required; administer oxygen
- Prevent chilling; wrap the patient in blankets
- Keep the patient as quiet as possible
- Do not give alcohol in any form
- Carboxyhemoglobin levels are analyzed on arrival at the ED and before treatment with oxygen if possible
- 100% oxygen is administered at atmospheric or hyperbaric pressures to reverse hypoxia and accelerate the elimination of carbon monoxide
- Oxygen is administered until the carboxyhemoglobin level is less than 5%.
- The patient is monitored continuously.
- Psychoses, spastic paralysis, ataxia, visual disturbances, and deterioration of mental status and behavior may persist after resuscitation and may be symptoms of permanent brain damage.

## **SKIN CONTAMINATION POISONING (CHEMICAL BURNS)**

= from exposure to chemicals are challenging because of the large number of offending agents with diverse actions and metabolic effects. The severity of a chemical burn is determined by the mechanism of action, the penetrating strength and concentration, and the amount and duration of exposure of the skin to the chemical.

### **Management**

1. The skin should be drenched immediately with running water from a shower, hose, or faucet.
2. The skin of health care personnel assisting the patient should be appropriately protected if the burn is extensive or if the agent is significantly toxic or is still present.
3. Prolonged lavage with generous amounts of tepid water is important.
4. Identity and characterize chemical agent for future treatment
5. Antimicrobial treatment
6. Debridement
7. Tetanus prophylaxis
8. Plastic surgery for further wound management
9. The patient is instructed to have the affected area reexamined at 24 and 72 hours and in 7 days because of the risk for underestimating the extent and depth of these types of injuries.

## **FOOD POISONING**

= a sudden illness that occurs after ingestion of contaminated food or drink.

**Botulism** is a serious form of food poisoning that requires continual surveillance.

### **Management**

The key to treatment is determining the source and type of food poisoning. If possible, the suspected food should be brought to the medical facility and a history obtained from the patient or family.

### **Specimen for examination**

1. Food
2. Gastric contents
3. Vomitus
4. Serum
5. Feces

### **Monitoring**

1. Respirations
  2. Blood Pressure
  3. Sensorium
-

- 
- 4. CVP (if indicated)
  - 5. Muscular activity
  - 6. Fluid and electrolyte balance
    - a. Severe vomiting produces alkalosis
    - b. Severe diarrhea produces acidosis.

#### Treatment

- 1. Antiemetic medication
  - = administered parenterally as prescribed, if the patient cannot tolerate fluids or medications by mouth.
- 2. Mild nausea, take sips of;
  - a. weak tea
  - b. carbonated drinks
  - c. tap water
  - d. After nausea and vomiting subside, clear liquids are usually prescribed 12 to 24 hours
  - e. Diet progressed to a low-residue, bland diet

## TERMINOLOGIES

**Triage** – the assignment of degrees of urgency to wounds or illnesses to decide the order of treatment of a large number of patients or casualties

**Mass Casualty Incident (MCI)** – present when health care needs exceed resources (MCI = Healthcare Needs > Resources)

## FURTHER READINGS

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## UNIT TASKS

Study Questions:

There has been an explosion and it is a mass casualty incident. Triage the following clients. Determine the appropriate color tag and the corresponding ESI category.

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1. Levi is a 25-year-old-male. He is able to follow commands but has trouble hearing. His capillary refill is <2 seconds, radial pulse is nonexistent, can't move due to a compound left femur fracture, respirations are >30cpm and he is coughing. What color tag is he and why?

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2. Mikasa is a 21-year-old-female. She can follow commands but is scared. Her capillary refill is <2 seconds, has a radial pulse, respirations are < 30cpm with shortness of breath. She has a sudden onset of chest pain. What color tag is she and why?

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3. Annie is a 35-year-old-female. She is alert, glossy sheen to exposed skin, capillary refill is <2 seconds, respirations 16cpm, a cut right forearm, minimal bleeding, some white glowing powder seen on casualty. What color tag is she and why?

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4. Eren, a 51 year old, installing a ceiling fan assisted by his friend. He was thrown back and his friend immediately switched off the power and called an ambulance. B2 had a brief period of loss of consciousness, alert when the ambulance arrived, in and out of consciousness during the trip to the ED. BP = 150/90mmHg, PR = 88bpm, RR 20cpm, O<sub>2</sub> sat = 96% HR = 110bpm, RR = 40cpm, O<sub>2</sub> sat = 91%

Tag color = \_\_\_\_\_ ESI category = \_\_\_\_\_

Rationale for color tag and ESI category:

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5. Armin, a 7-year old, an Ilocano speaking child, is brought to the ED in her father's car. You are called to assist her to get out of the car. The father tells you she is "very sick" and you noted that she is able to transfer to a wheelchair with minimal assistance but cringes and cries out when her hips are moved. According to her father, she fell from her upper double deck bed in their house. HR = 110bpm, RR = 40cpm, O<sub>2</sub> sat = 91%

Tag color = \_\_\_\_\_ ESI category = \_\_\_\_\_



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Rationale for color tag and ESI category:

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