Head to Toe Assessment for the Trauma Patient

Objectives

1. Learn Focused Trauma Assessment
2. Learn Frequently Seen Trauma Injuries
3. Appropriate Nursing Care for Trauma Patients

Prior to Arrival

- Ensure staff have received available details of the case
- Notify the entire responding Trauma team
- Assign tasks as appropriate for Trauma resuscitation
- Gather, check and prepare equipment
- Prepare Trauma room
- Don PPE (personal protective equipment)
- MIVT way to obtain history:
  - Mechanism of injury
  - Injuries sustained
  - Vital signs
  - Treatment given

Trauma Trust

Primary Survey

- Begins immediately on patient's arrival
- Collection of information of injury event and past medical history depend on severity of condition
- Conducted in Emergency Room simultaneously with resuscitation
- Focuses on detecting life threatening injuries
- Assessment of ABC's

Primary Survey Components

- **A**irway with simultaneous c-spine protection and **A**lertness
- **B**reathing and ventilation
- **C**irculation and **C**ontrol of hemorrhage
- **D**isability – Neurological: Glasgow Coma Scale [GCS] or Alert, Voice, Pain, Unresponsive [AVPU]
- **E**xposure and **E**nvironmental Controls
- **F**ull set of vital signs and **F**amily presence
- **G**et resuscitation adjuncts (labs, monitoring, naso/oro gastric tube, oxygenation and pain)

A – Airway and Alertness with C–Spine

- While assessing the patient's airway, you must protect the cervical spine from excessive movement.
- If the patient is not supine, logroll onto his/her back while maintaining protection
  - Remove any headgear with assistance
  - A trauma injury itself may cause disruption of the airway
- If the patient is in a collar and on a backboard, do not remove until directed by Trauma Surgeon
  - Check if devices are placed appropriately
- If the patient is not immobilized, perform in-line manual stabilization
  - Apply appropriately fitting c-collar
- Is the patient alert? Can the patient open and protect their own airway?

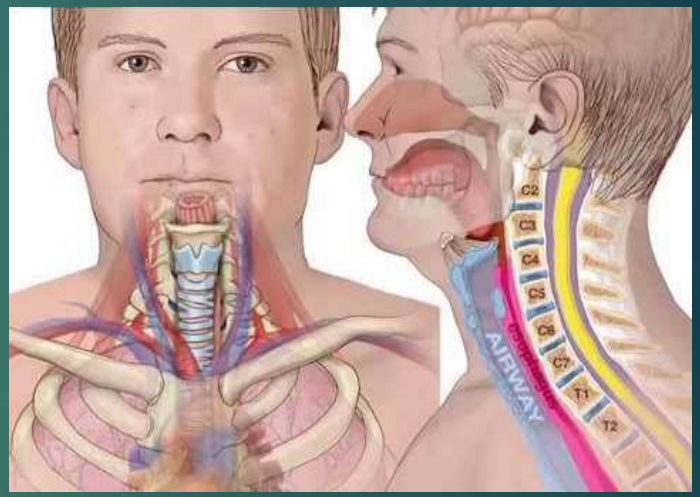
A – Airway and Alertness with C–Spine

Medica-chemistry.blogspot.com

- Maintain patent airway
  - Maintain neutral c-spine position
- Note abnormal sounds
  - Gurgling, stridor
- Gentle suction, if necessary
- Manual airway opening – jaw thrust for trauma
- Ability to maintain airway on their own
  - If awake and breathing, patient may position themselves to maximize ability to breath. Ensure interventions don't cause further compromise.

A – Airway and Alertness with C–Spine

- Open and inspect airway while maintaining c-spine precautions.
- Observe for the following:
  - Vocalization
  - Can the patient talk, cry or moan
  - Tongue obstructing airway
  - Loose teeth or foreign objects
  - Blood, vomitus, or other secretions
  - Edema
- Insert oro/nasopharyngeal airway, if appropriate
- Prepare for intubation, if not done in the field



www.youtube.com

A – Airway and Alertness with C–Spine

- If the patient is intubated or alternative airway placed prehospital then confirm the airway is in the correct position
  - Observe for equal rise and fall of the chest
  - Listen for equal breath sounds
  - Breathing rate and pattern
  - Integrity of chest wall (soft tissue and bony structures)
- Confirm placement:
  - Direct auscultation and end tidal CO_2
- Obtain CXR

www.sanova.at

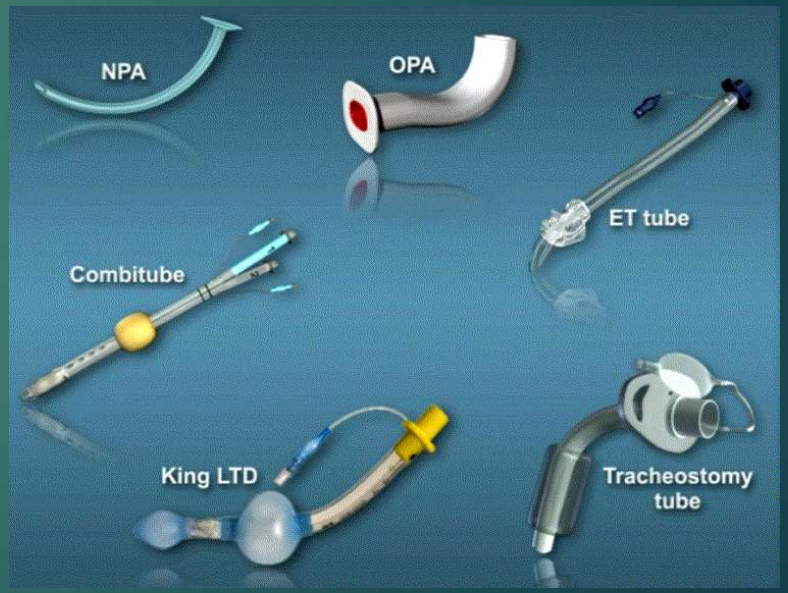
Only move on to B (breathing) if the airway is patent!

B – Breathing / Ventilation

- Is the patient breathing on their own?
- Rate should be between 12 – 29
- Symmetrical rise in fall of chest?
- Palpate for possible rib fractures or subcutaneous emphysema
- What do lungs sound like?

Do you need to breathe for the patient?

- Consider assisted ventilation and/or intubation



www.medictests.com

B – Breathing and Ventilation

Nursing Interventions:

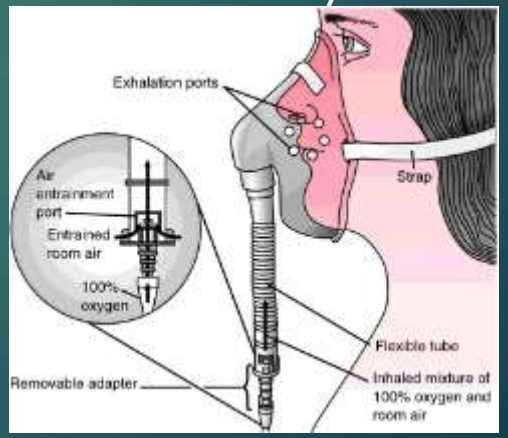
- If breathing is inadequate or absent;
  - Open airway with jaw thrust, insert airway adjunct
  - Assist ventilations with a bag-mask device 10-12 breaths per min or one breath every 5-6 seconds
  - Prepare for definitive airway

www.emedicine.medscape.com

B – Breathing and Ventilation

If breathing is present:

- Administer oxygen:
  - Non-rebreather mask at 15 L/min
  - Once patient is stabilized, closely monitor and titrate oxygen delivery to avoid the detrimental physiologic effects of hyperoxia (ENA)
- Determine ventilation effectiveness by using CO_2 monitoring

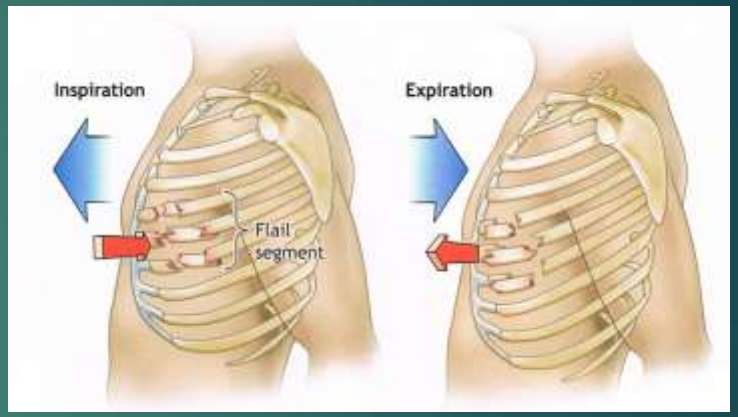


www.medical-dictionary.thefreedictionary.com

B – Breathing and Ventilation

Life Threatening Pulmonary Injuries:

- Open Pneumothorax
- Tension Pneumothorax
- Flail Chest
- Hemothorax



www.lhsc.on.ca

These injuries should be rapidly identified for immediate intervention before proceeding to the next step

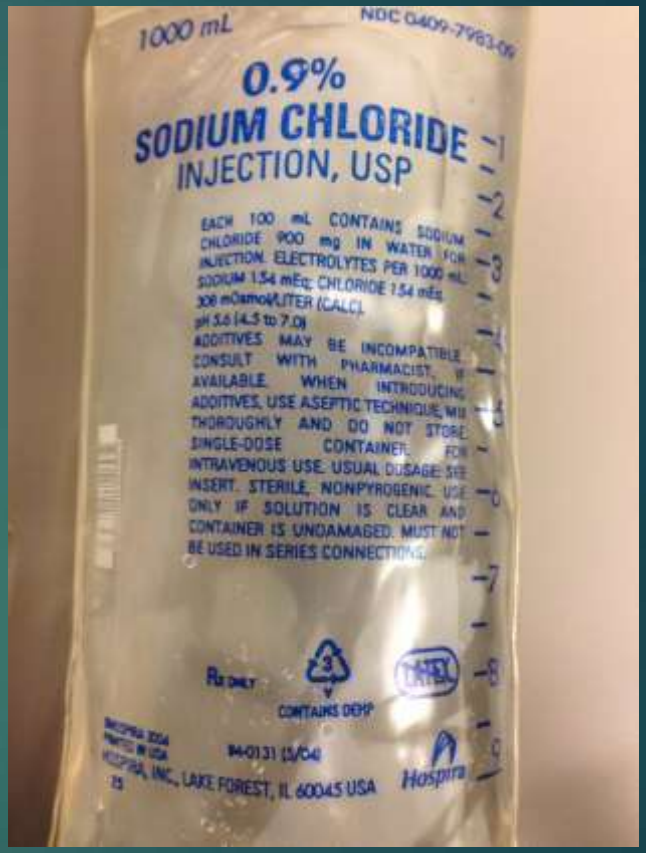
C – Circulation / Control of Hemorrhage

- Does the patient have a pulse? (If no, then begin CPR)
- IV access
  - Preferably 2 large bore catheters (18 gauge or larger)
  - If present, are they patent?
- External bleeding present
  - **Stop bleeding! Apply direct pressure over hemorrhage sites.**
- Skin Vitals
  - Inspect and palpate skin: temperature, color, moisture

C – Circulation / Control of Hemorrhage

- Blood pressure
- Volume replacement
  - Fluid (should be warmed)
  - Massive Transfusion Protocol (MTP)

Fluids: Balanced salt solution
NS or LR warmed to 37 – 40°



www.pinterest.com

C – Circulation / Control of Hemorrhage

Consider the following as a potential cause of absent pulses:

- Penetrating wound to heart
- Pericardial tamponade
- Tension Pneumothorax
- Rupture of the great vessels (aorta, vena cava)
- Abdominal or pelvic hemorrhage
- Exsanguination (uncontrolled external bleeding)

D – Disability (Neuro Status)

- Brief Neuro Exam
- AVPU

  Alert

  Responsive to **V**erbal

  Responsive to **P**ain

  Unresponsive

http://www.mcleishoptometrists.com

- GCS: Eve 4, Verbal 5, Motor 6
- Pupil Exam
- Any change in LOC (level of consciousness) is thought to be the result of a central nervous system injury until proven otherwise (American College of Surgeons)

E – Exposure / Environment

- Patients clothing needs to be removed for thorough exam
- Protect the patient from the environment, do NOT allow them to become cold.
- Actively warm them if already cold. Hypothermia may be already present or develop in the emergency department or operating room if uncovered.

Cold trauma patients are at increased risk for coagulopathy which can lead to death.

www.palexmedical.com

F – Full Set of Vital Signs / Family Presence

- Obtain baseline vital signs and re-check at regular intervals to trend for changes
  - Blood Pressure
  - Heart Rate
  - Respiratory rate
  - Pulse-oximetry

www.freepik.com

- Facilitate family as soon as possible
  - Evidence shows that patients prefer to have family members present during resuscitation. (ENA)

G – Get Resuscitation Adjuncts

L = Labs

- ABG, SpO_2, CO_2, base excess, blood typing, lactic acid (which can indicate the adequacy of tissue perfusion)

M = Monitoring cardiac rate and rhythm
N = Naso / oro gastric tube
O = Oxygenation and ventilation

- SpO2 (dependent on adequate peripheral perfusion) and CO2 monitoring (normal value 35-45 mm Hg)

P = Pain assessment and management

- Pain management is both pharmacological and non-pharmacological (ice, elevation, splinting)

Secondary Survey

- Systematic head to toe physical exam that is complaint focused & conducted simultaneously with reassessment of the ABCDEs.
- This exam / survey is done after stabilization of life threatening airway, breathing and circulation problems

www.depts.washington.edu

Secondary Survey Components

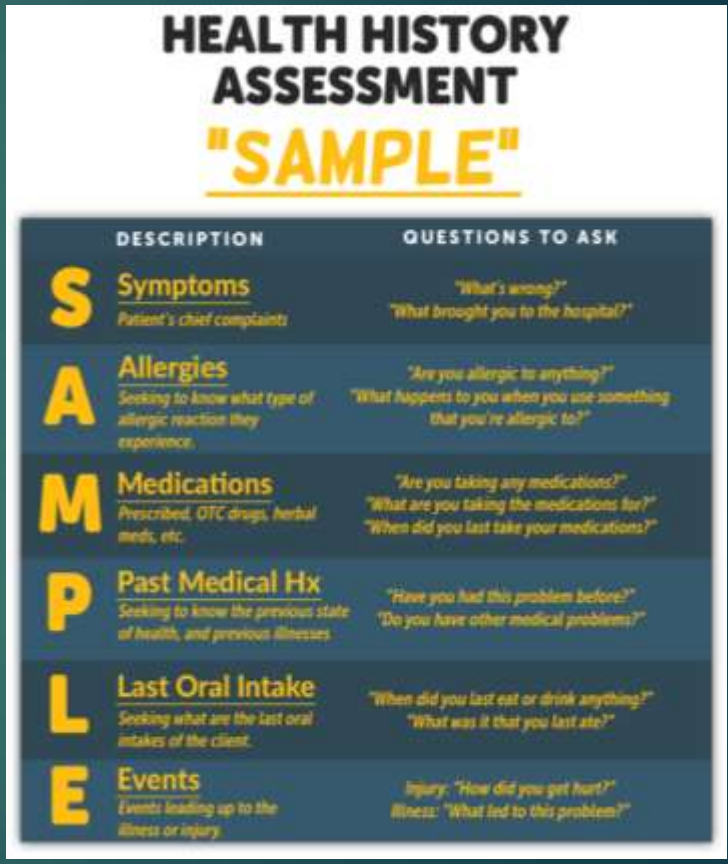
- **H**istory / MIST (method of injury, injuries sustained, signs and symptoms, treatment in field) and **H**ead-to-toe assessment
    - Important to determine if the patient has co-morbid factors that place the patient at greater risk for complications related to the injury
- **I**nspect posterior surfaces

Inspect

- Inspect posterior surfaces (vertebral column, and flanks)
- Logroll patient
- Inspect and palpate for wounds, edema, deformity and tenderness
- Inspect rectal tone or ability to squeeze gluteal muscles (exam done by advance practice nurse or physician)
- Remove rigid spine board

SAMPLE During History

Symptoms
Allergies and tetanus
Medications
Past medical history
Last oral intake
Events and environmental factors



www.nurselabs.com

5 P's of Evaluation

Pain or tenderness

Pallor – paleness or poor capillary refill

Pulses – diminished or absent

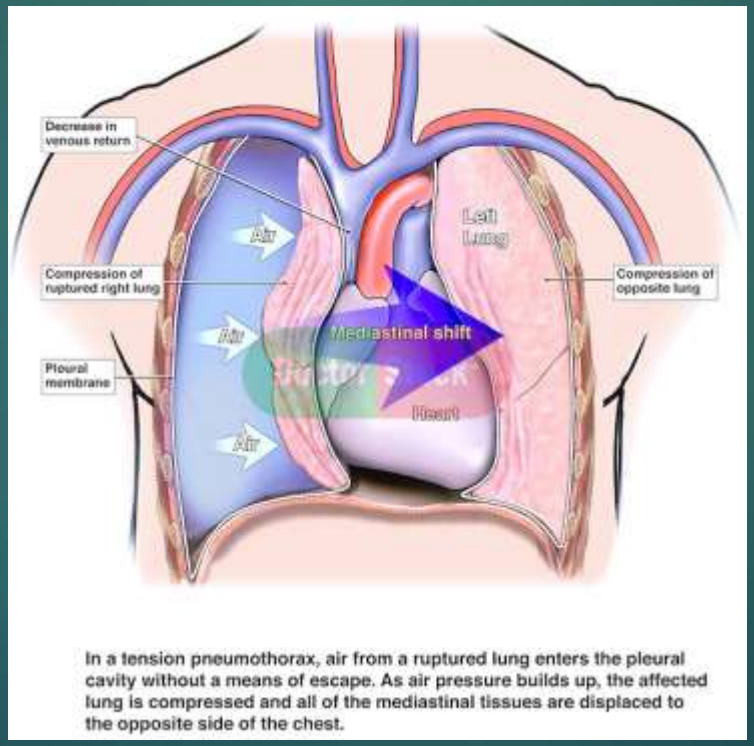
Paresthesia – pins and needles sensation

Paralysis – inability to move

Tension Pneumothorax

Treatment:

- Needle thoracentesis
- 14 gauge needle inserted into 2nd intercostal space in mid-clavicular line of the top of the rib

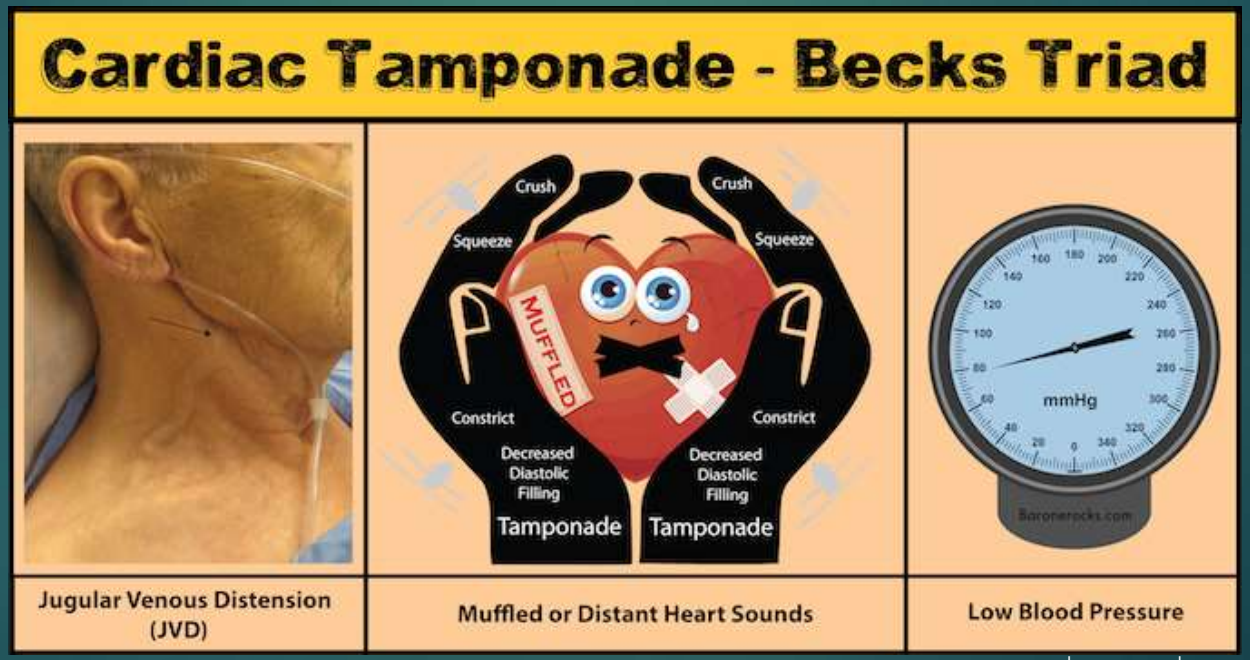


In a tension pneumothorax, air from a ruptured lung enters the pleural cavity without a means of escape. As air pressure builds up, the affected lung is compressed and all of the mediastinal tissues are displaced to the opposite side of the chest.

www.slideshare.net

Beck's Triad

- Hypotension
- Distended Neck Veins
- Muffled Heart Sounds



www.baronerocks.com

Tertiary Survey

- 18 – 36 hours post admission
- Performed in Critical Care or Med-Surg unit
- Focused Assessment: specific injury or medical complaint
- Labs: H/H, TPN, Lactic Acid, PT / INR
- Follow-Up Imaging: CT / MRI, Chest X-Ray

This the best opportunity to find injuries that may have been missed during the initial resuscitation.

Monitoring

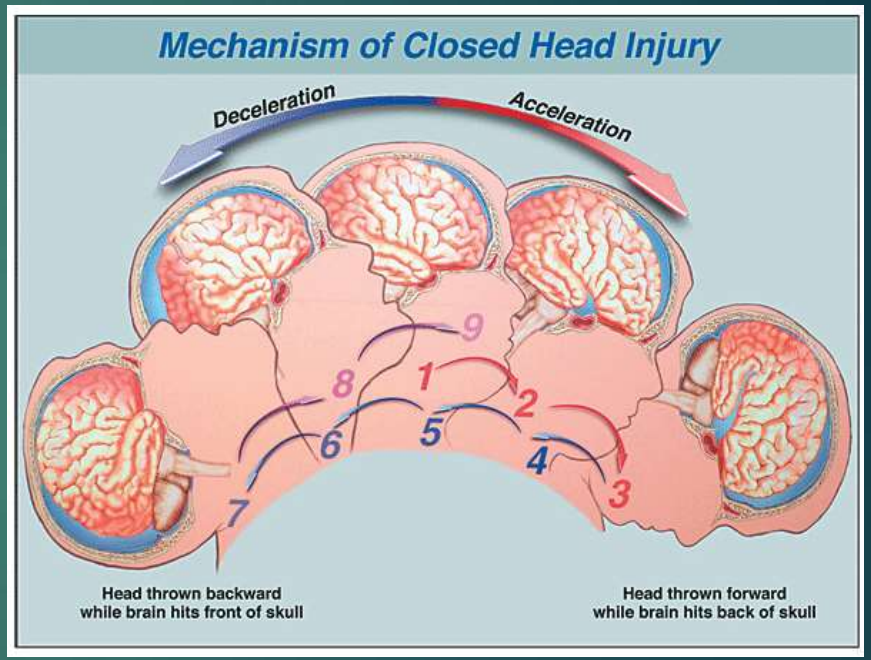
RN to monitor:

- Vital signs – look for changes in trends
- Signs/Symptoms of bleeding
- Urine Output
  - Adequate output: 0.5-1ml/kg/hour
- Injury specific complications

Head/Face Trauma

Head/Face Trauma

- Maxillofacial fractures
- Basilar skull fractures
- Ocular injuries
- Open/Closed Head injuries

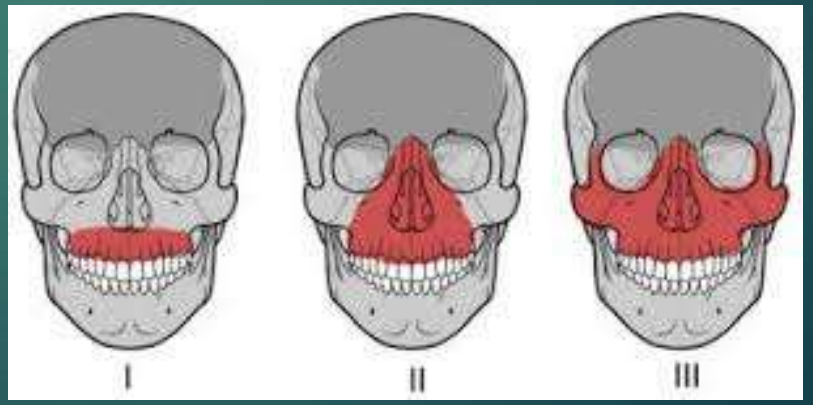


braininjury.blogs.com

LeFort Fractures

- LeFort I – transverse maxillary fracture above the level of the teeth
- LeFort II – pyramidal maxillary fracture involving the mid-face area
- LeFort III – complete craniofacial separation involving the maxilla, zygoma, orbits and bones of the cranial base

LeFort Injures I, II, III



www.emedicine.medscape.com

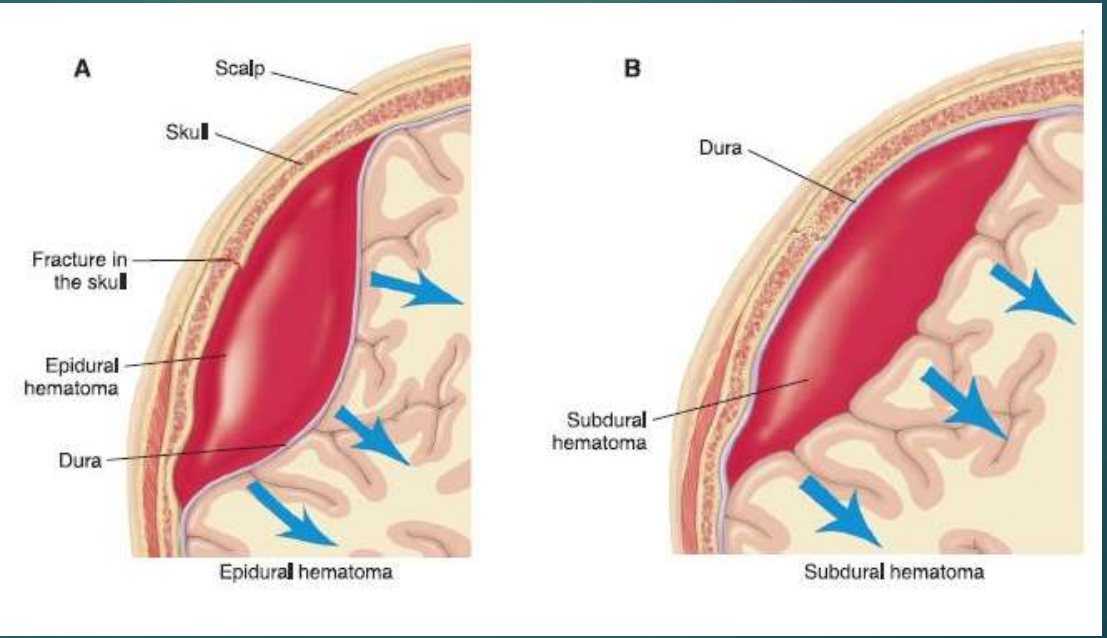
Head/Face Trauma

Epidural Hematoma

- Arterial
- Lucid interval followed by unconsciousness

Subdural Hematoma

- Venous
- Gradually increasing headache and confusion



www.brainandspine.titololawoffice.com

Head/Face Evaluation

- Battle's Sign (Hematoma over mastoid process)
- Blood or CSF draining from ears
- Cranial Nerve Assessment
- Pupils
  - PEERL
- GCS
  - Oriented
  - Verbal
  - Motor

Battle's Sign

www.pinterest.com

Nursing Care of Head Injuries

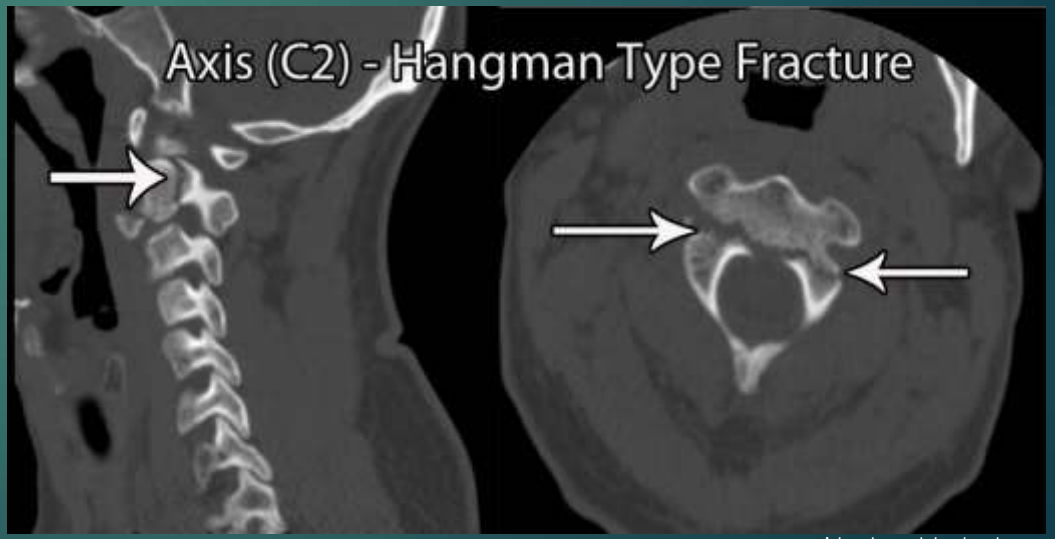
- Monitor for Bleeding: watch for signs of ICP
- Neuro checks per order
- Pupil assessment
- Monitor for neurogenic shock due to associated spinal cord injury
- Head of bed elevated
- Maintain in-line position of c-spine to promote cerebral blood flow

Neck Trauma

Neck Trauma

- Check airway for abnormalities: tracheal deviation, edema
- C-Spine Injuries
  - Spinal precautions
  - Check for tenderness or deformities

www.emedicine.medscape.com



www.virtualmedstudent.com

Nursing Care for Neck Injuries

- Monitor Airway
  - Breathing Difficulties
- Spinal precautions
  - Turning – maintain in line immobilization
- C – Collar care
  - Changing pads on c-collar per protocol
  - Monitoring for skin breakdown

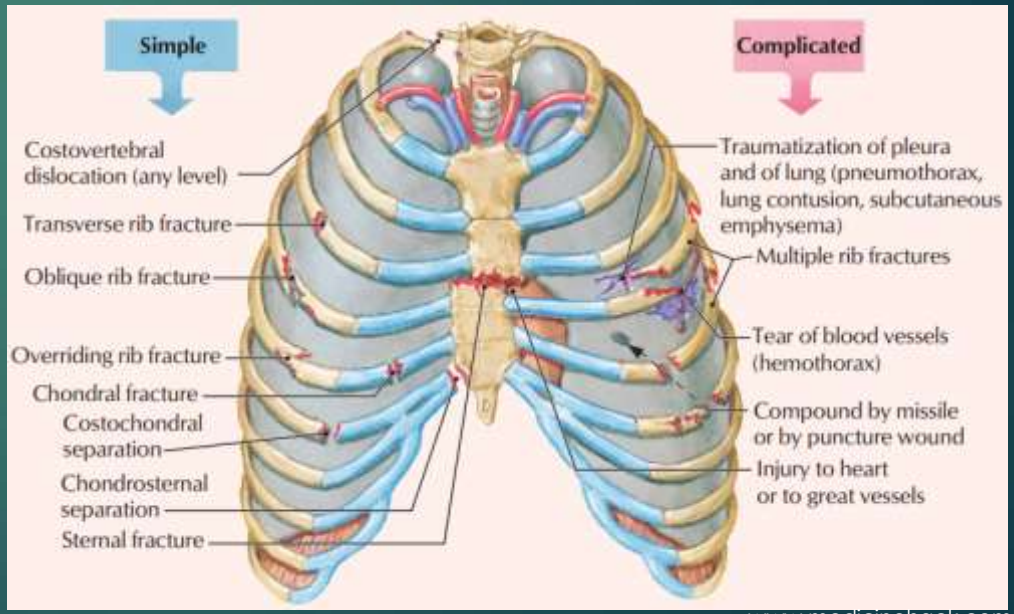
www.braceshop.com

Remember: C-spine clearance requires clinical exam and radiography. The absence of neuro deficit does not exclude spinal cord injury.

Thoracic Trauma

Chest Trauma

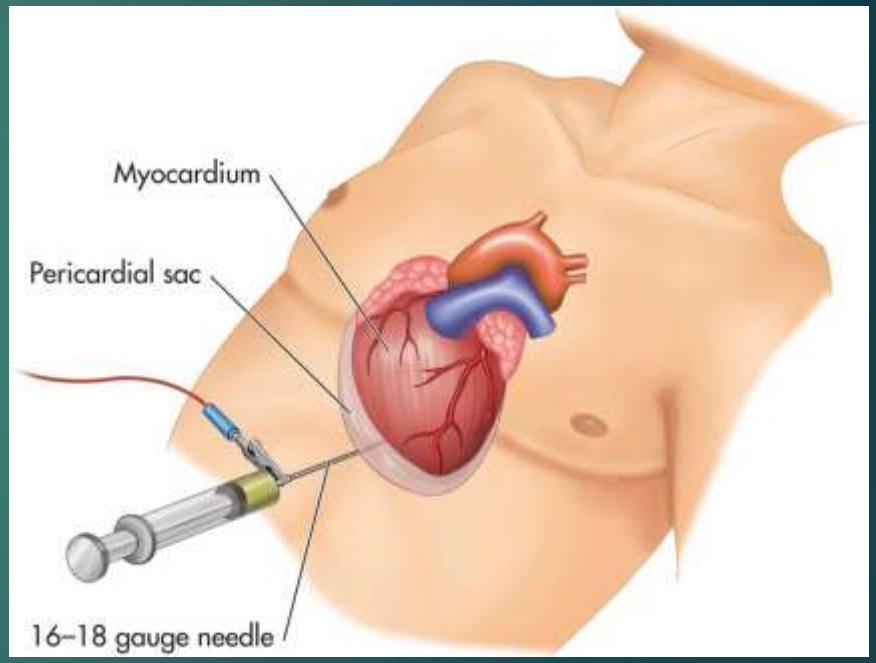
- Penetrating wounds
- Chest wall injuries
- Rib Fractures
  - Flail Chest: Multiple adjacent rib fractures causing free floating ribs that move independently
- Heart Injuries
  - Cardiac Tamponade
  - Blunt Cardiac Injury
- Lung injuries
  - Pneumothorax
  - Hemothorax



www.medicinehack.com

Cardiac Tamponade

- Fluid build up between the myocardium and pericardium causing pressure on the heart
- Monitor for Beck's Triad
  - Hypotension
  - Distended Neck Veins (JVD)
  - Distant (Muffled) Heart Sounds
- Notify MD and prepare to transfer to OR



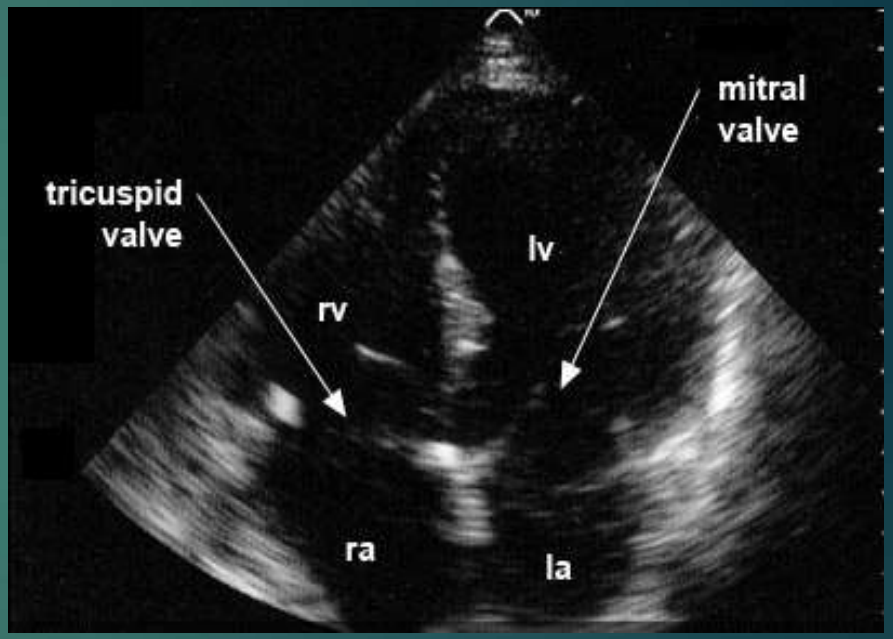
www.lookfordiagnosis.com

Nursing Care for Cardiac Trauma

Possible bedside TEE / ECHO

Monitor:

- Chest pain
- Cardiac Enzymes
- EKG Changes
- Pulses in limbs
- Changes in blood pressure



www.heart-vessels.com

Pneumothorax

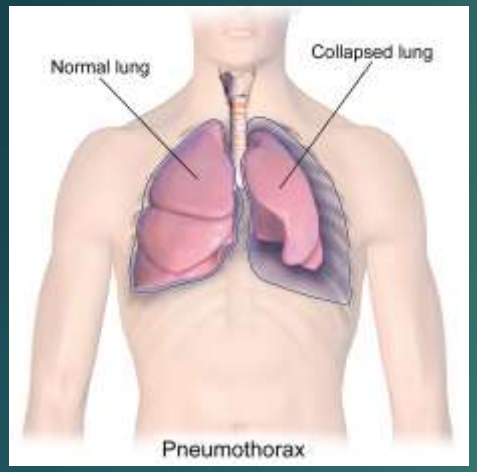
Pneumothorax can occur with:

- Central line placement
- Chest surgery
- Trauma to the chest wall
- Traumatic intubation
- Mechanical ventilation
- Spontaneous in some patients

If air continues to collect in the chest, pressure can rise and push the mediastinum to the over side creating a tension pneumothorax

Pneumothorax

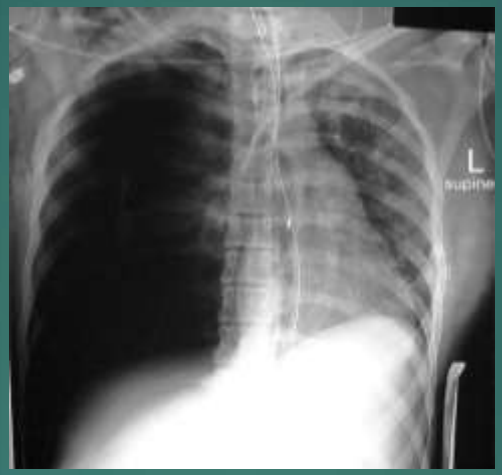
Simple



www.en.Wikipedia.org

- Respiratory distress
- Air in the Pleural space

Tension

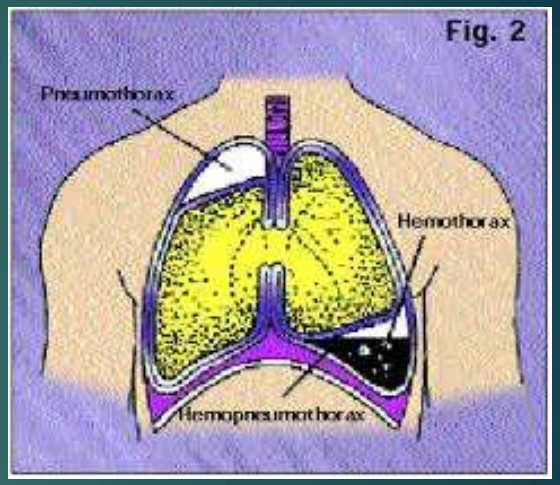


www.wikiradiography.net

- Respiratory & Circulatory problem
- Pleural space expands, shifts contents of thorax across mediastinum

OBSTRUCTIVE SHOCK

Hemo



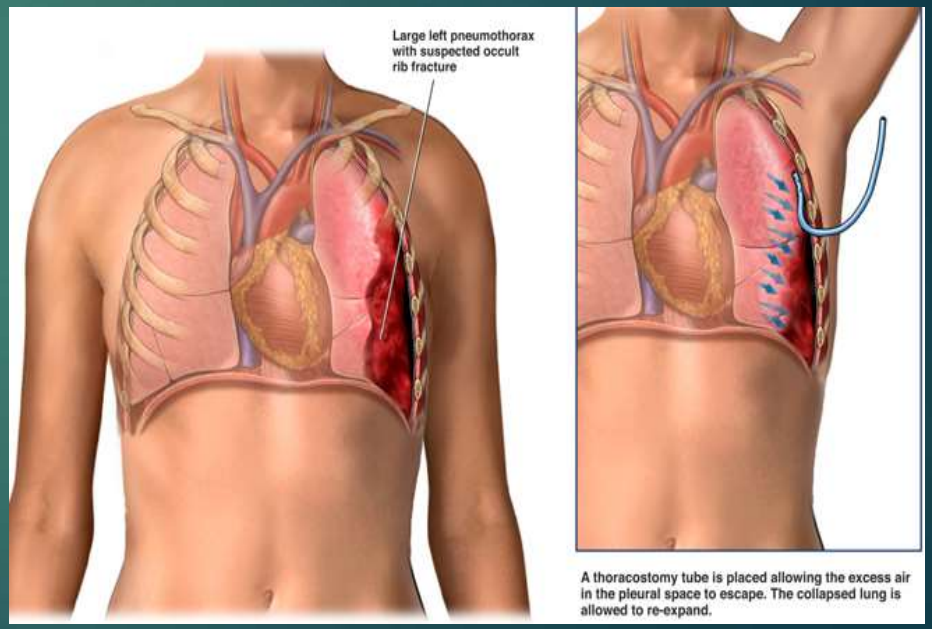
www.nursing.advanceeweb.com

- Blood rather than air in the pleural space

HEMORRHAGIC SHOCK

Tension Pneumothorax

- When air fills between the chest wall and the lung and causes the lung to collapse
- Monitor:
  - Tracheal shift to contralateral side
  - Distended neck veins
  - Decreased breath sounds on affected side
- Prepare for chest tube insertion



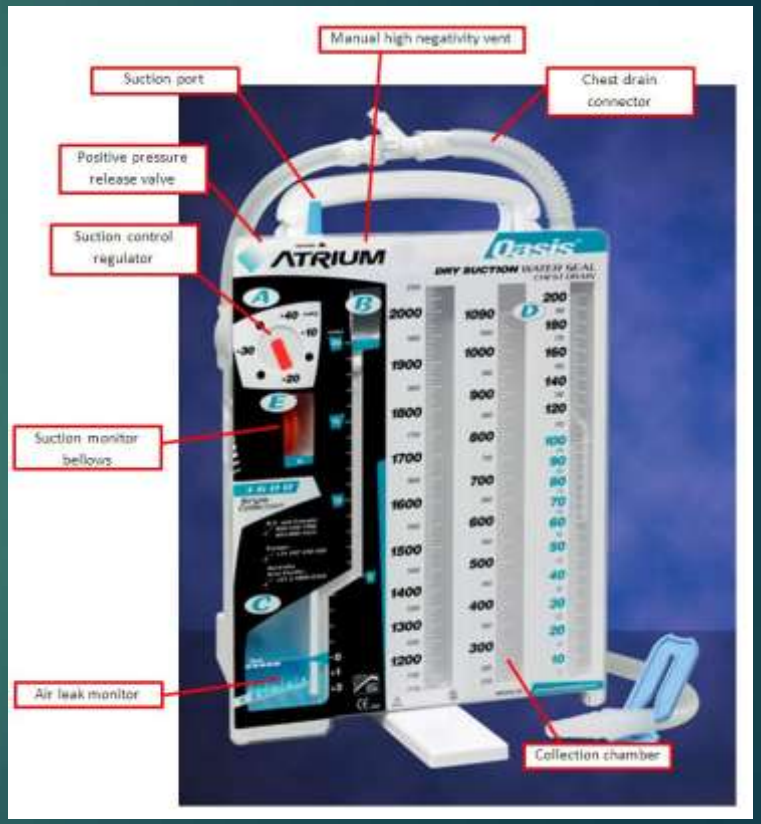
www.rayur.com

Nursing Care for Lung Trauma

- Chest x-rays
- Prepare for possible chest tube insertion
- Pain management
- Oxygen as needed
- Monitor:
  - Work of breathing and rate
  - Lung Sounds

Chest Tube Management

- Monitor patient for breathing difficulties
  - SpO2
  - Respiratory Rate
- Monitor:
  - Subcutaneous Emphysema (Crepitus)
  - Air Leaks
  - Output
  - Color of Drainage
  - Dressing status
- Do not leave chest tube clamped, unless ordered by physician



www.derangedphysiology.com

Abdominal Trauma

Abdominal Trauma

- Penetrating vs Blunt injuries
- Liver Injuries, splenic Injuries, bowel injuries
- Exploratory Laparotomies (Ex Lap)
  - Open Abdomen
- Abdominal Pressures
  - Watch for signs of increased tenderness or distension (abdominal compartment syndrome)

Spleen Injuries – Grading

Table 1: Classification of splenic injuries as proposed by the American Association for the Surgery of Trauma (AAST), 1994 revision (16)

Grade	Injury	Criteria
I	Haematoma	Subcapsular, <10% of surface area
	Laceration	Capsular tear, <1-cm parenchymal depth
II	Haematoma	Subcapsular, 10-50% of surface area Intraparenchymal, <5-cm diameter
	Laceration	1-cm to 3-cm parenchymal depth that does not involve a trabecular vessel
III	Haematoma	Subcapsular, >50% of surface area or expanding Subcapsular or intraparenchymal, ruptured Intraparenchymal, ≥5-cm diameter or expanding
	Laceration	>3-cm parenchymal depth or involving trabecular vessels
IV	Laceration	Laceration involving segmental or hilar vessels producing major devascularization of >25% of the spleen
V	Laceration	Completely shattered spleen
	Vascular	Hilar vascular injury that devascularizes the spleen

Advance one grade for multiple injury (up to Grade III)

www.bioline.org.br

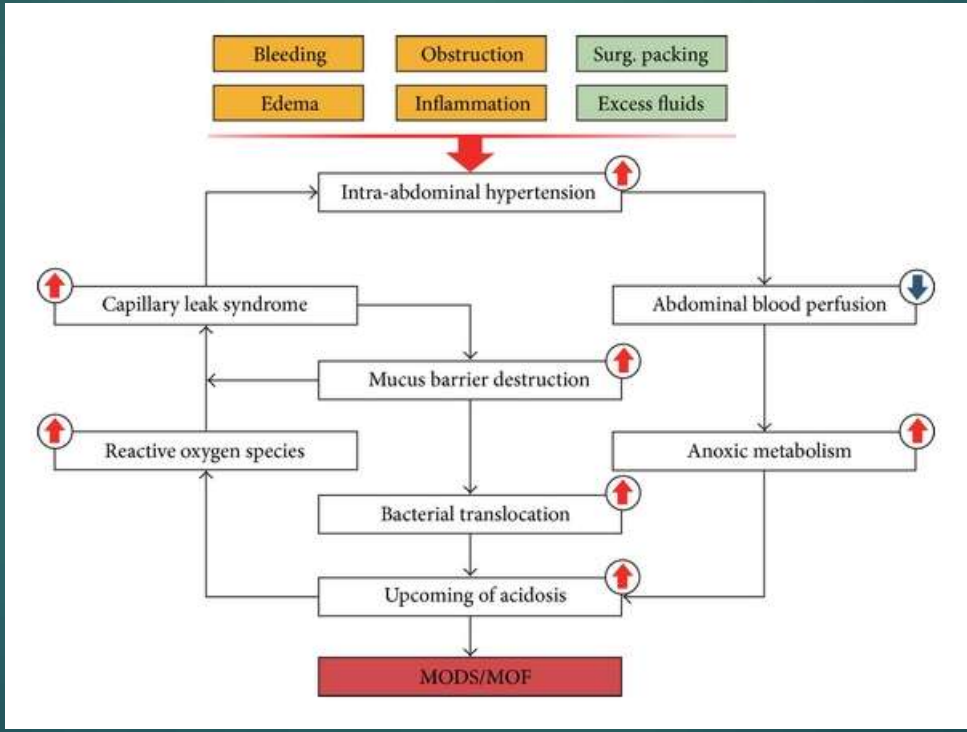
Liver Injuries – Grading

Grade	Type	Injury Description
I	Hematoma	Subcapsular, nonexpanding, <10 cm surface area
	Laceration	Capsular tear, nonbleeding, <1 cm parenchymal depth
II	Hematoma	Subcapsular, nonexpanding, 10–50% surface area; intraparenchymal nonexpanding <10 cm diameter
	Laceration	Capsular tear, active bleeding, 1–3 cm parenchymal depth <10 cm in length
III	Hematoma	Subcapsular, >50% surface area or expanding; ruptured subcapsular hematoma with active bleeding; intraparenchymal hematoma >10 cm or expanding
	Laceration	>3 cm parenchymal depth
IV	Hematoma	Ruptured intraparenchymal hematoma with active bleeding
	Laceration	Parenchymal disruption involving 25–75% of hepatic lobe or one to three Couinaud's segments within a single lobe
V	Laceration	Parenchymal disruption involving >75% of hepatic lobe or >3 Couinaud's segments within a single lobe
	Vascular	Juxtahepatic venous injuries (i.e., retrohepatic vena cava/central major hepatic veins)
VI	Vascular	Hepatic avulsion

Journal of Emergencies, Trauma and Shock 2011,

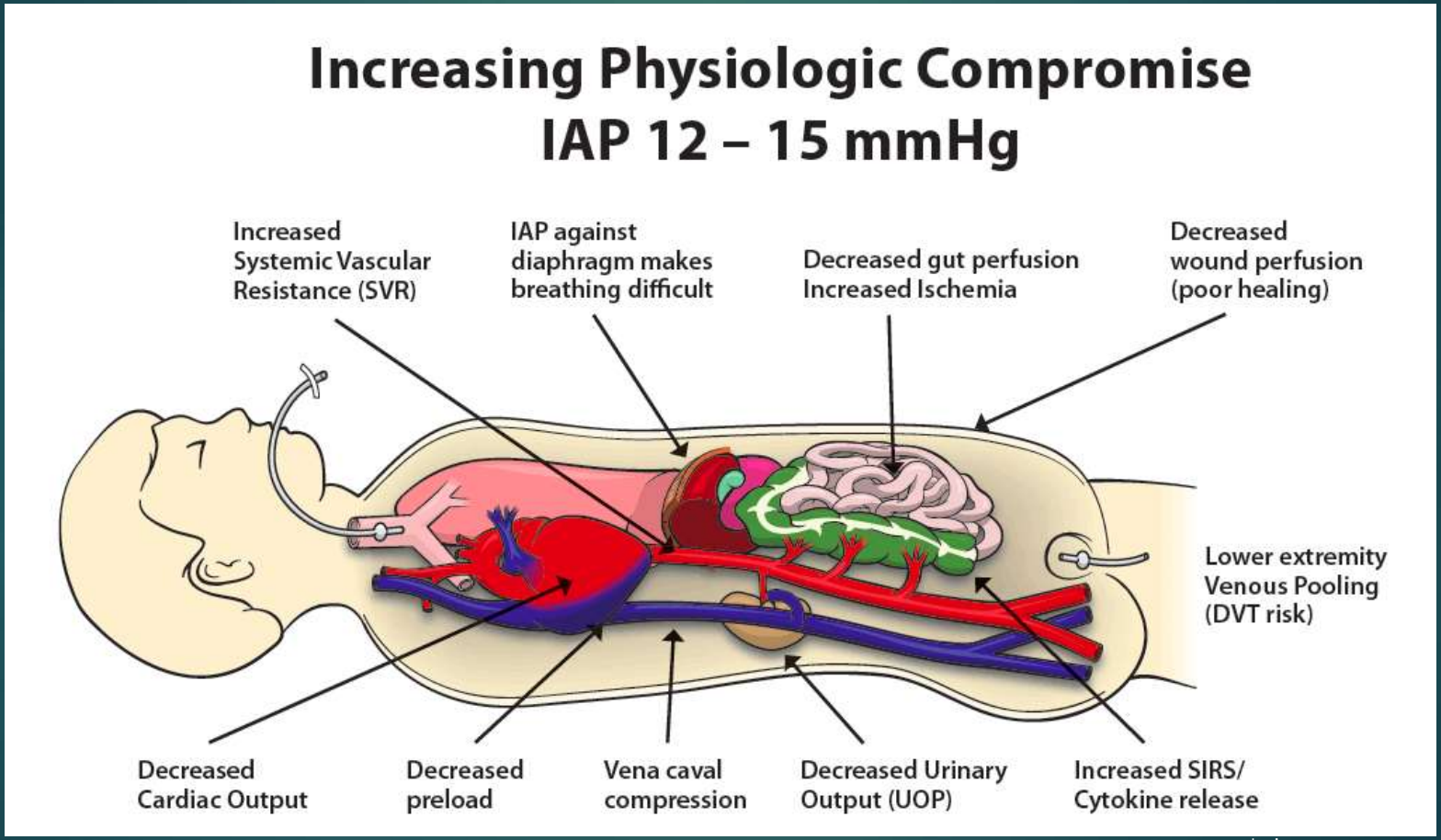
Intra-Abdominal Hypertension

- Iatrogenic measures such as surgical packing and fluid treatment would result in the development of intra-abdominal hypertension.
- This cycle identifies the poor outcomes of IAH once persistent hypertension is not well controlled.



http://www.hindawi.com

Intra-Abdominal Hypertension



www.abvisor.com

Nursing Care for Abdominal Trauma

- Monitor for Signs/Symptoms of Bleeding
  - Labs: CBC/ PT/INR
  - Grey Turner's (flank bruising)
  - Cullen's Sign (periumbilical Bruising)
    - Internal bleeding
- Abdominal Pressures
  - Distention
  - Notify provider if IAP >12
  - Check per order
- Follow up imaging
  - CT
  - X-Ray
- Possible OR/IR

www.onlinejets.org

Pelvic Trauma

Pelvic Trauma

- Pelvic Fractures
  - Watch for pain and continued bleeding (hypovolemic shock)
- Bladder Trauma
  - Rupture – Look for hematuria or blood at the meatus

www.littlemedic.wordpress.com

Nursing Care for Pelvic Trauma

- Neuro checks in lower extremities
- Peripheral vascular assessment
- Monitor for blood in urine:
  - Look for blood clots obstructing output
  - Anticipate the need for continuous bladder irrigation
- Urine output
  - 0.5 – 1ml/kg/hr

Consider splinting pelvis if there is a delay in repair or hypovolemia

Musculoskeletal Trauma

Extremity Trauma

- Fractures
- Dislocations
- Compartment Syndrome
- Amputations
- Vascular Injuries

www.orthoclips.com

Monitor

Pain – Disproportionate to injury

Pallor – Pale color

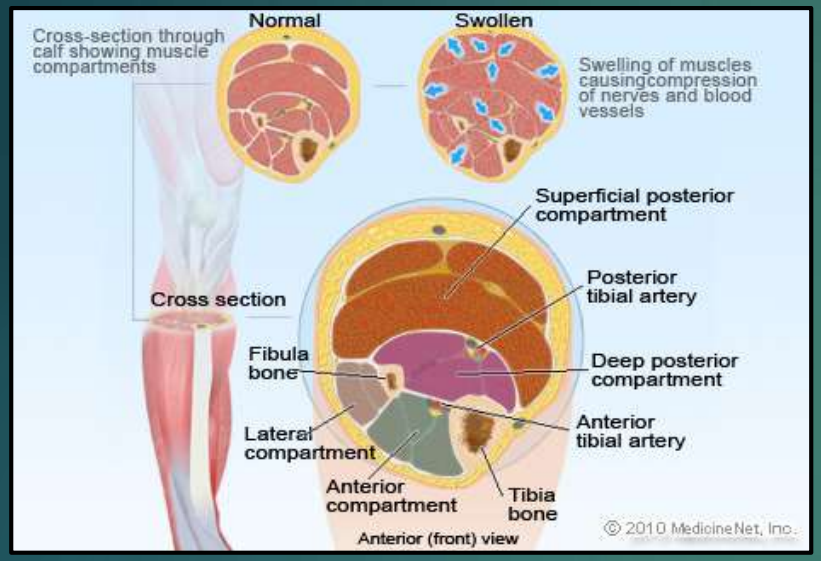
Pulse – Present, diminished, absent

Paresthesia – Decreased sensation (pins & needles feeling)

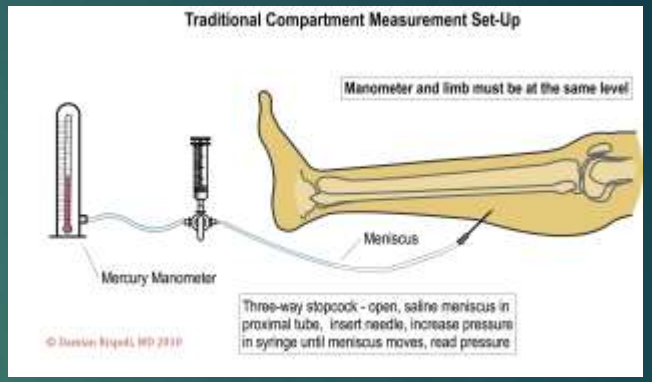
Poikilothermia – Cool

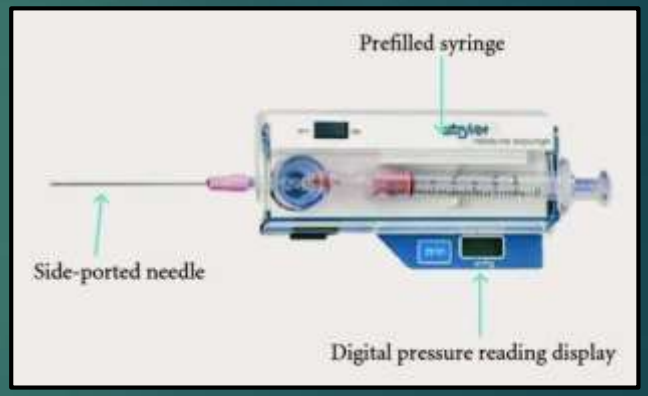
Pressure – Greater than 30mm Hg causes decreased tissue perfusion

Compartment Syndrome



Caused by: fractures either open or closed, but can also be caused by soft tissue injury like crush injuries, bites, infections, burns, extravasation of IV fluids, hematomas (especially in coagulopathic patient) and constrictive dressings or casts.





www.stryker.com

Monometer used to measure compartment syndrome

Nursing Care for Extremity Trauma

- Compartment Syndrome
  - Extremity swollen and tight on palpation
  - Severe Pain
  - Decreased Perfusion
    - **Elevate extremity to the level of heart NOT ABOVE**
- External Fixation
- Traction
  - Used to reduce, align and immobilize
  - Temporary
- Pulmonary Embolus
- Neuro assessment in extremities

Vascular Assessment

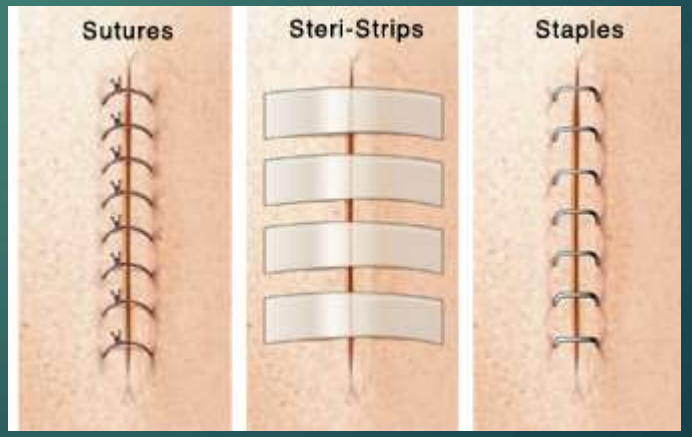
TABLE 1. ANGIOGRAPHIC APPEARANCE OF TRAUMATIC VASCULAR INJURY	
Type of Injury	**Appearance on Angiography**
Transection	Brisk extravasation of contrast. Partial or complete transection may result in vasospasm. The appearance cannot be distinguished from traumatic thrombosis or vasospasm without transection.
Dissection	Luminal irregularity with an intimal flap.
Pseudoaneurysm	Contrast filling an irregular outpouching in communication with the vessel lumen.
Arteriovenous fistula	Early filling of a vein adjacent to the contrast-opacified artery. This may have an associated pseudoaneurysm.
Thrombosis	Abrupt cutoff of the vessel. This cannot be distinguished from vasospasm.
Hemorrhage originating from cancellous bone	Group of small round collections of contrast, clustered together. This is seen within the region of osseous or ligamentous injury.
Vasospasm	May have several appearances, including contour irregularity of the vessel lumen, abrupt narrowing of the vessel, or abrupt cutoff.

www.evtoday.com

Wounds From Trauma

- Road Rash
- Open Wounds
- Wound Vacs
- Sutures

Wound Vac www.ucdmc.ucdavis.edu



www.mymosaiclifecare.org

Nursing Care for Wounds

- Is a Wound Consult needed?
- Follow wound care orders
- Daily changing
- Monitor
  - Bleeding
  - Infection
- Wound Vac suction
  - Have antibiotics been considered?
  - Tetanus up to date?
  - Output?

Case Study

- 25 year old Male in MVC arrived to unit with a left femur fracture and a right tibia fracture.
- The patient has increased pain in the right leg and states "It is the worst pain I have ever felt."
- Right leg is cool to touch, pale and weak.
- Pulse only noted by Doppler.
- Patient is still in a c-collar and is thrashing in bed due to the pain in his right leg.

Case Study Questions

1. What are the symptoms of compartment syndrome?
2. When caring for a patient in a c-collar what special precautions need to be made?
3. What are the 6 P's when performing a vascular assessment?
4. The patient suddenly complains of shortness of breath and has decreased O2 Saturation. What are the nursing actions to be taken at this time?
5. When calling the MD what are the important new changes to report about this patient?

References

Centers for Disease Control and Prevention (CDC). (2016). Injury Prevention & Control: Traumatic Brain Injury & Concussion. Retrieved March 31, 2016, from http://www.cdc.gov/traumaticbraininjury/get_the_facts.html

Crawford, A., & Harris, H. (2012). Rapid Trauma Assessment. Retrieved March 31, 2016, from http://nursing.advanceweb.com/Continuing-Education/CE-Articles/Rapid-Trauma-Assessment.aspx

Dries, D. J. (2014). Initial Evaluation of the Trauma Patient. Retrieved March 31, 2016, from http://emedicine.medscape.com/article/434707-overview#a7

Lee, R. K. (2012). Intra-abdominal Hypertension and Abdominal Compartment Syndrome: A Comprehensive Overview. *Critical Care Nurse, 32*(1), 19-31. Retrieved March 31, 2016, from http://www.aacn.org/wd/Cetests/media/C1212.pdf

Moya, M., & Hirschberg, R. (2011). Traumatic Brain Injury Rehabilitation - The American Association for the Surgery of Trauma. Retrieved March 31, 2016, from http://www.aast.org/GeneralInformation/braininjuryrehabilitation.aspx

National Institute of Health. (2014). Cardiac tamponade: MedlinePlus Medical Encyclopedia. Retrieved March 31, 2016, from https://www.nlm.nih.gov/medlineplus/ency/article/000194.htm

Primary Survey and Secondary Survey. (2014). Retrieved March 31, 2016, from http://chemm.nlm.nih.gov/appendix8.htm#secondary

Schecter, W. (2012). Initial Evaluation of the Trauma Patient. Retrieved March 31, 2016, from http://www.sfgh.surgery.ucsf.edu/media/2741381/lecture 2 initial evaluation of the trauma patient.pdf