

Medical Surgical Nursing 3

Finals, 1st Semester, A.Y. 2024-2025

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Week 9

- **Emergency and Disaster Nursing Care of Clients in Acute Biologic Crisis**
 - Scope and Practice
 - Principles of Emergency Care
 - A) Priorities of Care (Triage)
 - B) Assessment
 - Airway
 - Breathing
 - Circulation

WEEK 9: EMERGENCY AND DISASTER NURSING CARE OF CLIENTS IN ACUTE BIOLOGIC CRISIS

SCOPE AND PRACTICE

- **Emergency management**
 - Care given to patients with **urgent and critical needs** ideally
 - **Emergency** is whatever the patient or the family considers it to be
 - *Recognize the needs of the patients even though they are not an emergency case.*
- **Emergency nurse**
 - With **specialized education, training, and expertise**
 - Establishes **priorities, monitors, and continuously assesses patients**
 - Hindi lang VS q1
 - **Supports and attends, supervises, and educates**
 - **Support and attend to families**
 - **Supervise health allied personnel** by collaborating with them
 - **Educates patients and families**
 - **Interventions are accomplished interdependently**
 - Accomplished as a team
 - **Consultation or direction from a physician or practitioner**
 - Within a **time-limited, high-pressure** care environment
 - **High acuity situations**
- The **roles of nursing and medicine are complementary in an emergency situation.**
- **Reasons for going to the emergency department**
 - **Pain (abdominal and chest)**
 - Vague types of pain
 - **Cough, fever**
 - 14.5 million → admission → 2 million → ICU
 - **Injuries — 32% are falls and MVAs**

• **Consent form**

- Given by the patient for **invasive procedures**
- If a **pt is unconscious**, critically ill, or a minor, an **immediate relative may sign (preferably next of kin)**
- If **no relative** is present → **no one** will sign, and the **team may proceed with the interventions. However, document how the patient came in.**
 - *If the patient is unconscious and brought to the ED without family or friends, this fact must be documented*
 - *After treatment, a notation is made on the record about the patient's condition, response to the treatment, and condition at discharge or transfer*
 - Pag hindi nagproceed sa interventions tapos nakita ang relative → may lead to negligence.
- **Implied consent** – **immediate treatment is needed but relatives are not present**; if no immediate family, next of kin.
 - *Most important part of an informed consent is dapat naiintindihan ng patient yung sinasign niya.*

• **Medical records**

- **Patient's condition**
- **Treatment done**
- **Response to treatment**
- **Condition before discharge or transfer**
- **Discharge instructions**
- **Everything must be well-documented.**

PRINCIPLES OF EMERGENCY CARE: PRIORITIES OF CARE (TRIAGE)

- A **sorting process utilizing critical thinking** and a **standardized set of guidelines** in which an experienced RN assesses patients quickly upon arrival in the ED
- **Goal: Rapid assessment and decision-making in under 5 minutes**
- **Key: Ask appropriate questions**
- **Basic History taking**
- **Basic first aid** – triage ang unang pasok sa ER.
- You serve as the initial reason in talking to the family.
- **A triage nurse is a safety liaison**
 - *Responsible for and monitors the waiting area*
 - *Maintains a safe environment*
 - *Reassesses patients who are waiting*
 - *Initial liaison to the families of patients.*
- **Routine triage differs from mass casualty incidents (Field triage)**
 - *Scarce resources must be used to benefit the most people possible*
- **Triage comes from the French word "trier" — to sort**
- **Triage - immediacy**
 - **Motto: Being the worst makes you the first**

• TRIAGE CATEGORIES

- **Emergency:** those with emergency signs require immediate emergency treatment – **HIGHEST PRIORITY**
 - Clients who have life-threatening injuries and need immediate attention and continuous evaluation have a high probability of survival when stabilized.
- **Urgent/Priority:** those with priority signs should be given priority in the queue for rapid assessment and treatment but not immediately life-threatening
 - Clients who require treatment and whose injuries have complications that are not life-threatening, provided that they are treated within 30 minutes to 2 hours; these clients require continuous evaluation every 30 to 60 minutes thereafter.
- **Non-urgency:** those who have no emergency or priority signs are non-urgent cases and can wait their turn for assessment and treatment; **episodic illnesses**
 - Clients with local injuries who do not have immediate complications and who can wait at least 2 hours for medical treatment; these clients require evaluation every 1 to 2 hours thereafter.
 - Patients who are ambulatory; patients with fever of 37.8C that started last night

EMERGENCY SEVERITY INDEX (ESI)

- Patients are assigned to triage levels based on acuity and anticipated resource needs – resource means what the patient will use while hospitalized (mech vent, heplack only)

CATEGORY	TIME SEEN	CASES
ESI 1 RESUSCITATION	Seen immediately Requires immediate life-saving interventions ASAP	• Cardiac & respiratory arrest • Life and limb-threatening trauma (major) • Unresponsive/Unconscious • Active seizure • Shock/sepsis w/ signs of hypoperfusion • Anaphylactic reaction (super duper maga sa eyes, circumoral, and airway is very inflamed with laryngeal spasm) • Respiratory failure
ESI 2 EMERGENT	Within 15 minutes Pt in high-risk situation, disoriented, in distress, or VS are in the danger zone VS danger zone	• Signs of stroke • Sudden blindness • Chest pain • Lower airway obstruction • Severe pain • Profuse bleeding • Major head trauma • Abnormal vital signs • Suicidality • Febrile infant <28 days old with Temp ≥38C ↳ less than 2 hrs ≥ 38

ESI 3 URGENT	Within 30-40 mins If multiple resources are required to stabilize the patient, but vitals are not in the danger zone. Multiple	• Abdominal pain • Active vomiting • Mild asthma attacks • Allergic reaction • Diarrhea • Vaginal bleeding • Fever • Palpitations
ESI 4 LESS URGENT	Within 60-120 mins 1-2 hrs If one resource is required to stabilize the patient. One	• Minor trauma • Back pain • Headaches • Rashes • Painful urination • Muscle pain • Ankle injury
ESI 5 NON-URGENT	Within mins (20-15) 2-3 hrs If a patient is stable and does not require any resources to be stabilized do not need	• Sore throat • Rabies vaccination • Simple wound • NGT insertion • Sore eyes • Prescription refills • Change in Foley catheter • Cough/colds

CANADIAN TRIAGE AND ACUITY SCALE (CTAS)

- Triage patients according to acuity, risk, and care needs based on their presenting signs and symptoms
 - How frequently must the patient be reassessed by the nurse.
- Ensure that the sickest and highest-risk patients are seen first when ED capacity has been exceeded
- Reassess patients required to wait for a treatment space
- **Rationale:**
 - A national standard for triage
 - Improved patient care
 - Increased triage reliability and validity
 - Site and personal performance indicators

Level	Urgency	Estimated Time to be seen	Place
Level 1 B	Resuscitation	Immediately	Emergency
Level 2 R	Emergency	Within 15 min	Emergency
Level 3 Y	Urgency	Within 30 min	Emergency
Level 4 G	Less urgency	Within 60 min	Local health center
Level 5 W	Non urgency	Within 120 min	Local health center

R 15
E 15
U 30
L 60
N 120

REVERSE TRIAGE

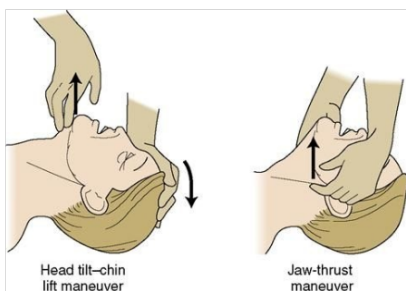
- A way to refocus hospital resources on critically ill patients in the field or the emergency department by identifying and discharging admitted patients who have a relatively small risk of complication if discharged early, thus ensuring the best reduction in morbidity and mortality for the greatest number of patients while treating the largest number of patients in the shortest period
- Do the greatest good to the greatest number of people
- Treat first patients who can help others
- Choose patients who can survive better

Reverse Triage

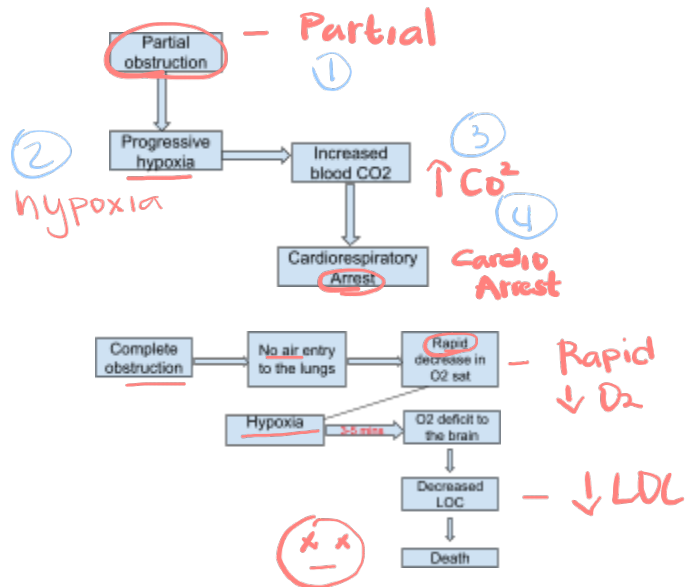
Priority Group			Description
Number	Name	Color	
P1	E Emergency/Immediate	Red	Patients who have <u>life-threatening injuries</u> that are treatable with a <u>minimum amount of time</u> , personnel, and supplies. These patients also have a <u>good chance of recovery</u> .
P2	Y Urgent	Yellow	Indicates that <u>treatment may be delayed for a limited period of time</u> without significant mortality or in the ICU setting patients for whom <u>life support may or may not change their outcome</u> given the severity of their illness.
P3	G Delayed	Green	Patients with <u>minor injuries</u> whose treatment may be delayed until the patients in the other categories have been dealt with or patients who <u>do not require ICU admission for the provision of life support</u> .
P4	B Expectant	Blue	Patients who have <u>injuries requiring extensive treatment that exceeds the medical resources available</u> in the situation or for whom <u>life support is considered futile</u> .
--	OK Dead	Black	Patients who are in <u>cardiac arrest</u> and for which <u>resuscitation efforts are not going to be provided</u> .

PRINCIPLES OF EMERGENCY CARE ASSESSMENT (PRIORITIES OF EMERGENCY CARE)

- Primary Survey (ABCDE)** — focuses on stabilizing life-threatening conditions
 - Airway**
 - Breathing**
 - Circulation**
 - Neurologic Disability**
 - Exposure** - to address the length of exposure from injuries from areas of contamination
 - If **CPR** needs to be initiated, use **CAB** — compressions, airway, breathing
- Airway**
 - Most important
 - Check for obstruction
 - Aspiration of foreign objects, anaphylaxis, angioedema, trauma (strangulation, suicidal ideations), inhalation or chemical burns, asphyxiation (smoke inhalation from being trapped in a building)
- Quick Neuro assessment (AVPU)**
 - A** - alert
 - V** - verbal
 - P** - pain
 - U** - unresponsive
- Undress the patient quickly but gently to identify wounds or areas of injury; this may entail cutting away clothing**
- Secondary Survey**
 - Complete history taking**
 - Head-to-toe assessment**
 - Diagnostic and Laboratory testing**
 - Application of monitoring devices**
 - Splinting of suspected fractures**
 - Cleansing, closure, and dressing of wounds**



AIRWAY OBSTRUCTION



MANIFESTATIONS	DIAGNOSTIC PROCEDURES
Unable to speak/ breathe/cough (complete) Cutch the neck Choking Apprehensive appearance Doesn't want to lie flat (+) Stridor (I & E) — seen in both Dyspnea (+) Use of accessory muscles Nasal flaring ↑ Anxiety, Restless, Confusion Late sign: cyanosis & loss of consciousness	X-ray — neck area (cervical area) Laryngoscopy Bronchoscopy Inspection of the oropharynx

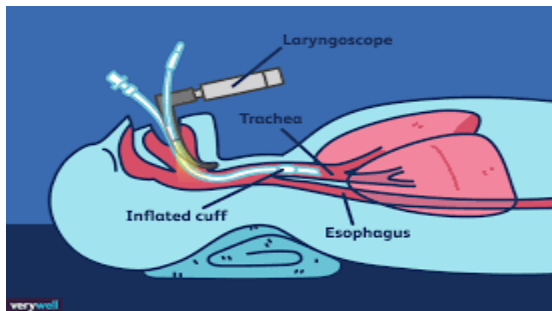
MANAGEMENT

- (+) Spontaneous coughing/breathing = **partial airway obstruction**
 - Encourage forceful coughing and persistent breathing efforts
- (+) Weak, ineffective cough; (+) Wheezing; (+) Cyanosis; (+) Dyspnea = **complete airway obstruction**
 - Establish an airway → Endotracheal intubation (best)
- After the obstruction is removed, rescue breathing is initiated

Airway Establishment

- Remove obstruction
- Reposition the head
- Head-tilt, chin-lift maneuver**
 - Contraindicated if (+) cervical spine injury
- Jaw-thrust maneuver**
 - Pushing down on both sides of the lower jaw while pulling up on both sides of the upper jaw to open up the airway

- **Oropharyngeal airway** *→ mouth*
 - Prevents the tongue from falling back against the posterior pharynx and obstructing the airway
 - For patients breathing spontaneously but unconscious
 - May allow for suctioning



- **Endotracheal intubation**
 - Contraindicated in severe airway trauma or obstruction that does not permit safe placement → proceed with surgical airway (i.e. cricothyrotomy)
 - Cricothyrotomy for patients contraindicated for ~~ET~~
 - Establish and maintain airway for patients with insufficiency in oxygen
 - The larynx will be opened
 - **Rapid sequence intubation** – performed by an anesthesiologist to provide something to relax muscles
 - Include a sedative, an analgesic, and a neuromuscular blockade agent;
 - Glidescope – parang digicam kasi may camera

- **Cricothyroidotomy**
 - Opening of the cricothyroid membrane to establish an airway.
 - Used in emergency situations in which endotracheal intubation is either not possible or contraindicated

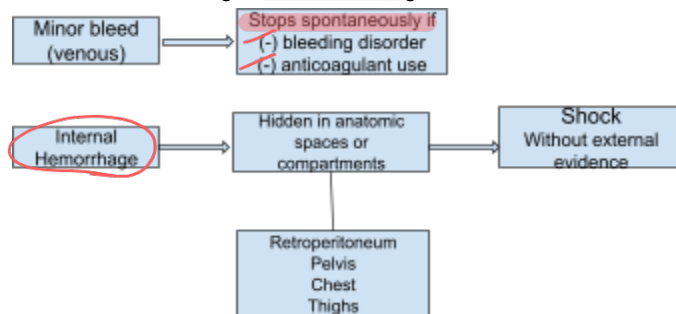


BREATHING

- Nurses must provide adequate ventilation
- **Quick assessment for:**
 - Absent/diminished breath sounds
 - Open chest wounds
 - Difficulty delivering artificial breaths (bag-valve maneuver or mech vent) to the patient
- **Diagnostic Procedures**
 - Oxygen saturation
 - Arterial blood gas (ABG)

CIRCULATION

- To control and stop whatever bleeding the patient has – essential because we need to promote adequate tissue perfusion
- Arterial bleeding – serious bleeding; does not stop with pressure; is projectile
- Venous bleeding – minor bleeding



GCS indicates tissue perfusion to the brain.

TABLE 38-2

Glasgow Coma Scale

BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best motor response	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
	No response	1
Total score:		
Best response		15
Comatose client		8 or less
Totally unresponsive		3

ASSESSMENT

- **Quick assessment for signs and symptoms of shock**
 - Cool, moist skin (poor peripheral perfusion)
 - Hypotension *↓ BP*
 - Tachycardia *↑ HR*
 - Decreased urine output *↓ UD*
 - Delayed capillary refill time

MANAGEMENT

- Fluid replacement (isotonic or electrolyte solutions) to maintain circulation
 - 2 large IV gauges for fluid and blood replacement
 - Volume per volume infusement
 - Packed RBCs are infused when there is massive blood loss

- Obtain blood samples for typing and crossmatching
- Control of **External** hemorrhage
 - **Primary management:** Direct and firm pressure
 - **Next:** pressure dressing → elevate injured part → immobilize the injury
 - A tourniquet can be used when bleeding cannot be controlled in any other way
 - Place tourniquet — labeled with the date and time it was applied
 - This may lead to amputation
- Control of **Internal** hemorrhage
 - ~~X~~ No external bleeding but (+) tachycardia, falling blood pressure, thirst, apprehension, cool and moist skin, or delayed capillary refill
 - Definitive treatment: surgery, pharmacologic treatment, positioning to supine (to prevent travel of clots)

INTERNAL HOSPITAL DISASTERS WHO MANUAL

- **WHO Manual on Safe Hospitals in Emergencies and Disasters**
 - During emergencies or disasters, hospitals and other health facilities must remain **SAFE, ACCESSIBLE, and FUNCTIONING** at a maximum capacity in order to help save lives.
 - A hospital must be organized with contingency plans.

EMERGENCY OPERATIONS PLAN (EOP)

- A comprehensive plan to tackle all potential and actual hazards.
- It is important for hospitals to become structurally sound and operationally sound.
- **Main goal:** protection of the community.
- **Hazard Vulnerability Analysis** – know your weaknesses
 - Responsibility of the local health care facility and its safety committee, safety officer, or ED manager.
- Have a realistic understanding of resources – the goal of each healthcare institution - **to become self-sufficient to sustain core services** (nursing, medicine, surgery...)
- **Components**
 1. **Activation response** - Defines where, how, and when the response is initiated.
 2. **Internal/external communication plan** - Communication is critical for all parties involved, including communication to and from the prehospital area.
 3. **Plan for coordinated patient care** - Response is planned for organized patient care into and out of the facility, including transfers from within the hospital to other facilities. The site of the disaster can determine where the greater number of patients may self-refer.

4. **Security plans** - A coordinated security plan involving facility and community agencies is key to the control of an otherwise chaotic situation.
5. **Identification of external resources** - Resources outside of the facility are identified, including local, state, and federal resources and information about how to activate these resources.
6. **Plan for people management and traffic flow** - "People management" includes strategies to manage the patients, the public, the media, and personnel. Specific areas are assigned and a designated person is delegated to manage each of these groups.
7. **Data management strategy** - A data management plan for every aspect of the disaster will save time at every step. A backup system for documenting, tracking, and staffing is developed if the facility utilizes an electronic health record.
8. **Demobilization response** - Deactivation of the response is as important as activation; resources should not be unnecessarily exhausted. The person who decides when the facility resumes daily activities is clearly identified. Any possible residual effects of a disaster must be considered before this decision is made.
9. **After-action report or corrective plan** - Facilities often see increased volumes of patients 3 months or more after an incident. Postincident response must include a critique and a debriefing for all parties involved, immediately and again at a later date.
10. **Plan for practice drills** - Practice drills that include community participation allow for troubleshooting any issues before a real-life incident occurs.
11. **Anticipated resources** - Food and water must be available for staff, families, and others who may be at the facility for an extended period.
12. **MCI planning (mass casualty incident)** - MCI planning includes such issues as planning for mass fatalities and morgue readiness.
13. **Education plan for all of the above** - A strong education plan for all personnel regarding each step of the plan allows for improved readiness and additional input for fine-tuning of the EOP.

Week 10

- **Emergency and Disaster Nursing Care of Clients in Acute Biologic Crisis**
 - Types of Emergencies
 - Multiple Trauma/Injuries
 - Intra-abdominal Injuries
 - Crush Injuries
 - Anaphylactic Reaction
 - Insect, Animal, and Human Bites

WEEK 10: EMERGENCY AND DISASTER NURSING CARE OF CLIENTS IN ACUTE BIOLOGIC CRISIS (CONTINUATION)

TYPES OF EMERGENCIES

- **Golden Hour: 60 minutes**
 - A **window of opportunity** during which HCWs can have a positive impact on the morbidity and mortality associated with injury.
 - We need to be urgent for the successful treatment of injury.

1. MULTIPLE TRAUMA/INJURIES

- **Trauma** – an unintentional or intentional wound or injury inflicted on the body from a mechanism against which the body cannot protect itself.
- **Multiple trauma** – caused by a single catastrophic event that causes life-threatening injuries to at least two distinct organs
 - Mortality is related to the severity, number of systems and organs involved, and severity of each injury alone and in combination
- Immediately after injury, the body is hypermetabolic and severely stressed
- **Triad of death (HAC)**
 - Hypothermia
 - Acidosis
 - Coagulopathy
- Meticulous documentation is essential when managing trauma patients, including:
 - Description of all wounds
 - Mechanism of injury
 - Time of events
 - Collection of evidence

Disc
Muh
Time
Evidence

Guidelines on Evidence Collection

- Each piece of clothing should be placed in an individual paper bag.
- Clothing should not be given to families
- Valuables should be inventoried
- Evidence cannot be left unattended in the room
- All deaths of trauma patients are reported to a medical examiner
- All tubes and lines must remain in place
- The patient's hands must be covered with paper bags to protect evidence on the hands or fingernails.
- In a surviving patient, tissue specimens may be swabbed from the hands and nails.
- Photograph wounds or clothing
- Documentation includes statements made by the patient in their own words with quotation marks.

MANAGEMENT

- Alert the trauma team
- Ensure/maintain airway and IV access
- Mitigate the effects of hypothermia
 - Remove wet clothes
 - Apply warm blanket
 - Warm IVF → Lactated Ringer's (preferred)
- Continuous monitoring of hemodynamic status, temperature, and ambient environment

Priority Management for Multiple Injuries

- Establish airway and ventilation
- Control hemorrhage
- Prevent and treat hypovolemic shock
- Assess for head and neck injuries
- Evaluate for other injuries – expose and reassess head and neck, chest; assess abdomen, back, and extremities
- Splint fractures and then reassess pulses and neurovascular status
- Perform a more thorough and ongoing examination and assessment; diagnostic studies

– circulation

CHEST/THORACIC TRAUMA

- Any trauma to the chest wall → Motor Vehicle Accident
- Causes: **Blunt** (MVA, suntok sa chest) or **Penetrating** (GSW, stabbing) gunshot wounds
- What makes this dangerous is the organs contained within the chest wall.
 - Esophagus
 - Aorta
 - Heart
 - Pericardium
 - Lungs
 - Pleura
 - Sternum
 - Rib cage

Primary survey: assess & treat life-threatening injuries

- **Airway:** ensure patency → ET intubation
- **Breathing**
 - **Look:** respiratory rate, O₂ saturation, breathing pattern
 - **Hypoxemic** → 100% oxygen non-rebreather mask
 - **Asymmetric breathing** → weak chest segment d/t rib fractures
 - **Listen:**
 - Signs of ↓ air entry → pneumothorax or hemothorax
 - Muffled heart sounds → Cardiac tamponade (fluid accumulates in the pericardial sac compressing the heart, and impairing contractility)
 - **Feel:** tenderness → (+) rib fractures
- **Circulation**
 - Blood pressure
 - Heart rate
 - Signs of shock
 - Causes:
 - Bleeding into the pleura or pericardium: rib punctured the heart → cardiogenic shock
 - Obstruction of cardiac output → Tension pneumothorax
 - Inadequate cardiac output → myocardial injury
 - Look for other sources of bleeding

- Prepare 2 large-bore IV lines – gauge 18 cannula
- Blood products for immediate transfusion
- **Signs of inadequate end-organ perfusion**
 - Altered mental status
 - ↓ urine output
 - Cool or pale skin
 - Delayed capillary refill
- **Bedside Ultrasound:**
 - Focused Assessment with Sonography for Trauma (FAST Exam)
 - Views added for Pneumothorax, Hemothorax, or Cardiac Tamponade → E-FAST (extended FAST)
- **Neurologic Disability** → Glasgow Coma Scale (GCS)
- **Exposure** → turn individual on their side, assessing back for occult (hidden) injuries

Secondary Survey

- **History**
- **Head-to-toe exam (detailed)** → detect subtle injuries
 - Recognize life-threatening injuries
 - **Life-saving interventions**
 - Needle decompression
 - Covering open pneumothorax wound
 - Pericardiocentesis
 - Remove excess fluid from the pericardial sac
 - Often performed in the setting of cardiac tamponade to correct hypotension d/t ↓ stroke volume from intrinsic compression of the heart chambers
 - Chest tubes
- **Chest X-ray to detect**
 - Rib fractures
 - Pulmonary contusions
 - Pneumothorax
 - Hemothorax
 - Aortic injury
- **CBC**
 - Baseline for bleeding
 - Dilutional anemia begins hours to days after trauma (RBC count appears to be lower than normal due to an increase in the total blood volume. This often occurs when there is excessive fluid retention)
 - Blood Type and crossmatch
 - PT, PTT, INR – coagulation studies
- **ECG, Cardiac enzymes** → Myocardial injury → increased CK-MB

RIB FRACTURES

- Most common chest wall injuries
- Pain → (+) shallow breathing
 - A patient may not exert effort breathing
- (+) Point tenderness and bruising at the area of fracture

- **Treatment:**
 - Deep breathing → to prevent lung collapse and pneumonia from shallow breathing; expand lungs
 - Pain control
 - Analgesics (Acetaminophen & NSAIDs)
 - Opioid medications
 - Intercostal nerve block – ultrasound-guided; Bupivacaine (a local anesthetic injected into the nerve)
- **Discharged home**
 - <65 y/o
 - No comorbidities
 - 1-2 rib fractures
- **Observation**
 - >65 y/o
 - (+) Comorbidities (COPD)
 - 3 or more rib fractures
- **Risk Factors**
 - **Modifiable:** intoxicated; contact sports
 - Don't drink and drive
 - **Non-modifiable:** advanced age; male

Consequences of Rib Fractures

- Pneumothorax
- Hemothorax
- Splenic or Liver Laceration
 - Right, middle segment ribs → high incidence of liver injury d/t its anatomical position (RUQ)
 - Left middle segment → high incidence of spleen injury
- Inadequate pain control and ventilation → Atelectasis → predisposed to post-traumatic pneumonia

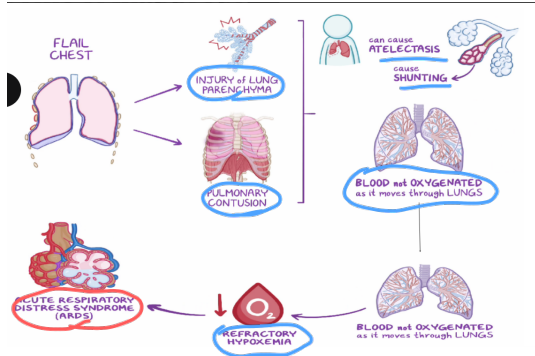
Management

- **Goals**
 - Maintain adequate oxygenation/ventilation
 - Manage pain
 - Monitor for complications
- **High-fowler position**
 - Splint flail segment → pillow or rolled blanket
- **Apply**
 - Pulse oximeter
 - High-flow humidified oxygen
 - CPAP: SpO2 >94%
- **Pulmonary assessment**
 - Rate, Depth, Ease of respiration
 - Use of accessory muscles
 - Breath sounds
 - Oxygen saturation
- Color of skin and mucous membranes
- Level of consciousness
- **Assess the chest for paradoxical wall motion**
 - Palpate for crepitus
- **Promote lung expansion & clearance**
 - Deep breathing
 - Assist with incentive spirometry every 1-2 hours → pt inhales

- **Pain management** → avoid sedation
- **Bed rest** → to minimize oxygen demand
 - Not flat on bed → 90 degrees
- **Examine the rest of the body** to identify other underlying injuries
 - Check the whole body 360 degrees

FLAIL CHEST

- Free-floating segment
- 3 or more adjacent ribs are fractured in at least 2 locations
 - Not everybody develops a flail chest
 - Kumakalas yung ribs

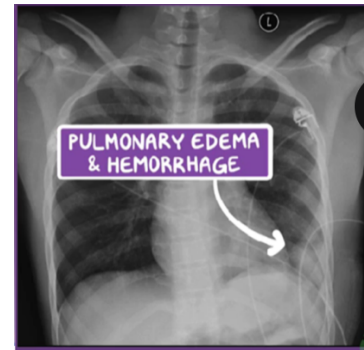


- Respiratory failure is related to underlying lung
 - **Pulmonary contusion "lung bruise"**
 - Injury of the lung parenchyma caused by blunt chest trauma
 - **Classic presentation:** initially well oxygenated → deteriorates over time
 - (+) hemorrhage in the alveoli → alveoli collapse → impaired gas exchange → Atelectasis
 - From pulmonary shunting
 - Passage of venous blood into the arterial blood system bypasses the alveoli blood gas exchange, often occurring when the fluid-filled alveoli cross parts of the well-ventilated arterioles are still being perfused
 - Blood flow is good, but oxygen insufficient
 - Can result in **Acute Refractory Hypoxemia**
 - Oxygenation does not improve despite a high concentration of supplemental O₂
 - This is relevant in COPD, where damaged alveolar tissue automatically shuts down, preventing effective gas exchange. As a result, even with increased oxygen flow, the lungs cannot adequately oxygenate the blood. This is why only low-dose oxygen is administered to COPD patients.
 - This may lead to ARDS
 - There is susceptibility to **Pneumonia** due to ineffective breathing, resulting in mucus accumulation in the airways.
 - Increased risk of developing **Pneumothorax** → (+) air in the pleural cavity

- The air outside the lungs will prevent it from expanding properly, pushing pressure on it.

Diagnosis

- **Chest X-ray** → may not show changes until 6 hours after injury
 - Fluids and blood in the x-ray appear gray/white

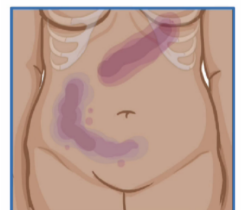


Manifestations

- (+) **Paradoxical breathing** → uncoordinated; weird
 - The affected area draws in when the patient breathes in and the rest of the chest expands
 - Intrathoracic pressure becomes more negative
 - The affected area moves outward as the patient exhales and the rest of the chest contracts
 - Intrathoracic pressure becomes more positive
- Pain at fracture sites, worse with
 - Breathing
 - Moving
 - Coughing
 - Sneezing
- ↓ breath sounds
- Crepitus (when fracture site is moved)

In severe cases

- Shortness of breath
- Cyanosis
- Refractory hypoxemia
- Hemodynamic instability
 - Hypotension
 - Tachycardia – an early compensatory mechanism
 - Arrhythmias
- Since clients have trouble breathing/coughing up secretions, they are susceptible to
 - Pneumonia
 - Pneumothorax – air in the pleural cavity doesn't allow lung expansion
- (+) **Splinting** → take short, shallow rapid breaths to limit chest movement
 - This may place them at higher risk for atelectasis and pneumonia
- (+) **Seatbelt sign** – ecchymosis and abraded skin; horizontal or diagonal



SEATBELT SIGN

elastic ← inward
tension → outward

extending across the abdomen evident after a car accident

- If with (+) abdominal pain and tenderness → higher likelihood of intraabdominal injuries
- Monitored in MVAs

Treatment

- Splinting or applying direct pressure over the chest – esp in Flail chest
- Supplemental oxygen
- IV fluids → address hypotension
- Pain management
 - NSAIDs
 - Opioids
 - Acetaminophen
 - Nerve block
- Chest physiotherapy → to mobilize and eliminate secretions
- If the condition worsens:
 - Ventilation → CPAP (continuous positive airway pressure) to provide continuous pressure throughout the breathing cycle
 - If ineffective → PEEP (positive end-expiratory pressure) to maintain positive pressure at every end of expiration through each breath with the help of a mechanical ventilator
 - If not enough → surgical stabilization of displaced ribs
 - Not every fracture is operated on immediately
 - Most rib fractures can heal on their own with conservative management
 - Surgery is considered when there are complications
 - Monitor ABG and vital capacity (VC)
 - Report to HCP:
 - ↓ FVC
 - Respirations <12 or >20 breaths/min
 - ↓ SpO₂
 - Oxygenation does not improve when receiving higher concentrations
 - (+) Confusion, Nasal flaring, intercostal retractions → sign of distress

PNEUMOTHORAX

- Traumatic
 - Causes: gunshot, stab wound
 - The parietal pleura is normally packed to the chest wall and the visceral pleura is packed to the lungs
 - They should not be touching
 - (+) air in the pleural space (between the lungs and chest wall) – normally contains fluid to avoid friction
 - The object rips through the parietal pleura, causing air entry into the pleural space → matatanggal yung lubrication
 - If the pressure builds up in the pleural space more than it normally can handle, the tension in

the diaphragm and chest wall will cause the expansion of the lungs outwards, but the elastic recoil will pull the lungs inwards.

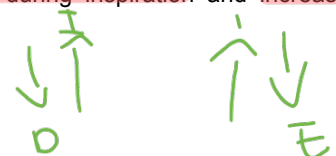
- Normally it should create a balance between the forces. Yung isa palabas, then yung isa palooob.
- Maintaining a normal pressure of negative 5cm of water in the pleural space, but 0 cm of water pressure in both the thoracic cavity and the lungs. However, if this 0 cm is punctured and air enters the space, the pressure equals 0 cm of water. Meaning nawawala yung space in between.
- The loss of negative pressure in the pleural space would cause the two opposing factors to no longer pull on one another. Wala nang hatak palabas. Therefore, the lungs would pull inward and collapse.

Tension

- Can develop similarly as spontaneous pneumothorax (biglang pumuputok yung bullae inside the lungs)
- Air leaks into the pleural space and cannot escape, causing increasing pressure on the lung and shifting the mediastinum
- In tension pneumothorax, a one-way valve is created. Pumapasok yung air sa loob and does not get out.
 - A flap of tissue does not allow the air to go the other way (palabas), causing air to build up, therefore increasing pressure, and compressing the heart and lungs against the chest cavity, making them less functional. Pasok lang ng pasok yung air sa more than the lungs' usual capacity.
- Medical emergency
- Significant indicator: (+) tracheal shift/deviation – normally in midline; away from the affected side
- (+) compressed heart and lungs
 - Compressed RA and VC: ↓ cardiac output → ↓ BP → altered LOC → hypoxemia → ↑ JVP → Obstructive shock

Signs and Symptoms

- Hemodynamic instability (HypoTach)
 - Hypotension
 - Tachycardia – compensatory
- Shortness of breath (dyspnea)
- Chest pain
 - Sudden onset → tension pneumothorax
- Breath sounds
 - Tension: unequal; ↓ sounds over the involved lung
- Hyperresonant – excessive air
- Pulsus paradoxus – blood pressure decreases significantly during inspiration and increases during expiration



• Diagnosis

○ X-ray/CT

- Tracheal deviation → away from the affected side
- Collapsed lung (atelectasis)
- Tension pneumothorax → displaced chest structures

• Treatment

- If suspected → medical emergency
- Decompression

■ Finger → initial management

- An incision is made on the skin over the intercostal spaces. The surgeon inserts a finger to allow the air to escape and relieve the pressure. This can be done on either side of the chest, usually on the 2nd ICS midclavicular line or at the 5th ICS if more access is needed.
- This is a rapid and effective intervention, although often followed by further treatment, such as CTT (chest tube thoracostomy) to drain/relieve pressure.
- Successful intervention converts tension pneumothorax to a simple pneumothorax. However, there is a possibility of subsequent pneumothorax as a result of the maneuver (finger thoracostomy).
- Continual monitoring is necessary and a more stable intervention, such as chest tube thoracostomy (mandatory).

■ Needle

- Needle in the mid-clavicular line

- Chest tube in anterior axillary line

Open Pneumothorax

- “Sucking chest wound”
- There is a hole in the chest wall that allows air to leak into the pleural space. This can cause the lung to collapse, as the air pressure in the pleural space is higher than the pressure inside the lung.
 - Air moves in and out freely due to an open chest wound. At times, a traumatic pneumothorax can lead to an open one. It occurs if the chest wound is more than 2 or 3.
 - Air from the outside enters the pleural space through the hole in the chest wall. If the chest wall is compromised, air enters during inhalation leading to a loss of negative pressure that normally keeps the lungs inflated.
- Air takes the path of least resistance
 - Air flows in through the chest wall defect when the pressure is lower inside the thoracic cavity during inhalation and escapes during exhalation.
- Absence of obstructive shock → no air trapped in pleural space → no pressure build-up

- Pressure is equalized instead of negative to keep the lungs inflated
- Rapid management: close the open wound with a sterile dressing large enough to overlap the wound edges
 - If unavailable, plastic wrap can be a temporary measure
- Treatment: taping securely from 3 sides (flutter-valve effect)
 - Ensures air can flow out of the pleural cavity without allowing more air to enter.



■ FIGURE 4-4 Dressing for Treatment of Open Pneumothorax. Promptly close the defect with a sterile occlusive dressing that is large enough to overlap the wound's edges. Tape it securely on three sides to provide a flutter-valve effect.

HEMOTHORAX

- Blood in pleural space
- Signs and Symptoms
 - Shortness of breath
 - Hypoxia
 - ↓ Air entry on auscultation and dullness on percussion (d/t blood)
- Major concern for hemorrhagic shock
- Massive hemothorax: results from the rapid accumulation of more than 1500 ml of blood or one-third or more of the patient's blood volume in the chest cavity.
 - The problem is fluid accumulation, blood loss, and shock
 - Immediate response: stabilization and fluid management

DIFFERENTIATING TENSION PNEUMOTHORAX & HEMOTHORAX					
Condition	Breath Sounds	Percussion	Tracheal Position	Neck Veins	Chest Movement
Tension Pneumothorax	↓ or absent	Hyperresonant <i>air</i>	Deviated away	Distended	Expanded immobile
Hemothorax	↓	Dull <i>fluid/blood</i>	Midline	Collapsed	Mobile

• Diagnosis

- Upright chest X-ray (CXR)
 - Supine CXR may miss a smaller hemothorax – fluid is distributed when lying flat
 - Originates from injury to lung parenchyma or intercostal vessels
- FAST exam and CT scan of the abdomen

- Consider intra-abdominal source of bleeding
 - If (+) → move to OR to control bleed
- FAST exam is needed to identify if bleeding originates from the lung parenchyma or intercostal vessels
- Abdominal CT to check if the source of the bleed is intra-abdominal → OR

• Treatment

- Chest tube → to drain blood
- Restoring circulating blood volume
 - Blood drained >1500 mL/day (persistent) or bleeding >200 mL/hour for 2-4 hours or decompensated after initial stabilization
 - Surgical thoracotomy – open chest surgery to identify and stop bleeding
- Autotransfusion – eliminates the risk of transfusion reactions
 - Lost blood is collected in a sterile manner and the same blood is transfused back into the patient

MYOCARDIAL CONCUSSION

- “Commotio Cordis”
- Sudden cardiac arrest due to a non-penetrating blow to the chest or contact sports activities (blunt force)
- Sudden collapse of an individual due to a life-threatening arrhythmia
 - Asystole
 - Ventricular fibrillation
 - Cardiac arrest
- Blow to the chest just before the T-wave → Electrical vulnerability
 - The force of the blow can cause a mechanical disruption in the heart's electrical conduction system, leading to fatal arrhythmias if the timing of the blow coincides with the T-wave.
 - The heart is particularly vulnerable during T-wave because it is the period of ventricular repolarization.
- Treatment
 - Follow ACLS protocol
 - CPR
 - Defibrillation
 - The most important initial thing to do during a code is to deliver high-quality CPR

MYOCARDIAL CONTUSION

- “Heart bruise”
- This injury can lead to temporary or even permanent damage to the heart muscle.
- The most commonly injured is the right ventricle
- Symptoms – depend on the extent of the injury
 - Chest pain
 - Arrhythmias and Hypotension
 - Presumed to be from hemorrhage
 - Cardiogenic shock

• Diagnosis

- ECG → identify arrhythmias
 - Sinus tachycardia
 - Conduction blockade
 - Ischemia
 - Hemodynamically stable → admitted for continuous ECG monitoring
- Troponin I → marker of cardiac myocyte injury (gold standard)
 - ↑ troponin → hemodynamically unstable → emergent echocardiogram
 - ↓ cardiac contractility
 - Valvular damage
 - Rupture of the myocardial wall

• Treatment

- Serious arrhythmias → medically treated
- If ↓ CO inotropic agents (Dobutamine)
 - Dobutamine is a beta-1 adrenergic agonist → increases cardiac contractility and heart rate with minimal vasodilation effects
 - We do not want more vasodilation as this will induce more bleeding, leading to cardiogenic shock
 - Used in situations where increased cardiac output is needed without a significant decrease in vascular resistance
 - Increase cardiac output and stroke volume with less effect on blood pressure, compared to norepinephrine
- Most recover with no residual cardiac damage

CORONARY VESSEL DISSECTION SECONDARY TO TRAUMA

- A condition where the inner layer of a coronary artery tears away from the outer layers.
 - It can lead to a narrowing or blockage of the artery, → reduce blood flow to the heart muscle → heart attack.
- Obstruct coronary blood flow → myocardial infarction
 - Dissection == divided into two segments
- Diagnosis:
 - ECG → identical to myocardial infarction caused by atherosclerosis
- Treatment
 - Catheterization lab for percutaneous coronary intervention (PCI)
 - Cardiac arrest (blunt cardiac injury) → Thoracotomy

MYOCARDIAL RUPTURE

- Rupture of the ventricular or atrial walls → rapid death
 - When these chambers rupture, they will no longer be able to contract
- Bleeding is limited by the pericardium → Pericardial tamponade
 - Diagnosis: Echocardiogram (2D-Echo)

- **Treatment: Thoracotomy**
 - Evacuate pericardial tamponade
 - Control bleeding
 - Repair defect

PERICARDIAL EFFUSION

- Fluid pools in the pericardial sac around the heart
- It can develop into cardiac tamponade depending on
 - How much and how quickly fluid pools → if rapid approx. **150 ml of fluid is enough**
- Trauma – ruptures lots of small vessels
 - Stabbing
 - Blunt trauma
- Aortic dissection → aortic rupture
- Myocardial infarction → ventricular wall rupture
- Heart surgery → weakened muscle rupture

ACUTE PERICARDIAL TAMPONADE

- As little as **50 mL of blood** → tamponade
 - The heart cannot stretch out fully between contractions → chambers don't fill properly due to too much pressure → $\downarrow$ CO → $\downarrow$ BP → $\uparrow$ HR (compensatory)
- A significant amount of fluid accumulates in the pericardial sac → compresses the heart → difficult to pump blood effectively.
- Fluid encroaches on ventricles and atria → Limit filling capacity → $\downarrow$ CO
- **Beck's Triad**
 - Muffled heart sounds
 - Hypotension – d/t bleeding
 - Jugular venous distension – fluid build-up
 - In trauma may be hypovolemic → jugular veins should be flat
- **Signs and Symptoms**
 - Beck's triad *MHS, $\downarrow$ BP, JVD*
 - Tachycardia
 - Coughing
 - Dyspnea
 - Weakness
 - Lightheadedness
- If severe, the heart can become ischemic → $\downarrow$ blood volume → may stop beating (arrest) *BP $\downarrow$ $\uparrow$*

Pulsus paradoxus

- A decrease in **SBP of >10 mmHg**
 - An abnormal drop in **SBP** during inspiration only
 - The negative intrathoracic pressure is less effective in increasing RV filling due to the external pressure from the fluid outside. Therefore, filling is ineffective leading to reduced LV filling
- With cardiac tamponade
 - During inhalation, the SBP drops
- In tamponade
 - Extra volume pushes the interventricular septum to the left

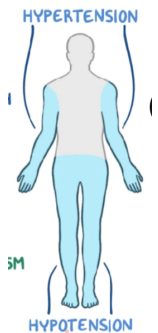
- Less left ventricular diastolic volume
- Lower stroke volume (SV)
- Lower Systolic BP during inspiration

CARDIAC TAMPONADE

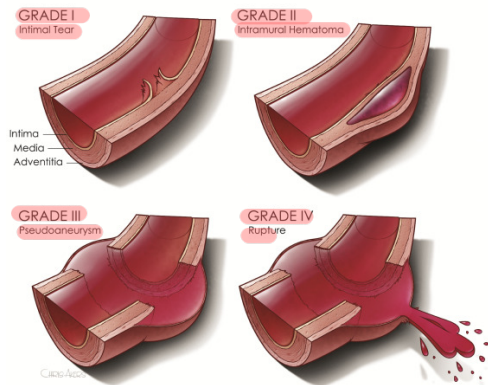
- **Assess clinical findings for other immediately life-threatening conditions**
 - Hypotension
 - JVD
 - Muffled heart sounds
 - Pulsus paradoxus
 - Pocus → Pericardial effusion
- **ECG**
 - Sinus tachycardia
 - $\downarrow$ QRS voltage
 - Electrical alternans
 - As part of the heart's compensatory mechanism
- **Treatment**
 - IVF to maintain BP – to address hypotension
 - Ultrasound-guided pericardiocentesis
 - If blood has clotted → Thoracotomy
 - Address underlying disease

AORTIC INJURY

- Due to blunt trauma or rapid deceleration forces
- **Most common site of injury → Isthmus**
 - The site is narrow and fixed position
 - Particularly in blunt trauma – high-impact collisions
- **Ligamentum arteriosum**
 - Creates tension that leads to injury
 - The aorta is strongly tethered
 - Limits free movement
 - During rapid deceleration, the aorta can be stretched or torn
- **Signs and Symptoms**
 - Chest pain
 - Interscapular pain – *Aortic*
 - Aortic rupture causes referred pain at the interscapular region due to sympathetic nerves or involvement of the aorta's position in the chest cavity
 - Shortness of breath
 - Rupture of aorta → **Rapid Hemorrhagic Shock** → Rapid death
 - **Mediastinal hematoma**
 - Hoarseness from compression of recurrent laryngeal nerve
 - Dysphagia from esophageal compression
 - Left-sided hemothorax
 - **Ischemia to distal extremities** → Extremity pain due to lack of perfusion



CLASSIFICATION OF TRAUMATIC AORTIC INJURY



- **Nonspecific presentation and high mortality**
 - Always suspected in individuals with a potential mechanism
 - Upper extremity → hypertension (from fluid buildup in the chest cavity, increasing BP)
 - Lower extremity → hypotension
- **Diagnosis**
 - **Chest X-ray**
 - Wide mediastinal diameter → sensitive but nonspecific sign
 - >8 cm on SUPINE
 - >6 cm on UPRIGHT
 - CT Angiography – gold standard
 - Contrast material in the femoral artery
 - Does not identify injury
 - Intravascular ultrasound
 - Assess aortic injuries in real-time
 - No exposure to radiation or contrast material → can alter results
 - Abnormal aortic contour
 - Left hemothorax
 - Downward displacement of right mainstem bronchus
 - Due to pressure
- **Treatment**
 - SBP >100 mmHg → beta-blockers (↓ shearing effect)
 - ↓ BP, ↓ HR = heart will not exert force
 - Grade 1 – no surgery
 - Grade 2-4 – surgical repair asap
 - TEVAR → performed w/ local anesthesia right after CT angiogram
 - Thoracic Endovascular Aortic Repair
 - Minimally invasive procedure to treat an aneurysm in the upper part of the aorta
 - Access to the femoral artery where a catheter is inserted
 - No cardiopulmonary bypass

INTRA-ABDOMINAL INJURIES

- **Penetrating** – requires surgery; results in injury to hollow organs
 - Gunshot wound – velocity is the most prognostic factor
 - Stab wound
 - The liver is the most frequently injured due to its size and anterior placement in the RUQ
- **Blunt trauma** – associated with extra-abdominal injuries to the chest, head, or extremities
 - MVA, falls, blows, or explosions
 - Greater incidence of delayed and trauma-related complications
- **Intraperitoneal Injury**: assess for referred pain
 - Diagnostic peritoneal lavage:
 - RBC >100,000/mm³; WBC >500/mm³; (+) bile, feces, or food
 - Ultrasonography
 - Abdominal CT
- **Genitourinary Injury**:
 - Male: high-riding prostate → urethral injury
 - Female: digital vaginal exam to assess for open pelvic fracture
 - indwelling catheter → inserted to decompress the bladder

MANIFESTATIONS	DIAGNOSTIC
Absence or decreased bowel sound	Hemoglobin and hematocrit levels
Progressive abdominal distention	Lactate levels
Involuntary guarding	ABGs
Tenderness, pain, muscle rigidity, or rebound tenderness	INR
Pain on left shoulder → ruptured spleen	WBC count
Pain on right shoulder → lacerated liver	Abdominal CT
	Abdominal ultrasound

ABDOMINAL TRAUMA

- Causes: blunt or penetrating
- The ff will determine the level of priority and best method of abdominal and pelvic assessment
 - Mechanism of injury
 - Injury forces
 - Location
 - Hemodynamic status

MIST sign Treatment

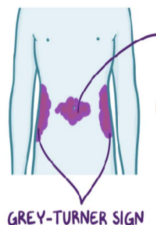
Primary Survey – assess & treat life-threatening injuries

- **Airway**
 - Intact → clear voice
 - If not → assess the ability to maintain airway
 - Assisted ventilation w/ bag-valve mask
 - Endotracheal intubation
- **Breathing**
 - Look: tracheal deviation; hypoxic (100% O₂ non-rebreather mask)
 - Listen: breath sounds
- **Circulation**

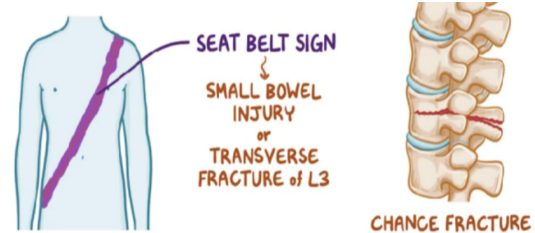
- Assessment includes early evaluation of possible intra-abdominal and pelvic hemorrhage in patients who sustained blunt trauma (internal bleeding).
- Torsal wounds between the nipple and perineum must be considered as intra-peritoneal injury.
- Heart rate and blood pressure
 - Tachycardia and Hypotension → Hemorrhagic shock
- Signs of inadequate end-organ perfusion
 - Altered mental status
 - ↓ urine output
 - Cool or pale skin
 - Delayed capillary refill
 - Significant blood loss can be present in the abdominal cavity without a dramatic change in the external appearance and no obvious signs of peritoneal irritation. Why? It is a large cavity, it can accommodate extra pressure. This is why it is fatal, it can go undetected.
 - Any patient who has sustained a torso injury from a direct blow, deceleration, blast, or penetration must be considered to have a potential abdominal visceral, vascular, or pelvic injury until proven otherwise
- Management:
 - Prepare 2 large-bore IV lines (g18) and blood products
 - Bedside ultrasound: FAST Exam
 - Non-invasive; Portable
 - Great for intra-abdominal bleeding
 - Doesn't identify which organ is injured → fluid in hepatorenal space ≠ hepatic injury
 - Morrison's pouch is a space in the (RUQ) peritoneal cavity between the right kidney and the right lobe of the liver. It is the most dependent part of the abdominal cavity when a person is in a supine position. It is where the accumulation of fluids occurs, often assessed in a FAST Exam. Fluid in this pouch may indicate the presence of internal bleeding.
 - Views added for Pneumothorax, Hemothorax, or Cardiac tamponade → E-FAST
- Disability – neurologic; GCS
- Exposure – turn to the side to assess the back for occult injuries

Secondary Survey

- History
- Head-to-toe exam → detect subtle injuries
 - Cullen's sign – intraperitoneal hemorrhage from pancreatic injury
 - Grey-Turner sign – retroperitoneal hemorrhage from pancreatic injury

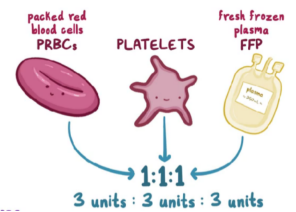


- Kehr's sign – splenic injury irritating left hemidiaphragm, innervated by the phrenic nerve
 - Referred pain in the shoulder *Left +*
- Seatbelt sign – small bowel injury or transverse fracture of L3



Signs of Peritoneal irritation may be present

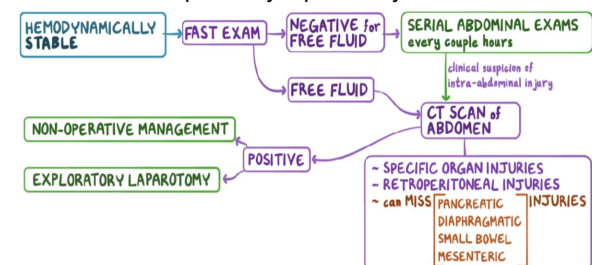
- Guarding
- Rebound tenderness
- Absence doesn't rule out injury
- CBC
 - Blood type & crossmatch
 - PT, PTT, INR
 - Urine Beta-hcG → any female of childbearing age
 - Urinalysis
 - Hematuria → GU injury
- Bleeding → loss of platelets, coagulation factors, RBCs
- Prophylactic Antibiotics → PipTaz
 - ↓ risk of intra-abdominal source of sepsis



MANAGEMENT

Hemodynamically unstable

- Immediate FAST exam: (+) Free fluid → Exploratory laparotomy
 - If (-) free fluid in FAST → resuscitation continued
 - Check for other sources of hemorrhagic shock are searched for (e.g. bleeding from the pelvis or long-bone fracture)
- Microscopic analysis
 - Gross blood of >100,000 RBCs/mm³ or >500 WBC/mm³
 - Exploratory laparotomy indicated



Brunner

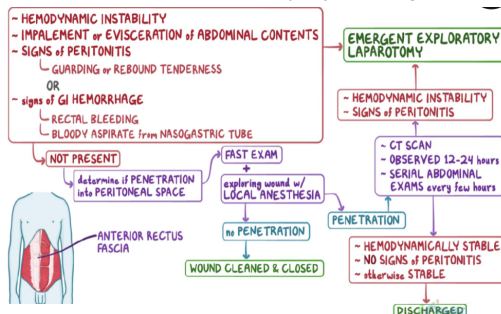
- Initiate resuscitation procedures as prescribed
- Blunt trauma → immobilize the spine (stretcher)
- Maintain cervical spine immobilized
- Identify the mechanism of injury
- Locate, count, and document all wounds
- Cover protruding viscera with sterile, moist saline dressing
- NPO; stomach contents aspirated
- Give Tetanus prophylaxis and broad-spectrum antibiotics as prescribed
- Continuously monitor for changes

PENETRATING ABDOMINAL TRAUMA

- Primary and secondary surveys are similar
- **FAST** is performed
 - Less helpful → no fluid accumulation
 - Is not used in isolation as a decision-making tool
 - Done as **E-FAST**
 - Concern for pneumothorax or hemothorax
- Tetanus toxoid vaccine administered
- Prophylactic broad-spectrum antibiotics
 - If with Surgical intervention → leave the penetrating object in place until surgically removed

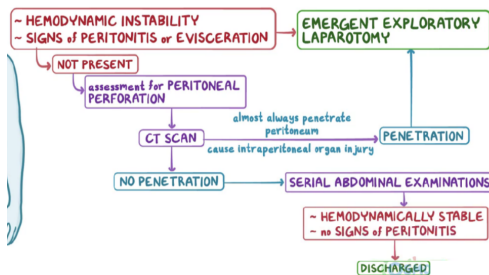
Stab Wounds

- The liver is the most commonly injured organ



Gunshot Wounds

- Large and small bowels are the most commonly injured organ



Liver

- A big target for injury in blunt and penetrating trauma
- Graded I-VI
- **Diagnosis**
 - CT w/ IV contrast → same findings as splenic injury
- **Management**
 - Blunt trauma → non-operatively
 - Angiography embolization if (+) evidence of contrast extravasation

- Lumbarbas yung contrast, wherein dapat nagsstay siya
- Failed non-operative management → **Surgical**
 - **Pringle maneuver** → The portal triad is occluded temporarily
 - To minimize bleeding during hepatic surgeries or in cases of liver injury since the liver is hypervascular
 - While this is in place, the surgeon can explore the source of bleeding and manage it more effectively.

Spleen

- One of the most common injuries in blunt or penetrating trauma
- Diseases: **Splenomegaly** (infectious mononucleosis) predispose to splenic injury
- **Diagnosis**
 - CT w/ IV contrast
 - Blood collecting
 - Intraparenchymal or Subcapsular hematoma
 - "Contrast blush" → hyperdense areas due to leakage of contrast materials
 - Visualization of hyperenhancement or increased brightness in the splenic regions on contrast-enhanced CT scan indicates ongoing bleeding. Typically from a lacerated or ruptured spleen.

GRADE		MANAGEMENT
1	Minor	Non-operatively Serial abdominal exams Hemoglobin measurements If (+) contrast blush → angiographic embolization of splenic artery
2		
3	Moderate	Ongoing hemorrhage
4	Severe	Splenectomy
5		

TRAUMA TO GI TRACT

- "Hollow Viscus Injury"
- **Diagnosis**
 - CT
 - Pneumoperitoneum
 - Bowel wall thickening → Hematoma
 - Free intraperitoneal fluid in the absence of another solid organ injury
- **Management**
 - Surgically → repair or resect injured segment
 - Intravenous fluorescein dye and looking with **Wood's Lamp**
 - A type of light that emits long-wave UV lights. In GI injuries, it can help identify certain substances that light up under UV light, such as bile.

Duodenal Injuries

- Usually from penetrating trauma

- **Large duodenal hematoma** → obstruct gastric outlet
- → severe projectile vomiting
- **Diagnosis**
 - CT → tends to be missed
 - **Upper GI series** → water-soluble oral contrast (Gastrografin)
 - Barium swallow
 - Fluoroscopy
- **Management**
 - Surgical

Pancreas

- From penetrating trauma
- **Diagnosis**
 - ↑ Serum or DPL fluid (diagnostic peritoneal lavage)
 - Amylase is the indicator of pancreatic injury
 - This may be due to the general inflammatory response
 - CT
- **Management**

GRADE	MANAGEMENT
1	Endoscopic Retrograde Cholangiography (ERCP) - Often employed when there is an injury to the biliary tract - Look for pancreatic duct injury - w/o ductal injury → Nonoperatively - w/ ductal injury → surgery
2	
3	
4 & 5	Surgical intervention

ABDOMINAL COMPARTMENT SYNDROME

- Fluid or blood in the peritoneal cavity or retroperitoneum increases pressure.
- **Organ dysfunction**
 - ↑ intraabdominal pressure → compression → ↓ perfusion of abdominal organs → **Organ ischemia**
- **Compression of Inferior vena cava (IVC)**
 - ↓ venous return → ↓ CO → worsen ischemia
- **Diagnosis**
 - Bladder pressure with Foley catheter with pressure transducer
 - >20 mmHg + organ dysfunction → abdominal compartment syndrome
- **Management**
 - Limit fluid resuscitation
 - Decompressing stomach and bladder with NGT and Foley catheter
 - Decompressive laparotomy

CRUSH INJURIES

- Trauma caused by a direct crushing force.
- In addition to direct tissue damage, the compressive force prevents venous outflow, leading to the accumulation of potassium, phosphorous, and myoglobin in the tissues. Why? Normally these are inside the compartment and

bones and muscles, which become damaged due to the injury, hence they leak out.

- Venous obstruction is also associated with extremity edema
- **Mechanism of Injury**
 - Direct physical trauma
 - Ischemic injury
 - Reperfusion injury
- **Extent of injury**
- **Duration from the time the injury is sustained**
 - "The longer the injury is sustained, the greater the injury"
- **Damage related to crush injuries include**
 - Bleeding
 - Bruising
 - Compartment syndrome → increased pressure in an arm or leg that causes serious muscle, nerve, blood vessel, and tissue damage
 - Fracture → broken bone
 - Laceration → open wound
 - Nerve injury
 - Infection → caused by bacteria that enter the body through the wound
- **Observed for the ff:**
 - Hypovolemic shock resulting from extravasation of blood and plasma
 - Spinal cord injury
 - Erythema and blistering of skin
 - Fractures
 - AKI

Acute Compartment Syndrome

- **Factors**
 - Severe trauma
 - Penetrating injury
 - Motor vehicle crash
 - Burn injury
 - Intravenous fluids → extravasation
 - Increased risk of bleeding
 - Compression
- **Complications**
 - Necrosis and Gangrene → susceptible to becoming infected
 - Rhabdomyolysis
 - Nerve damage
- **Signs and Symptoms – 6P's**
 - **Pain** that is out of proportion; worse with passive stretching
 - **Paresthesia**
 - **Pallor**
 - **Pulselessness**
 - **Poikilothermia**
 - **Paralysis**
- **Diagnosis**
 - **Compartment pressure >30mmHg**
 - Handheld manometer

- **Delta pressure:** diastolic pressure → compartment pressure **<30 mmHg**
 - X-ray, CT scan, MRI, Ultrasound
 - **Locate injuries**
 - CBC → ↑ WBC, ↑ erythrocyte sedimentation rate
 - Rhabdomyolysis
 - Lab workup – ↑ creatine kinase (CK-MM) & myoglobin
 - Urinalysis – **tea-colored urine**
- **Nursing Diagnosis**
 - **Acute pain**
 - **Ineffective peripheral tissue perfusion**
 - **Risk for peripheral neurovascular dysfunction**
 - **Readiness for enhanced knowledge**
- **Implementation**
 - **Pain medication**
 - **Hydrocodone + Acetaminophen**
 - **Ibuprofen**
 - **Labs**
 - **CBC count**
 - **ESR**
 - **Myoglobin**
 - **Creatine kinase**
 - **CPK**
 - **Kidney function tests – BUN, Crea**
 - **Urinalysis**
 - **Neurovascular assessments**
 - **q30 minutes**
 - **Or if the leg does not improve (within 4 hours)**

- **Prompt action – relieve pressure**
 - **Cast removal**
 - **Fasciotomy**
 - **Amputation**
 - **Classification**
 - **Above a joint**
 - Above elbow amputation (AEA)
 - Above knee amputation (AKA)
 - **Below a joint**
 - Below elbow amputation (BEA)
 - Below knee amputation (BKA)
 - **Through a joint**
 - **Disarticulation**

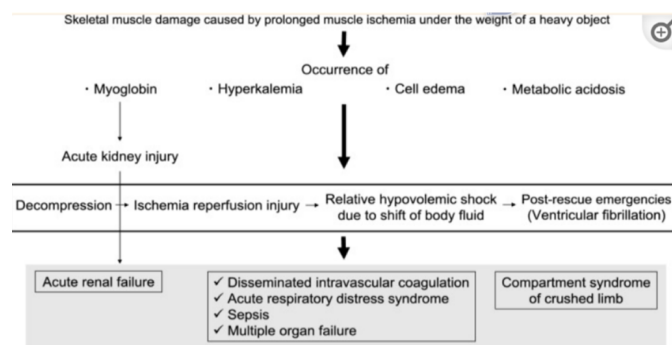
MANAGEMENT

- **Priority of Nursing Goals**
 - **Postoperative care**
 - **Monitor for complications**
 - **Emotional support**
 - **Refer for reconstructive surgery or neurovascular surgery**

Brunner

- Maintain ABC
- Observe for
 - AKI
 - **Rhabdomyolysis** *bow manupole*
 - **Myalgias**
 - **Generalized muscle weakness**
 - **Dark urine**
 - **Elevated serum creatine kinase → most sensitive indicator**
- **Control bleeding and pain**
- **Monitor serum lactic acid**
- **Elevate injured extremity – relieve swelling and pressure**
- Administer **analgesics and anxiolytics**

CRUSH SYNDROME



2. ANAPHYLACTIC REACTION

- **Shock** – organs don't receive enough oxygen and nutrients to function properly.
 - **Types based on the cause**
 - **Hypovolemic** – occurs when there is a significant loss of blood or fluid volume, resulting in insufficient blood circulating
 - **Cardiogenic** – caused by the heart's inability to pump enough blood to meet the body's needs.
 - **Obstructive** – occurs when there is a physical obstruction to blood flow, preventing the heart from pumping blood effectively.
 - **Distributive** – occurs when blood vessels dilate excessively, leading to a decrease in blood pressure and inadequate blood flow to the tissues
 - **Septic shock** – due to infection
 - **Anaphylactic** – allergic reaction
 - **Neurogenic** – damage to the nervous system

PATHOPHYSIOLOGY

- **Smooth muscle** → relaxes (vasodilation) and contracts (vasoconstriction)
- **Controlled by the sympathetic nervous system (SNS)** – it normally maintains a partial constriction that generates enough force to keep blood circulation; the fight-or-flight system

- Increased SNS stimulation → vasoconstriction → ↑ peripheral vascular resistance → ↑ BP → blood (constant) moves faster
- Decreased SNS stimulation → vasodilation → ↓ peripheral vascular resistance → ↓ BP → slowed blood flow (constant)

- **Type I hypersensitivity reaction**

- Mediated by **IgE antibodies** that bind and sensitize mast cells and basophils
- External trigger reaches the body → binds IGE antibodies → stimulates mast cells and basophils to degranulate → releases vasoactive mediators (**Histamine and Bradykinin**) → **Systemic vasodilation** → increased vascular permeability → **Edema**
 - Main cause: Systemic allergic reaction to external trigger: medications, foods, pollen, dust, smell of things (always) unless an autoimmune disease
 - RF: Older age, decreased immunity, asthma, COPD, chronic lung diseases, cardiovascular diseases
 - IgE mediates allergic reactions and activates muscles and basophils
- Mast cells release **Tryptase** → breakdown protein → **local tissue damage**

- **Mast cell**

- Tissue-resident cells
- Triggered during an allergic reaction
- For immediate hypersensitivity
- Serve as an alert system for allergen
- Play a part in how your immune response to certain bacteria and parasites
- Control other immune responses
- Fight particles that are harmful even if not
- **Bee sting** – not usually harmful but mast cell thinks that it is

- **Basophils**

- Immune surveillance
- Release histamines during allergic reaction/asthma attack
- Largely circulating cells
- "Late" phase

- **Histamine**

- Signaling molecule
- Sends messages between cells
- Sleep-wake cognitive function
- Opens blood vessels, and constricts airways, and the gastrointestinal tract to create mucus because it thinks that body is in danger

- **Permeability**

- Ability of water to pass through certain areas → causing a shift from ICF to ECF → causes edema when there is allergic reaction

- **Bradykinin**

- Mediates inflammation by causing vasodilation
- Increases vascular permeability
- Stimulates prostaglandin synthesis (lipid mediators also synthesized by active mast cells)
- Participates in late-phase reactions (subsequent to exposure of allergens)

- Contributes to tissue hyporesponsiveness, local inflammation, and hypotension

- **Tryptase**

- Vasoactive mediator
- Established indicator of mast cell activation
- An enzyme that breaks down proteins
- Causes local tissue damage

- **Stages of Anaphylactic Shock**

- **Initial**

- Systemic vasodilation causes less blood to return to the heart → ↓ CO → ↓ perfusion to body cells → switch to **anaerobic metabolism** (production of energy without oxygen; use glucose and glycogen) to produce energy → lactic acid build up in the blood → ↓ blood pH (more acidic) → **metabolic acidosis** → activates the compensatory stage

- **Compensatory**

- Increased SNS tissue activity to compensate for decreased tissue perfusion to maintain homeostasis
- Acid-base compensatory mechanisms activate to correct acidosis
 - If not treated, it will progress
 - Metabolic acidosis compensatory mechanism → activated buffer system (bicarbonate and protein) and renal compensation
 - Such as Kussmaul's respirations (rapid, deep breathing) → body tries to remove excess CO

- **Progressive**

- Compensatory mechanisms start failing → Metabolic needs can't be met → ↑ Lactic acid builds up in the blood (more than initial stage) → gradually worsening metabolic acidosis

- **Refractory**

- Shock progresses to cellular death and multiple organ damage due to the inability to compensate → **Fatal**

- **Complications**

- Decreased perfusion to heart → **myocardial infarction** (scarring of heart tissue)
- Decreased perfusion to the brain → **loss of consciousness** → **altered LOC**
- Laryngeal edema → upper airway obstruction, respiratory failure, cardiorespiratory arrest, death

ASSESSMENT

- **Main cause:** Systemic allergic reaction to external trigger

- Medications
- Insect bites
- Food

- **Risk factors:**

- Older age
- Asthma
- COPD

- Cardiovascular disease

MANIFESTATIONS	DIAGNOSTICS
Cardiovascular • Hypotension — decreased CO • Tachycardia — compensatory mechanism • Chest pain — lack of tissue perfusion Respiratory • Laryngeal edema — fluid shifts ○ Voice hoarseness — trapped larynx ○ Shortness of breath ○ Stridor ○ Angioedema of lips and tongue Skin • Flushing • Itching — due to bradykinin • Insect bite: localized signs of inflammation at the site of the bite	• History and Physical exam • ECG, X-ray, or CT scan to exclude complications • Skin prick test to determine evidence of allergy ○ <i>Raised itchy red bump or wheal</i> • Lab tests: ○ Increased histamine, tryptase, and serum IgE antibodies

TREATMENT

- **Ensure airway patency**
 - Severe cases → ET intubation
 - Epinephrine IM → first-line
 - (+) Laryngospasm → tracheostomy
- High flow oxygen
- Nebulized Albuterol IV — bronchodilator
- IV Diphenhydramine
- IV Methylprednisolone — corticosteroids
- IV fluids for early resuscitation in case of hypotension
- **Vasopressors:** Norepinephrine or Vasopressin (has a renal protective function)

MANAGEMENT OF CARE

- **Priority nursing goals**
 - Maintain airway patency and oxygenation
 - Promote adequate organ perfusion
- Monitor airway
- Pulse oximetry and administer high-flow oxygen — **keep SpO₂ >90%**
- Inspect face, lips, and tongue for swelling
- Monitor respiratory rate, depth, and effort
- Assess mental status → Decreased tissue perfusion to the brain may cause decreased LOC
- Auscultate lung sounds — must be equal
- **Report to HCP:**
 - Dyspnea
 - Stridor or hoarseness
 - Drooling

- *Suction secretions and prepare to assist with rapid intubation*
- *Problems with larynx — rapid sequence intubation*
- **Signs of ↓ oxygenation**
 - Altered level of consciousness
 - Decreased BP — report immediately to MD
 - Tachycardia — **HypoTach:** shock
 - Weak peripheral pulses — fast pulses but weak
 - Slow capillary refill
 - Cool and mottled skin
 - Anuria: administer prescribed IVF and medications

- **Watch for signs of decreased organ perfusion**
 - Assess circulatory status
 - **Assess:**
 - Vital signs
 - Peripheral pulses
 - Capillary refill
 - Skin color
 - Urinary output
 - **Administer prescribed fluids and medications**
 - Epinephrine (to help mediate allergic reactions) or vasopressors
 - Epinephrine
 - Vasoconstrictor that prevents upper airway mucosal edema r/t fluid shifts because vessels are dilated
 - Will keep vessels closed; manages hypotension by adding pressure
 - Important bronchodilator effects
 - Important inotropic (contractility) and chronotropic (heart rate) effects
- Raise the client's legs and feet to aid circulation to the central part of the body to lessen edema
- Assist the healthcare team in identifying the underlying cause

- **Client and Family Teaching**
 - **Anaphylactic shock** occurs because of a severe allergic reaction (anaphylaxis)
 - **Cause identified** → Stress importance of avoiding the allergen
 - Recognize signs of anaphylaxis: pag nahirapan huminga
 - How to use automatic injectable epinephrine → keep it with them at **ALL times!**
 - Wala sa Philippines
 - Obtain medical alert ID
 - Seek emergency medical treatment immediately after using an injectable epinephrine device.

- Larynx problems: may need muscle relaxants
 - Succinylcholine
 - **Anxiolytics:** diazepam, fentanyl, midazolam

3. INSECT, ANIMAL, AND HUMAN BITES

ANIMAL AND SNAKE BITES

- **1. Animal bites**

- **Causes**

- **Insect stings**

- **Dogs**

- Up to 90% of all bites
 - Typically affects children <10 years

- **Cats**

- Less common
 - More frequently in adults
 - High risk of infection

- **Small rodents**

- **Provoked** – healthy animal while attempting to feed or handle

- **Unprovoked** – animal with rabies

- **2. Snake bites**

- It can occur inadvertently; a medical emergency
 - The most common site is the upper extremity

- **2 main venomous families**

- **Elapids**

- Corals
 - Cobras
 - Mambas

- **Vipers** – 75-80% result in envenomation (injection of poisonous material)

- **Rattlesnake** – more likely to cause coagulation abnormalities and more systemic effects

- **Copperheads**

- **Risk factors**

- Living in certain areas – South East Asia, Sub-Saharan Africa, Latin America; live in dense, forest areas or regions of high density; p... regions which attract snakes through rodents
 - Disturbing animal

- **3. Human bites**

- Frequently associated with rapes, sexual assault, or other form of battery
 - High risk of infection

- We give human rabies immunoglobulin (HRIG) for human bites – if a patient is allergic to equine rabies immunoglobulin (ERIG)
- HRIG is only available in San Lazaro Hospital and Research Institute for Tropical Medicine.
- There is antirabies for human bites.
- Stings – toxic venom into our body because it is their self-defense mechanisms
- Insect bites – from blood-feeders (i.e. mosquitoes)

PATHOPHYSIOLOGY

- **Layers of the Skin**

- **Epidermis**

- Protective barrier from the environment

- **Dermis**

- Blood vessels + nerve endings

- **Hypodermis**

- Connective tissue
 - Provide structural support

- Immune cell → cytokines and histamine

- Plasma proteins → fluid shift

- Epidermis gets damaged from scratch/bite → immune cells get activated to fight invading pathogens → release inflammatory molecules (cytokines, histamines) → attracts more immune cells to sites of injury
- Cytokine activation: capillaries larger and more permeable → more fluid shifts → plasma fluid and proteins leave to circulation from intravascular to interstitial → swelling
- Immune system: recognizes and acts against pathogens that cause disease; in some clients, they overreact and cause harm to molecules that do not cause problems for most (allergic reaction).

- **Signs of inflammation**

- Heat
 - Pain
 - Redness
 - Swelling
 - Pallor NOT INCLUDED because you will not expect paleness in an inflammation

- **Mechanical injury + complications** (infection, envenomation) — exposure to poison or toxin

- Know the mechanism of the injury

- **Mild lacerations or punctures** → severe destruction of skin and underlying tissues (including blood vessels, muscles, and bones)

- **Cat bites**

- Deep puncture wounds (longer canines)
 - Often infected
 - More frequent in adults
 - Reach joint space or periosteum
 - Septic arthritis
 - Osteomyelitis – osteo is bones

- **Dog bites**

- Serious tissue injury
 - Rarely get infected unless the dog is rabid
 - Gangrene → sepsis (esp. if asplenic (no spleen) or liver disease)
 - **Capnocytophaga canimorsus** - bacteria in rabid animals; normal oral flora of dogs and cats; typically no effect in healthy animals

- Affects those with immunocompromised conditions → sepsis, endocarditis, respiratory conditions, meningitis
 - Spleen – plays crucial role in filtering bacteria in bloodstream and producing antibodies
 - Liver – essential for immune function; produces proteins that fight infections and clear toxins from blood
- **Snake bites**
 - Lasting injuries (loss of finger or limb due to amputation)
 - Erythema
 - Swelling
 - Hemorrhagic bullae (blood-filled sac) + tissue necrosis
 - General symptoms depend on the type of venom
 - Allergic reactions

- **No VeroRab to rat bites** – only tetanus toxoid.
 - Rats do not carry rabies.

ASSESSMENT

- **Clinical Manifestations**
 - Simple laceration or puncture wound
 - Severe tearing of multiple skin layers
 - Loss of sensation around the bite
 - Blistering, pus, or fluid oozing
 - Pain, swelling, and redness
- **Systemic infection**
 - Fatigue
 - Fever or chills
 - Swollen lymph nodes – the body's natural filter
- **Envenomation**
 - **Common clinical signs:**
 - Edema, ecchymosis, and hemorrhagic bullae
 - **Neurotoxicity**
 - Diplopia – double vision
 - Difficulty swallowing or talking – dysphagia
 - Limb or respiratory muscle paralysis (rapidly developing **descending paralysis**)
- **Clinical manifestation**
 - Direct cellular injury
 - Hemotoxicity – venom alters the balance of the coagulation system therefore inducing coagulopathy
 - **Coagulopathy**
 - Gum bleeding
 - Epistaxis
 - Hematemesis
 - Hematochezia – passage of fresh blood per anus
 - **Hemorrhage secondary to coagulopathy** → severe shock and cardiovascular collapse

- Treat snake bites immediately.
 - When referring to snake bites in the ER, refer to surgery.
- **Myotoxicity (tender and weak)** → rhabdomyolysis → can cause death
 - Venom damages the muscle fibers at the site of infection and its surroundings, whereas other venoms act systemically, causing muscle damage at distal sites
 - Rhabdo - rod (affects striated/skeletal muscles)
 - Myo - muscle
 - Lysis - breakdown
 - Breakdown of skeletal muscle
 - A medical condition characterized by the breakdown of skeletal muscles leading to the release of all muscle cell contents such as myoglobin
 - **Myoglobin** - a protein found in the muscle tissue that plays a key role in the storage and transport of oxygen within muscle cells → mamamatay ang muscle → various complications such as kidney damage and death

DIAGNOSTIC TESTS

- History – saang lugar (most important)
- Species?
- Circumstances of bite?
- Physical examination
- **Mammal bites**
 - CBC (for leukocytosis) - the body's immune response to infection
 - Can provide hindsight in the severity of infection (higher leukocytes = more severe infection)
 - ESR and CRP - can increase with infection
 - ESR - measures how quickly blood cells settle in a test tube over a specific period; can be influenced by the presence of inflammation in the body; useful marker in the context of infections and other inflammatory conditions
 - Elevated - (+) infection
 - CRP – a substance produced in the liver in response to inflammation
 - Elevated - (+) inflammation in the body
 - If it looks infected - gram stain and culture before antibiotics
 - If signs of systemic illness - blood cultures
 - Fever
 - Fatigue
 - Chills
 - Obtain blood culture → may lead to septicemia
 - Deep wound – X-ray
 - Foreign bodies (baka naiwan ang teeth ng animal)
 - Bone or soft tissue injury
 - Subcutaneous gas

- **Snake bites**
 - **Lab testing**
 - Thrombocytopenia (increased thrombocytes)
 - Increased PT, CK level, urine myoglobin
 - CK (MM) is released when there is muscle damage
 - Urine myoglobin - damage to muscle releases myoglobin
 - Decreased fibrinogen

MANAGEMENT

- **Animal Bites**
 - Control bleeding with direct pressure
 - Cleaned with normal saline or soap and water
 - Superficial dead tissue debrided - to promote tissue growth
 - Primary wound closure for superficial dog bites
 - Cat and contaminated bites → closed by secondary intention → high risk of infection
 - **Tetanus prophylaxis (for all)**
 - Tetanus toxoid
 - Tetanus immunoglobulin
 - In ER, we have Tetagam.
 - If wild/stray animal → **rabies prophylaxis**
 - Rabies vaccine
 - Immunoglobulin (ERIG or HRIG)
 - **If infected:**
 - **Mild injuries**
 - Oral antibiotics
 - **Serious wound**
 - **IV antibiotics**
 - Amoxicillin-clavulanic acid
 - Piperacillin-tazobactam

- We do not close cat bites because they should be left to close on their own → closure by secondary intention (edges are not brought together but allowed to heal naturally from bottom up then sides inward)
 - Reduces risk of infection since the wound is not closed tightly
 - Promotes exudate drainage

- **Snake Bites**
 - Have the person lie down, and remove constrictive items (i.e rings)
 - Provide warmth
 - Cleanse the wound and cover with a light sterile dressing
 - Immobilize the injured body part below the level of the heart
 - Analgesia: acetaminophen, NSAIDs, opioids
 - IV fluids
 - Elevate the limb – to prevent pulling of the venom in the area

- **Administer Antivenom (FabAV or CroFab)**
 - Most effective if given within 4 hours; no greater than 12 hours after the bite
 - Given as an IV infusion – 4-6 hours after the bite
- **Not recommended:**
 - Sucking out venom
 - Applying a tourniquet or ice to bite

MANAGEMENT OF CARE

- Promote healing
- Monitor for complications
- **Cleanse wound and irrigate with saline**
 - Size and depth
 - Swelling, redness, pain, and wound exudate
- **Wound culture**
 - Apply sterile dressing if mediated
- **Assess pain**
 - Administer prescribed analgesic
 - Administer prophylactic antibiotic and tetanus prophylaxis + rabies prophylaxis
 - Assess ROM and sensation – esp. If bite is near joint
 - Obtain an x-ray of the hand to check for injured tissue or retained
- Monitor the client's vital signs and watch for complications
- **Report to HCP if:**
 - Fever
 - Chills
 - Nausea
 - Vomiting
 - Malaise
- **Client and Family Teaching:**
 - Take prescribed antibiotics and analgesic
 - How to care for wound – observe wound
 - **Contact HCP if:**
 - The wound has warmth, increased pain, swelling, and redness
 - Fever
 - Chills
 - **Seek emergency care if:**
 - The wound has a bad smell, pus, red streaks, numbness and tingling
 - Follow-up with HCP
 - **How to avoid dog bites:**
 - Avoid unfamiliar dogs, angry or scared dogs
 - Not to frighten or disturb dogs that are eating, sleeping, and caring for puppies
 - Ask before petting
 - Approach slowly
 - Let the dog sniff the hand

INSECT BITES

• Causes

- Insect stings are caused by **stinger insects** of the **hymenopteran family**:
 - Bees
 - Wasps
 - Hornets
 - Yellowjackets
 - Fire ants
 - **Along with other animals**:
 - Spiders
 - Scorpions
 - Insect bites are caused by insects that **feed on host's blood** to survive:
 - Mosquitoes
 - Chiggers
 - Bedbugs
 - Lice
 - Ticks
 - **Many insects only sting when provoked!**
- ### • Risk factors
- Disturbing the animals: stepping on a beehive
 - Clients who spend a lot of time outdoors
 - Warmer climates
 - Wetlands
 - Forested areas with lots of woods, bushes, and tall grass
- ### • Other risk factors
- Collecting insects as a hobby
 - Not using protective clothes or repellent when outdoors

PATHOPHYSIOLOGY

- **Insect stings and bites** → similar injuries but different pathology
- **Stings**
 - Insect introduces toxic venom through stingers into the skin
 - The problem isn't really the venom, but rather the immune system's reaction to it
 - **Mild cases**:
 - Local skin reaction around the sting site
 - Activation of neighboring immune cells and subsequent release of proinflammatory molecules (histamine and bradykinin)
- **Bites**
 - Insect pierces the client's skin during a blood meal
 - Injects a small amount of anticoagulant saliva
 - Prevents blood from clotting
 - Activate the immune system's response
 - Most only cause **maddening itches**
 - Some can spread **vector-borne diseases**:
 - Malaria
 - Lyme disease
 - Rocky Mountain spotted fever

- Dengue (in PH)

• Stings and bites

- Some clients may develop a potentially life-threatening reaction
 - **Anaphylaxis**: increased amounts of histamine and other proinflammatory molecules leak into bloodstream and reach multiple organs
 - Generalized swelling
 - Widespread vasodilation
 - Constriction of airways
- Scratching stings and bites creates **more tissue injury**
 - Entryway for secondary bacterial infections

ASSESSMENT

• Clinical Manifestations

- **Insect stings**
 - Mild local skin reactions around sting site
 - Irritation
 - Pruritus
 - Swelling
 - Redness
 - Potentially life-threatening anaphylaxis (severe allergic reactions)
 - Intense pain and swelling on a larger part of body
 - Whole face (angioedema)
 - Limbs
- **Insect bites**
 - Generally cause less swelling
 - Might be a bump or blister around bite mark
 - Intense pruritus
 - **Anaphylaxis** → **angioedema**
 - Tissues all over body start swelling up d/t hyperreactive immune system reaction
 - Respiratory symptoms
 - Shortness of breath, coughing, or wheezing
 - Abdominal cramps, vomiting, or diarrhea
 - Abdominal cramps - histamine plays a part in GI acid secretion
 - Hypotension

DIAGNOSTIC TESTS

- History
- Physical assessment
- In most cases, no other laboratory or imaging tests are necessary
- **Additional studies** (for secondary infection or vector-borne disease):
 - Blood tests
 - Microbiological studies
 - EKG

- Dengue NS1 – not a confirmatory test for dengue
 - (-) Cannot be totally ruled out
- Use dengue IgG and IgM to rule out dengue

TREATMENT

- **Most insect stings and bites**
 - **Simple supportive measures**
 - Cleaning area with soap and water
 - Applying ice compresses
 - Elevating area (cases of swelling)
 - Pain management: Acetaminophen, NSAIDs
 - **Mild pruritus**
 - Calamine lotion
 - Topical corticosteroids
 - **Moderate or severe pruritus**
 - A short course of systemic corticosteroids
 - Oral antihistamines
 - Both H1 and H2 blockers
 - If a secondary infection is present: Antibiotic therapy
 - Anaphylaxis = **medical emergency** → must be treated immediately
 - Intramuscular injection of epinephrine
 - Supportive measures

- We are not targeting the bite itself but the immune system's reaction to the bite.
- Anaphylaxis is ESI 1.

CARE FOR A CLIENT WITH BEE STING

- **Priority goals**
 - **1. Promote comfort**
 - Assess the site of the sting (pain? itching ?)
 - Redness
 - Swelling
 - Blistering
 - Check for stinger
 - Carefully remove
 - Gently scrape over the bite using a straight-edged object or piece of gauze
 - **Avoid using tweezers** as they can squeeze more venom into the skin
 - **2. Monitor for complications**
- Wash the area with soap and water to prevent infection
- **Decrease swelling**
 - Remove any constrictive clothing
 - Elevated affected area
 - Place ice compress on site for 10 minutes then remove compress for 10 mins; repeat as needed

- Ice compress is not for snake bites.
- We are treating the immune reaction, not the sting.

- **Prescribe administered medications**
 - NSAIDs
 - Antihistamine
 - Topical corticosteroid
- Obtain vital signs
- **Watch closely for signs of anaphylaxis**
 - **Immediately report to HCP if:**
 - Flushing
 - Swelling of lips, gums, or tongue
 - Hoarseness
 - Dyspnea
 - Chest tightness or pain
 - Hypotension
- Administer prescribed epinephrine and continue to monitor
- **Client and family teaching**
 - **Ways to manage an insect sting at home**
 - How to safely remove a stinger using a thin, flat object (i.e. credit card)
 - Wash the area with soap and water
 - **Can decrease swelling, pain, and itching**
 - Applying ice packs
 - Elevated affected area
 - Applying calamine lotion or topical corticosteroid
 - Taking an antihistamine: Diphenhydramine
 - Ibuprofen or acetaminophen for pain
 - **The localized reaction may continue to develop over the next 24-48 hours before it starts to resolve**
 - Seek medical attention if:
 - Swelling continues to spread
 - Fever
 - Wheezing
 - Difficulty breathing
 - Chest tightness
 - **Prevent insect stings and bites**
 - Outdoors – increased risk
 - Grassy areas
 - Wetlands
 - Areas being actively by bees and wasps
 - Avoid perfumes or fragrant soaps and lotions
 - *Bees are attracted to the smell of flowers.*
 - Eating outside – keep food and drink covered
 - Wear clothing that covers arms and legs
 - Use insect repellent
 - **Anaphylactic reaction to an insect sting or bite**
 - **How and when to use the prescribed EpiPen**
 - Confidence with procedure

- We do not have an EpiPen available in the Philippines.
- We may prepare 3 cc syringes and 1 ampule of

epinephrine pero good luck.

Week 11

- **Emergency and Disaster Nursing Care of Clients in Acute Biologic Crisis**
 - Fractures
 - Hypothermia
 - Near Drowning
 - Poisoning
 - Ingestion
 - Inhalation
 - Skin contamination
 - Burns

WEEK 11: EMERGENCY AND DISASTER NURSING CARE OF CLIENTS IN ACUTE BIOLOGICAL CRISIS (CONTINUATION)

FRACTURES

- A complete or partial break in a bone due to a physical force or overuse during repetitive activities
 - Running
 - Jumping
- **Osteoporosis or Cancer**
 - Spontaneous fractures due to bones being brittle
- **Modifiable Risk Factors**
 - Low in Vitamin D → significantly impacts bone health by ensuring adequate calcium absorption in the diet;
 - Essential for maintaining bone density
 - Crucial in bone remodeling
 - Smoking
 - Alcohol
 - Glucocorticoid use → steroids decrease/suppress immune system response, including normal osteoblast function
 - **Osteoblasts** are essential for new bone formation
 - Increases bone resorption by enhancing **osteoclast** activity → breaks down bone tissue
- **Non-modifiable Risk Factors**
 - Increased age → Bones become frail and brittle
 - Congenital Disorders
 - **Osteogenesis Imperfecta (brittle bone disease)** – problems with bone formation; bones break easily often without obvious cause; heritable disease
 - Mild symptoms – few fractures
 - Severe symptoms – many medical complications
 - Malabsorption problems
 - Calcium → hypocalcemia
 - Vitamin D → esp. in the UK (gloomy and rainy weather, no days of sun); decreased absorption

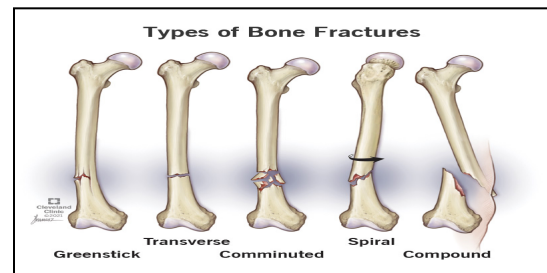
- **Celiac disease** – The immune system attacks its tissue when gluten is ingested (Vit D absorption decreases)
- **Cystic fibrosis** – inherited disorder that causes severe damage to the lungs; overproduction of mucus, sweat, and gastric juices (decreased permeability for Vit D absorption)

- **Assess the patient for:**

- Ecchymosis
- Tenderness
- Crepitation

TYPES OF FRACTURES

- **Greenstick Fractures**
 - One side of the bone breaks while another side bends
- **Impacted Fractures**
 - A piece of one bone gets wedged into another one
 - Broken ends of a bone are jammed together by the force of the injury
- **Comminuted Fractures**
 - Bone breaks into multiple fragments (durog)
- **Spiral Fractures**
 - The fracture line follows the projection of a strong, twisting force
 - Bone is broken with a twisting motion –
- **Non-Accidental Traumas**
 - Due to physical abuse, mauling (bugbog)
 - As a patient advocate, it is important to know the mechanism of injury (is it from sports? MVA? Physical injury?)

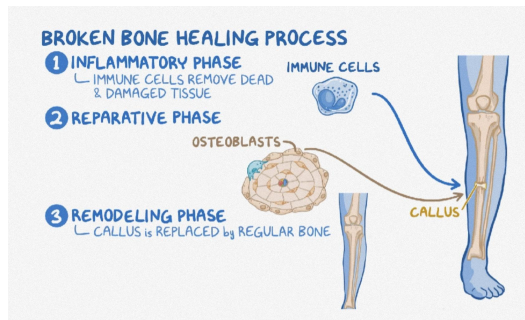


BOX 61.2 Types of Fractures

Closed or Simple: Skin over the fractured area remains intact.
Compound or Open: The bone is exposed to air through a break in the skin, and soft tissue injury and infection are common.
Comminuted: The bone is splintered or crushed, creating numerous fragments.
Complete: The bone is separated completely by a break into two parts.
Compression: A fractured bone is compressed by other bone.
Depressed: Bone fragments are driven inward.
Greenstick: One side of the bone is broken and the other is bent; these fractures occur most commonly in children.
Impacted: A part of the fractured bone is driven into another bone.
Incomplete: Fracture line does not extend through the full transverse width of the bone.
Oblique: The fracture line runs at an angle across the axis of the bone.
Pathological: The fracture results from weakening of the bone structure by pathological processes such as neoplasia; also called *spontaneous fracture*.
Spiral: The break partially encircles bone.
Stress: Occurs in normal or abnormal bone exposed to repeated stress.
Transverse: The bone is fractured straight across.

BROKEN BONE HEALING PROCESS

- **Inflammatory phase**
 - Immune cells remove dead and damaged tissue (pupunta kung saan may sira) → broken bone → swelling occurs as part of the immune response
- **Reparative phase**
 - Osteoblast (form new bones) → Callus formation → Bone matrix release → Makes protein into new bone tissue
 - *Bone matrix fills in the gaps left by the fracture and spaces, forming a new bone tissue (temporary callus), up until it matures and becomes a mature bone containing osteocytes.*
- **Remodeling phase**
 - The callus (temporary) is replaced by a regular bone → give it time to heal and mature



- The healing process starts with blood clots that form in the broken ends of the bone. At about 5 weeks, the body will join two bone portions together → a temporary bone forms until it matures.

ASSESSMENT

- **Signs and symptoms**
 - Localized pain
 - Swelling
 - Bruising
 - A broken bone may have splinters that cause rupture of blood vessels, causing bleeding and hematoma formation.
- **If displaced:**
 - Misaligned
 - Shortened
 - Deformed
- **Assess for skin intact:**
 - Localized bruising and edema around midshaft tibia
 - Trace edema on left foot and ankle
- **Check circulation, motion, and sensation (CMS)**
 - Capillary refill <3 sec → due to blood vessels being damaged
 - Pedal pulse is strong and palpable
 - Able to wiggle toes
 - Able to feel
 - No numbness or tingling → nerve damage if (+)
 - *What's important in fractures is to check circulation, motion, and sensation.*

Complications

- The broken end of the bone may damage surrounding structures
 - Disrupted blood vessels → bleeding
 - Damage to nerves → Altered sensation
 - Tears to the muscles or tendons
- **Compartment syndrome** → painful buildup of pressure around muscles
 - **5P's**
 - PAIN
 - PULSELESSNESS
 - PARESTHESIA → pins and needles; tingling
 - PARALYSIS
 - PALLOR
 - Bleeding or edema → ↑ pressure inside limb → ↓ blood supply → tissue necrosis
 - Tight cast → ↓ blood supply → compartment syndrome
- Fracture of **long bones** might induce **fat embolism** → Emboli are released in disruption of fat cells in fractured bones and enter through ruptures of narrow vascular beds
 - Obstructing blood flow in
 - Heart
 - Lungs
 - Brain
- **Long-term complications**
 - Healing abnormalities → bone deformity
 - **Malunion** → it occurs when a fractured bone heals in an incorrect position → bent (parang bali)
 - **Delayed union** → The bone requires more healing time; slow healing process
 - **Nonunion** → failure to heal after an extended period (some cases over 9-12 months)
- **Mobility complications**
 - Joint stiffness
 - Masasanay yung joint na hindi nagagalaw, hence titigas siya.
 - Instability
 - Due to the malunion of the fracture, there is an imbalance in the posture
 - Contractures
 - Limited range of motion → Muscles become tight
 - Clients are immobilized
 - Pressure injury formation
 - Deep vein thrombosis (DVT) → impaired blood flow → increased blood viscosity → more susceptible to form clots

DIAGNOSTIC TESTS

- **X-ray** in two different planes
 - Anteroposterior – front to back
 - Lateral – side

- If the x-ray appears normal, but clinical presentation suggests a possible fracture
 - **MRI or CT scan is ordered** → hairline fractures
 - Hairline Fx → manipis na fracture undetected by x-ray
 - Treated by immobilization

NURSING DIAGNOSIS

- Acute pain related to left tibia fracture
- Risk for peripheral neurovascular dysfunction related to disrupted bone and soft tissue integrity
 - Because of the embolus
- Impaired physical mobility related to left tibia fracture

IMPLEMENTATION

- **Pain management**
 - IV analgesic
- **Non-pharmacological**
 - Cold compress (10-15 mins)
 - Distraction – Music
- **Ensure properly immobilized and elevated on pillows**
 - ↑ circulation
 - ↓ edema
- **CMS Check**
 - Circulation, Motion, Sensation
 - To monitor for neurovascular compromise
- **Assist to ambulate to the bathroom**
 - Proper use of crutches
 - Forward with the strong leg
 - Carry weight with hands
 - Look forward, not their feet
 - Non-weight bearing on the affected side
- **Inform that physical therapist will work with post-operatively**

TREATMENT

- Rest and immobilization of the affected limb
- Removable splints or casts
- Displaced fractures → reduction (management)
 - In a displaced fracture, the broken ends of the bone are not aligned and separated from each other. It occurs in various ways, such as:
 - **Angulation** – at an angle to each other
 - **Translated** – the fragments are shifted along the lengths of the bone
 - **Rotation** – fragments twisted out of their normal position, especially in a ball-and-socket joint

Reduction – procedure aimed at realigning the broken bone fragments into their normal anatomical position. It is crucial for proper healing and restoring function

- **Closed reduction** – non-surgical intervention; surgeon manipulates the displaced fragments externally using manual pressure to realign them without incisions (e.g **Bucks traction**)
 - Guided by imaging → x-ray

- **Open reduction** – with surgery; an incision is made to directly access the fracture site. The surgeon then realigns the bone fragments and uses external fixator devices (e.g. plates, screws, or rods) to stabilize the fracture.
 - **Internal fixation** – metal plates inside
 - Follows an open reduction
 - Provides immediate bone stabilization
- External fixation – metal plates outside

EVALUATION

- **CMS intact**
 - The new cast should not feel too tight or loose
- **Physical therapist**
 - Plan to evaluate in a few hours after the reduction
- **Stay overnight and discharge home tomorrow**
 - Pain should be well-managed
 - CMS remains intact
 - Able to safely use crutches, if required.
- **Update healthcare team**
 - DVT prophylaxis – the risk of fat embolism
 - Drug of choice: LMWH (Enoxaparin)
 - PE – monitor for Compartment syndrome
- **Continue to monitor**

HYPOTHERMIA

- First initial response: **chilling**
- Condition in which the core (internal) temperature is **35°C (95°F) or less** as a result of exposure to cold or an inability to maintain body temperature
 - *Prolonged exposure to cold can overwhelm the systems*
- Body temp drops → normal thermoregulation fails → body metabolic processes slow down (HR, RR, mental functioning)
 - *Also done in post-code patient*
 - *After cardiac arrest, the brain can sustain significant damage due to a lack of oxygen. Inducing hypothermia can help reduce the metabolic rate of brain cells, decrease the release of harmful neurotransmitters, and provide a protective effect against cell death.*
- Body **loses heat faster** than it can produce heat, causing a medical emergency.
 - **Normal body temperature is around 37C.**
 - *Hypothermia can cause cardiorespiratory failure and even death.*
 - *Wet clothing accelerates heat loss, and immersion in cold water increases heat loss by 25%*
 - *Trauma patients are at risk resulting from treatment with cold fluids, unwarmed oxygen, and exposure during examination*

RISK FACTORS

- Exhaustion, fatigue, sleep deprivation
- Older age
- Very young age
- Mental conditions

- Alcohol and drug use
 - *Alcohol ingestion increases susceptibility as it causes systemic vasodilation*
- Certain medical conditions
 - **Raynaud's phenomenon** – decreased perfusion to the fingertips.
 - Hypothyroidism — cold intolerance
 - SCI
- Medicines
 - Phenothiazines

STAGES OF HYPOTHERMIA

- **Mild Hypothermia (36-35C)**
 - **Shivering** – involuntary control
 - Cannot do complex motor functions but can still walk and talk
 - **Vasoconstriction** to periphery (fingers, toes)
- **Moderate hypothermia (35-33C)**
 - **Reduced LOC** — neurologic disability
 - **Loss of fine motor coordination**, particularly in hands due to restricted peripheral blood flow
 - **Slurred speech**
 - **Violent shivering** in an attempt to produce more heat
 - **Irrational behavior**, such as paradoxical undressing
 - The casualty starts to remove clothing unaware that they are cold
- **Severe hypothermia (<33-30C)**
 - **Shivering occurs in waves**, violent then pauses; pauses get longer until shivering finally ceases because the **heat output** from burning glycogen in the muscles is not sufficient to counteract the continually dropping core temperature, the **body shuts down on shivering to conserve glucose**.
 - Casualty falls to the ground, curls up into a **fetal position** to conserve heat
 - **Muscle rigidity** develops because peripheral blood flow is reduced and due to **lactic acid and carbon dioxide buildup** in the muscles
 - The skin becomes **pale**
 - **Pupils dilate**
 - Pulse rate decreases
 - At **32 C** – the body tries to move into **hibernation**, shutting down all peripheral blood flow and reducing RR and HR.
 - *While vasoconstriction aids in retaining heat, it does little to control heat loss from the head.*
 - At **30 C** – the body is in a state of '**metabolic icebox**'.
 - *The casualty looks dead but is still alive.*
 - *If treatment is not initiated, breathing will become erratic and very shallow, the level of consciousness will continue to fall and cardiac arrhythmias may develop.*
 - **Metabolic icebox** – we are reduced to 1 organ system functioning (patayin na lahat ng systems → casualty looks dead but not moving at all; heat loss is not aided)

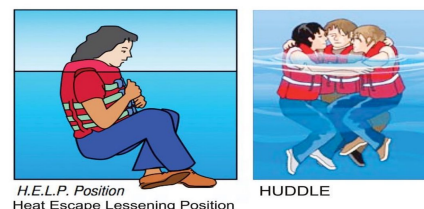
ASSESSMENT

- **Brunner**
 - Progressive deterioration, with apathy, poor judgment, ataxia, dysarthria, drowsiness, pulmonary edema, acid-base abnormalities, coagulopathy, and coma
 - Decreased CO, BP, weak pulse
- **Causes**
 - Wearing clothes that are not warm enough for weather conditions.
 - Staying out in the cold too long.
 - Being unable to get out of wet clothes or move to a warm, dry location
 - Falling into the water, such as in a boating accident.
 - Living in a house that is too cold, either from poor heating or too much AC.
 - **How does your body lose heat?**
 - **Radiated heat** – *surfaces are not protected*
 - **Direct contact** – *from something very cold*
 - **Wind** – *carries the thin layer of warm air at the surface of the skin*
- **Complications**
 - People who develop hypothermia because of exposure to cold weather or cold water are also vulnerable to other cold related injuries, including:
 - **Frostbite**, which is when skin and underlying ...
 - *Do not put direct heat or warm water because it will hurt. Do not manipulate immediately.*
 - **Gangrene**, which is when body tissue decays and dies because blood flow is blocked

TREATMENT

- **Prevention**
 - Stay warm in cold weather.
 - **COLD** – **cover, overexertion, layers, dry**
 - Keep children safe from cold.
 - Avoid alcohol – substance abuse risks hypothermia
 - Cold water safety
 - Wear life jacket
 - Get out of water if possible
 - Do not attempt to swim unless close to safety
 - Position body to minimize heat loss
 - **HELP** – Heat Escape Lessening Position

H.E.L.P / HUDDLE



- **First aid tips**
 - Be gentle

- Move the person out of cold
- **Remove wet clothing** (if dry, do not remove)
- **Cover** the person with blankets
- **Insulate** the person's body from the cold ground
- **Monitor breathing**
- Supply warm beverages (if alert and able to swallow)
 - Do not apply direct heat to skin (extreme heat can burn the skin)
- Use warm-dry compresses

- **Ways to rewarm patient**

- **Active internal rewarming**
 - **Moderate to severe hypothermia**
 - Cardiopulmonary bypass
 - Warm fluid administration
 - Warmed humidified oxygen by ventilator
 - Warmed peritoneal lavage.
 - Monitoring for ventricular fibrillation as temperature increases from 31°C to 32°C (88°F to 90°F)
- **Passive (spontaneous) rewarming**
 - For mild hypothermia
 - Warm clothes and fluids to drink if able to swallow
 - Over-the-bed heaters to the extremities
 - Forced-air warming blankets
- **Blood rewarming**
 - Example: Hemodialysis
- **Warm IV fluids** to correct hypotension, maintain UO, and core rewarming
- **Airway rewarming**
 - Warm humidified oxygen
- **Irrigation**
 - Warm saltwater solution

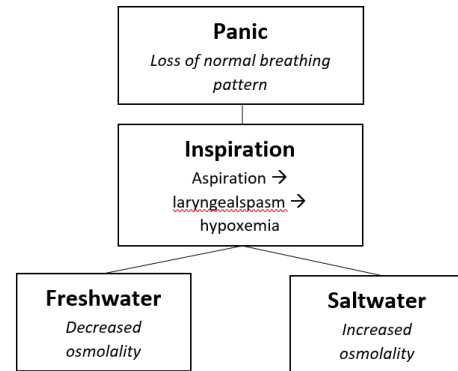
NEAR DROWNING

- Submersion or immersion of a person in any liquid may lead to respiratory impairment.
 - Whole body
 - Head only (Head in the bucket or tub)
- Nonfatal drowning is survival for at least 24 hours after submersion that caused a respiratory arrest.
- Most common consequence is **hypoxemia**.
- After resuscitation, **hypoxia and acidosis** are the major complications experienced

PATHOPHYSIOLOGY

- Freshwater aspiration results in a loss of surfactant.
 - *Freshwater such as rivers, lakes have **lower concentration than the body's cells**.*
 - *Once absorbed to the bloodstream, hemodilution may occur → **hypotonicity** (too little salt in the blood due to lack of salt concentration in freshwater) → may lead to pulmonary edema → alveolar damage.*
- Salt-water aspiration leads to **pulmonary edema** from the osmotic effects of the salt within the lungs.

- Higher concentration than the body's cells and deals with higher osmotic pressure due to high salinity of the water.
- Water from the bloodstream go to lungs in an attempt to balance the salt concentration.
- Worsens breathing difficulty (erratic)
- Body loses water rapidly (shrinks) → dehydration.



EPIDEMIOLOGY

- **Children less than 5 years old**
 - Neglect, no supervision
- **Ages 15 to 25**
 - Adventure, swim trial, failure to thrive (rivers, lakes, beaches)
 - Magaling magswimming sa pool pero sa river, hindi (failure to thrive)
- **Over 85 years old**

RISK FACTORS

- Poor swimming ability
- Risky behavior (cliff diving)
- Alcohol, substance intoxication
- Trauma
- Stroke, MI, seizure episodes

ASSESSMENT

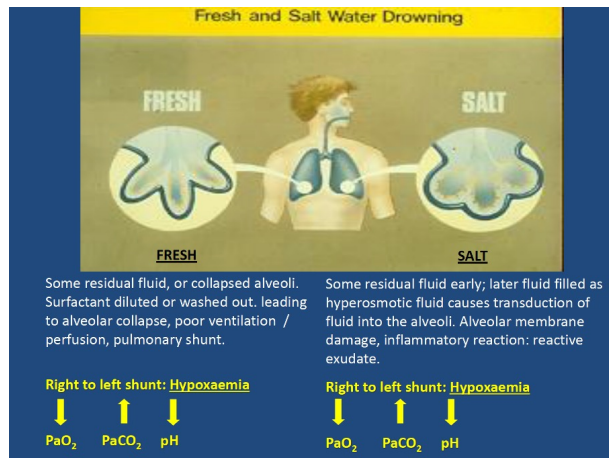
- **Systemic effects**
 - **Pulmonary effects**
 - **Washed out effect** – surfactant gets washed in the lungs leading to V.Q. mismatch causing atelectasis.
 - SOB, wheezing, crackles
 - **Neurologic effects**
 - Increased ICP → cerebral edema → hypoxemia → brain ischemia
 - *There is more volume in the brain*
 - **Cardiovascular effects**
 - Tachycardia/bradycardia – arrhythmia leads to atrial fibrillation
 - **Renal effects**
 - Hemoglobinuria, myoglobinuria → acute tubular necrosis (necrosis means cell death)

Dirty water

- Aspiration of particulates leading to obstruction and infection

MANAGEMENT

- **Management**
 - Acute/prehospital: initiate CPR + ventilation
 - most important priority in resuscitation is manage the hypoxia, acidosis, and hypothermia
- **ER Management**
 - **A**
 - Airway – intubate if GCS less than 7
 - ABG – $\text{PaO}_2 < 60 \text{ mmHg}$, $\text{PCo}_2 > 50 \text{ mmHg}$
 - **Breathing** – maintain oxygenation, supplemental oxygen, CPAP
 - **Circulation** – monitor BP, PR, $\text{O}_2 \text{ Sat}$, temp
 - **Disability** – neurologic (GCS)
 - Elevate head, GCS, diuretics, sedatives, anxiolytics
 - **Exposure** – remove wet clothes and warm the patient to prevent hypothermia



BURNS

- Damage from skin from heat, radiation, electricity

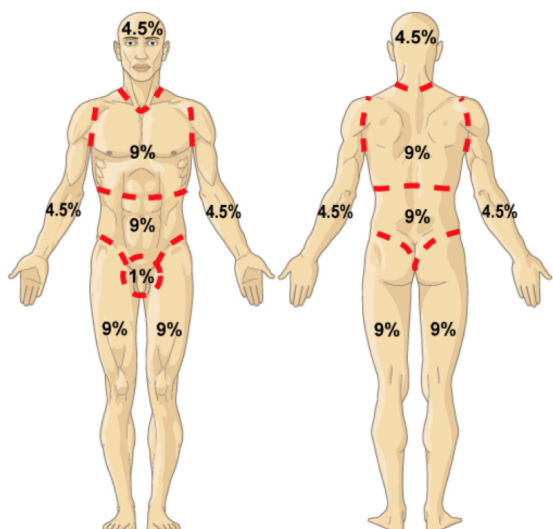
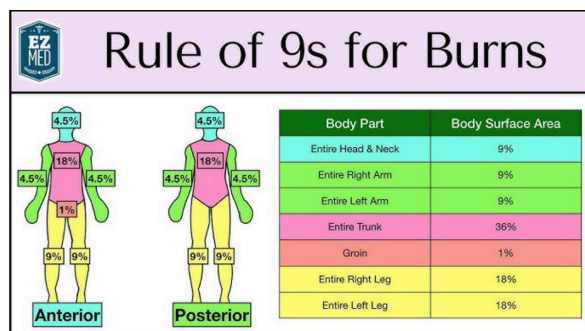
ASSESSMENT

1ST DEGREE	2ND DEGREE	3RD DEGREE	4TH DEGREE
Superficial Low-intensity flash Sunburn Scald (paso)	Partial thickness Scalds Flash flame Contact	Full thickness Flames Prolonged exposure to hot liquids Electric current Chemical Contact	Full thickness; fat, fascia, muscle, bone Prolonged exposure or high-voltage electrical injury

	First Degree (Superficial)	Second Degree (Partial Thickness)	Third Degree (Full Thickness)	Fourth Degree (+ Fat, Fascia, Muscle, Bone)
Skin Involvement	Epidermis	Epidermis + Portion of the Dermis	Ep/Dermis + Subcu + Connective Tissue	Deep Tissue, Muscle, Bone
Clinical Manifestation	Tingling Hyperesthesia Peeling Itching	Pain Hyperesthesia Sensitive to air currents	Insensate Shock Myoglobinuria Possible contact points	Shock Myoglobinuria
Wound Appearance	Reddened Blanches w/ pressure Minimal or no edema Dry	Blistered, mottled red base Weeping surface Edema	Dry, pale white, red, brown, leathery Coagulated vessels Edema	Charred
Recurative Course and Treatment	Complete Recovery (few days) Oral Pain Meds	Recovery: 2-3wks (+) Scarring and depigmentation Grafting	Eschar may slough (+) Grafting Scarring and loss of control and function	Amputations Grafting of no benefit given depth and severity

Hyperesthesia – high sensitivity of the skin

Eschar – dead cells



CHEMICAL BURNS

Acid Burns

- **Cause:** exposure to strong acids like SULFURIC, HYDROCHLORIC, or NITRIC ACID
- **Pathophysiology:** Acid → **Protein denaturation** → destruction of tissue in a concentrated area/ prolonged exposure → Deep tissue injury
- **Clinical manifestation:**
 - Localized tissue necrosis
 - Redness and irritation at the site of contact
 - Eschar formation

Alkali Burns

- **Cause:** Exposure to bases such as SODIUM HYDROXIDE (Lye), POTASSIUM HYDROXIDE, AMMONIA
- **Pathophysiology:** Alkali → **Breakdown fat molecules** → Deep penetration into tissues
 - Often causes more SEVERE and DEEPER burns
- **Clinical manifestations:**
 - Initially **PAINLESS** – increases as deep tissues are affected
 - **Rapid tissue necrosis** – d/t lipid dissolution and penetration to deeper tissues
 - Skin becomes **white, wrinkled, or mummified** from prolonged exposure

Organic Chemical Burns

- **Cause:** Chemicals like PHENOLS, FORMALDEHYDE, GASOLINE
- **Clinical manifestations:**
 - **DELAYED onset** of symptoms (after a few hours)
 - Deep tissue injury with FAT and NERVE damage

CHEMICAL BURNS MANAGEMENT

Remove from the source

- If safe to do so, remove the individual from the contaminated environment **but not at your own risk (if without PPE)**
- For **liquid chemical burns:** remove contaminated clothing and rinse the skin immediately with a large amount of water
- For **dry chemicals:** brush off the chemical before rinsing with water (**DO NOT USE WATER IMMEDIATELY for dry powders**)

Rinse the affected area

- **Water:** for most chemicals, rinsing with cool running water is the **PRIMARY TREATMENT** (should be done for at least 15-30 mins or longer) to dilute and remove the chemical
- **Eye exposure:** use saline or water to irrigate the eyes, typically for 20 minutes or longer (may require continuous irrigation via an eye wash station)

Neutralization

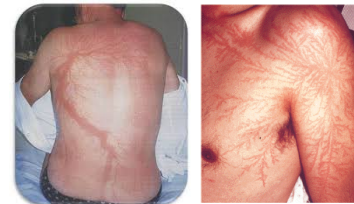
- For **acid burns:** if the chemical is known to be an acid, a mild baking soda solution (NaHCO₃) can help neutralize, but **WATER LAVAGE** is preferred

- For **alkali burns**: VINEGAR or dilute acetic acid can help neutralize, but again, **WATER LAVAGE** is the preferred first step.
- **Protect the Respiratory System**
 - Vapor/fume chemicals: oxygen and respiratory support may be required
 - Monitor for chemical inhalation symptoms
 - Bronchospasm
 - Coughing
 - Airway obstruction
- **Monitoring and Further Care**
 - After initial decontamination, **ASSESS** the extent and depth of the burn
 - Topical antibiotics may be applied to prevent infection in more superficial burns
 - For severe chemical burns, hospitalization and surgical debridement may be needed

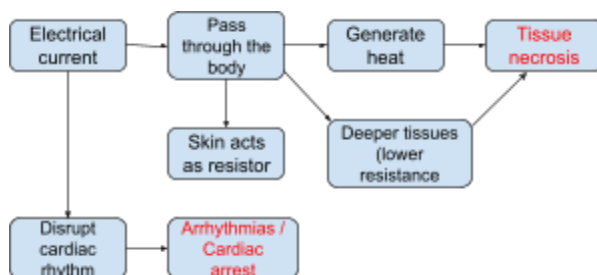
- May cause vision damage if the arc flashes near the eyes

● **Lightning Burns**

- **Cause**: High-voltage electricity from a lightning strike
- **Clinical manifestations**
 - Superficial burns often with a **FEATHERING** pattern
 - Cardiac arrest
 - Fractures
 - Blunt trauma
 - Neurological deficits



ELECTRICAL BURNS



● **Low-Voltage Burns**

- **Cause**: household electrical systems (110-240V)
- **Clinical manifestations**
 - Local burns at the site of contact
 - Muscle contractions at the point of entry and exit of the electrical current
 - May lead to arrhythmias (if the current passes through the heart)

● **High-Voltage Burns**

- **Cause**: occurs from industrial equipment, power lines, or lightning strikes (often >1000 V)
- **Clinical manifestations**
 - **Deep burns** sometimes with entrance and exit wounds
 - Fractures (due to muscle contractions or falls from electrical shock)
 - Severe tissue necrosis
 - Destruction of underlying structures
 - Risk of cardiac arrest or arrhythmias

● **Arc Burns**

- **Cause**: Electrical arcs (discharges of electricity across an air gap)
- **Clinical manifestations**
 - Superficial burns on exposed skin

ELECTRICAL BURNS MANAGEMENT

- **Ensure safety**
 - Turn off the power source or disconnect the person from the electrical source **IF SAFE TO DO SO**
 - **DO NOT TOUCH THE VICTIM** if they are still in contact with the source
 - If high-voltage, call emergency services immediately
- **Assess ABCDE**
 - Check airway compromise
 - Check for signs of cardiac arrest (arrhythmia, pulseless)
 - CPR may be needed if the person is unresponsive or pulseless
- **Treat burns**
 - **Superficial burns (1st and 2nd)**: cool the burn with water and apply a sterile burn dressing
 - **Deep burns (3rd)**: **DO NOT COOL** these burn for prolonged periods to prevent hypothermia; cover with sterile dressings
- **Fluid resuscitation**
 - Administer IVF based on the severity of the burn and the patient's clinical condition – that's why you need your Rule of Nines.
 - Electrical burns may lead to significant fluid loss due to tissue necrosis and muscle breakdown (rhabdomyolysis)
- **Monitor for cardiac complications**
 - Continuous cardiac monitoring is essential to watch out for arrhythmias
 - ECG should be performed for the detection of arrhythmias including V. Fib or Asystole
- **Neurological and Musculoskeletal Evaluation**
 - Assess for fractures or dislocations that might have occurred during the muscle contraction
 - Perform neurological assessment

- Muscle damage from electrical burns → rhabdomyolysis → renal failure

- **Infection control**

- Systemic antibiotics and wound care are needed due to deep tissue necrosis

- **Surgical intervention**

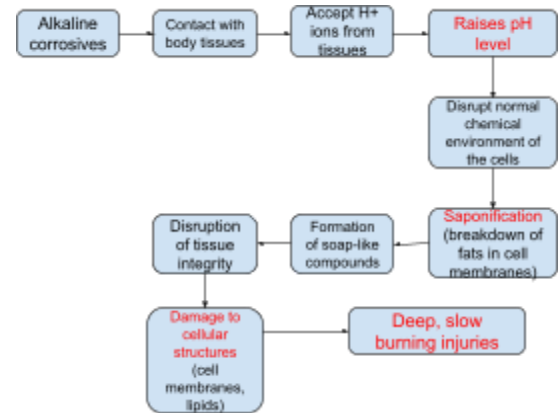
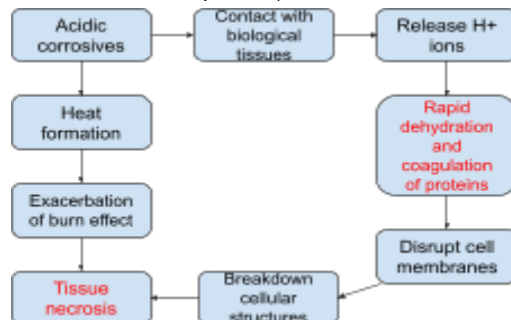
- Severe burns may require **DEBRIDEMENT** or **SKIN GRAFTING**
- If muscle damage is extensive, **FASCIOTOMY** might be necessary to prevent or relieve compartment syndrome

POISONING

- Any ingestion of any substance...
- Either intentional or unintentional
- May be corrosive (able to destroy materials by a chemical reaction) especially in body cells and tissues.
- **Goals of emergency**
 - Removal or inactivation of the poison before it is absorbed — primary goal
 - Provision of supportive care in maintaining vital organ function (brain, heart, kidneys, and lungs)
 - Administration of a specific **antidote** to neutralize a specific poison
 - Implementation of treatment that hastens the elimination of the absorbed poison

TYPES OF POISON	
ALKALINE PRODUCTS	ACID PRODUCTS
● Lye ● Drain cleaners - most common ● Toilet bowl cleaners ● Oven cleaners ● Bleach ● Button batteries (watch batteries)	● Toilet bowl cleaners ● Pool cleaners - chlorine ● Metal cleaners ● Rust removers ● Battery (sulfuric) acid - most common source for adults

- Acids cause protein denaturation (rapid dehydration and coagulation of proteins.
 - Release hydrogen ions
- Alkaline corrosives – the accept hydrogen ions
- Deep and slow burning injuries (can cause effects even after the exposure)



TYPES OF EXPOSURE

INGESTION	INHALATION	SKIN CONTACT
Swallowing corrosive substances can lead to severe burns in the mouth, throat, esophagus, and stomach	Breathing in fumes from corrosive chemicals can lead to respiratory damage , including burns to the respiratory tract	Corrosives can cause immediate burns , irritation, and ulceration, which may not be felt immediately but worsen over time

Ulceration refers to an opening

EFFECTS OF POISONING

- **Heat generation**
 - Both acidic and alkaline agents
 - Exacerbates the damage by causing thermal burns in addition to chemical burns
- **Direct cellular damage**
 - Breakdown or burn the cell membranes, leading to leakage of cellular contents and further inflammation
 - Allows bacteria to invade → infections → worsening tissue damage
 - *Di pa napatchup, pumasok na kaagad ang bacteria.*
- **Systemic effects**
 - Corrosive substances can cause **systemic toxicity** that may damage the GI tract especially if ingested
 - The body may respond with shock, or organ failure, depending on the amount and location of exposure
 - Hypovolemic shock (from bleeding) or septic shock (infection)
- **Delayed effects**
 - Corrosive agents may cause delayed symptoms as the tissue damage progresses over time
 - This can result in long-term complications

ASSESSMENT: CLINICAL MANIFESTATIONS

- **INGESTION**

IMMEDIATE EFFECTS	DELAYED EFFECTS (severe)
● Pain & burning sensation (mouth, throat, chest, abdomen) ● Drooling and dysphagia ● Oral and pharyngeal ulcers ● Edema and swelling ● Salivation (result from irritation) ● Vomiting ● Hematemesis	● Perforation of GI tract — leading to peritonitis because the corrosive agents lead to perforation leading to peritonitis. ● Shock (hypovolemic or septic) ● Strictures - healing can cause scarring ● Esophageal and Gastric

Abdominal pain - severe burning or cramp-like pain as corrosive agent damages stomach lining	necrosis
--	----------

• INHALATION

IMMEDIATE EFFECTS	DELAYED EFFECTS
- Burning sensation (throat and chest) - Coughing - persistently dry or mucus/blood; a reflex - Shortness of breath (dyspnea) - Wheezing - airways are constricting - Hoarseness - vocal cords may be damaged - Eye irritation - stinging, watery d/t fumes	- Pulmonary edema - accumulation of fluid due to irritation - Respiratory failure - Chemical pneumonitis - may progress to ARDS; inflammation of the lung tissues - Chronic respiratory issues (asthma, fibrosis)

• SKIN CONTACT

IMMEDIATE EFFECTS	DELAYED EFFECTS
- Burning sensation - Redness and inflammation (esp. Site of contact) - Blistering and ulceration - may lead to open sores; - Tissue necrosis and Eschar	- Full-thickness burns – third degree burns - Scarring and contractures - may be after healing - Infection - portal of entry of bacteria

Alkali - tissue necrosis → tissue death

Remove toxin or decrease its absorption.

Management: still ABC

ACID POISONING MANAGEMENT

- Dilution and Irrigation**
 - If the acid is ingested, the primary first aid measure is dilution with **water or milk**
 - Do not induce vomiting**
 - For **fuming or volatile acids (sulfuric acid, hydrochloric acid)** – dilution should not be attempted as fumes may irritate the airways.
 - Gastric lavage with activated charcoal is **not recommended** as it may cause further damage to the tissues, only for specific instances, and
 - Used in toxic ingestion of medication
 - Via NGT – lavage may cause further damage in mucosa
 - 1 hour
 - Not used in acid and alkali poisoning
 - Irrigation of exposed skin or eyes (for dermal or ocular exposure) with a large volume of water for at least 15-20 minutes
- Neutralization (cautious use)**
 - It should not be done in large quantities or indiscriminately. It is not always recommended.
 - Neutralization with baking soda (sodium bicarbonate) in case of **minor** acid exposure on the skin or mouth – can produce exothermic reaction.
- Antibiotics**
 - Risk of secondary infection
 - Use broad-spectrum antibiotics, especially in cases of perforation.

• Surgical intervention

- In cases of severe tissue damage

• Supportive care

- Airway management (intubation may be required in cases of severe respiratory distress) – ABC management
 - Airway is always protected.
- Intravenous fluids for fluid resuscitation to maintain blood pressure and prevent shock (typically, crystalloid solutions like PNSS or PLR)
- Pain control – opioids or strong pain medications
- GI protection (PPIs or H2 blockers)
- Close monitoring – VS, electrolytes, renal function
 - Watch out for prerenal problem

SULFURIC ACID	HYDROCHLORIC ACID
- Causes deep tissue burns and exothermic reactions upon contact with water (battery acid) - Dilute with water/milk - Fluid resuscitation, pain management, esophageal/gastric protection Wala ang ____ → dilute with water and milk.	- Causes local tissue necrosis Ingestion: dilute with water or milk Dermal exposure: irrigate with copious amounts of water - Maintain airway patency, fluid management, and treat systemic complications
ACETIC ACID	NITRIC ACID
- Less potent but can still cause significant tissue damage Mild exposure: dilute with water - Significant ingestion/dermal exposure: supportive care and monitoring Vinegar but more potent (it's giving lambanog.)	- Causes severe toxic burns and may also release toxic fumes Ocular exposure: immediate irrigation Ingestion: dilute with water or milk Inhalation: treatment of respiratory distress (supplemental O2 and monitoring for pulmonary edema)

ALKALI POISONING MANAGEMENT

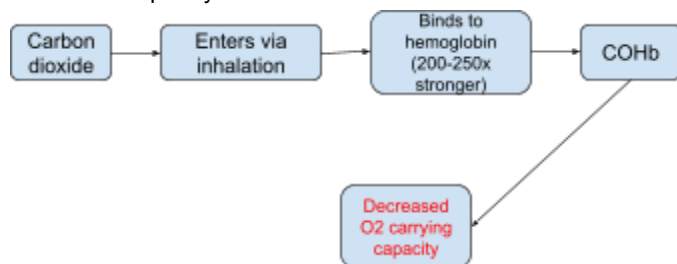
- Immediate action**
 - Do not induce vomiting**
 - Dilution only if a **patient is conscious and not in respiratory distress**
 - Avoid acidic beverages (vinegar or fruit juice) - to not neutralize the alkali substance
- Neutralization**
 - Symptom-based treatment
 - Dilute the acidic solution with vinegar or citric acid
- Supportive care**
 - Pain management – analgesics or opioid
 - Fluid resuscitation – maintain hydration and manage shock
 - Endoscopy in cases of severe ingestion
 - Surgical intervention in severe tissue necrosis or perforation

- **Monitoring**

- Close monitoring for signs of respiratory distress, hypotension, or shock
- Electrolyte and renal function

CARBON MONOXIDE POISONING

- Most common cause of fatality due to misdiagnosis
- Unreported or misdiagnosed – occurs in house, car without windows
- There may be delay in management
- **Sources**
 - **Incomplete combustion**
 - CO is produced by burning fuel in enclosed spaces such as gas stoves, furnaces, water heaters, and car engines
 - **Smoke inhalation -**
 - **Others**
 - Gas-powered generators, grills, and engines in poorly ventilated areas also emit CO



COHb - carboxyhemoglobin
Brain and heart become hypoxic.

ASSESSMENT: CLINICAL MANIFESTATIONS

- **MILD TO MODERATE POISONING**
 - Headache (dull)
 - Dizziness
 - Nausea and vomiting
 - Fatigue/weakness
 - SOB
 - Confusion — neurological sx
 - Chest pain
 - **Cherry red skin color** – characteristic symptom; due to binding of CO to Hgb
- **SEVERE POISONING**
 - Loss of consciousness/fainting
 - Seizures
 - Hypotension
 - Arrhythmias
 - Respiratory distress/failure
 - Cardiac arrest

MANAGEMENT

- **Immediate Management**
 - Move the patient to fresh air immediately, if possible – exposure requires immediate treatment.
 - Open all doors and windows
 - Loosen all tight clothing

- Initiate traditional CPR if warranted
- Prevent chilling → wrap the patient with a blanket
- Keep the patient as quiet as possible to preserve energy – to prevent conversion of aerobic to anaerobic; to conserve energy
- Do not give alcohol in any form or permit the patient to smoke

- **ER Management**

- Analyze carboxyhemoglobin (COHb) levels
- Deliver 100% oxygen (atmospheric or via hyperbaric chamber) until COHb is less than 5%

GROUP	COHb levels
Normal	0.2%
Smokers	5-10%
Mild poisoning	10-20%
Moderate poisoning	20-40%
Severe poisoning	40-60%

FOOD POISONING

- From contaminated food or drink
- **Assessment**
 - How soon after eating did the symptoms occur?
 - Immediate onset: chemical source
 - What was eaten in the previous meal? Unusual odor or taste?
 - Did anyone else become ill from eating the same food?
 - Did vomiting occur?
 - Smell? Color? Content?
 - Did diarrhea occur?
 - Are any neurologic symptoms present?
 - Does the patient have a fever?
- **Management**
 - **Systemic**
 - Monitor LOC
 - Monitor BP, hemodynamic status
 - Monitor muscular activity – will cause you to lose electrolytes
 - Monitor VS
 - Watch out for hypovolemic shock - d/t fluid loss
 - **Gastrointestinal**
 - Collect secretions/excretions - gastric content, vomitus
 - Antiemetic medications - Metoclopramide, Ondansetron
 - Fluid resuscitation for volume to volume replacement

- **Mild nausea:** sip weak tea, carbonated drinks, or tap water (temperature)
- **Post-nausea and vomiting:** clear liquids for 12 to 24 hours to rest the GIT
- **Diet progression:** low-residue, bland diet

ABUSE, VIOLENCE, AND NEGLECT

Aggression and Violence

- **Predictors**
 - Pacing – lakad nang lakad
 - Agitation
 - Threatening remarks
 - Combative posture
- **De-escalation Techniques**
 - Provide a clear limit-setting and redirection
 - Encourage relaxation techniques
 - Offer some distractions with positive activities such as exercise
 - Provide a quiet area with decreased stimuli under close observation
 - Move away other patients from the area and ensure you have sufficient staff if needed to intervene
- **Interventions**
 - Priority provide our own safety and safety of other patients
 - Administration of **Haloperidol** or **Lorazepam**
 - Apply restraints or put patient in seclusion
 - **Safety Tips!**
 - Do not wear necklaces
 - Make sure the patient is not between yourself and the door

Abuse - commonly seen in pediatric in geriatric patients.

- **Physical** – intentional use of physical force
- **Emotional** – behaviors that harm another person's self-worth or emotional well-being
- **Sexual** – forcing a person to engage in sexual acts without consent
- **Economic** – making an individual financially dependent through improper use of funds by a person in a trusted relationship
- **Neglect** – failure to take care and provide basic needs of a vulnerable person

Cycle of Abuse

- Tension-building phase
- Explosive phase
- Honeymoon phase - abuser apologizes and may give presents to the victim.

Once an abuser, always an abuser.

Risk Factors

- **Perpetrator risk**
 - Poor education
 - Low socioeconomic status

- Substance abuse
- Family history of violence
- Low self-esteem

- **Victim risk**

- Intimate partner violence
- Sex: women, pregnancy
- Unwanted or unplanned children; with special needs
- Domestic abuse
- Chronic health challenges in elderly

NURSING CARE OF ABUSE SITUATIONS

- Provide immediate care for any physical injuries
- Document and assess further injuries
- Interview patient and companion, partner, caretaker separately
- Nurse as an advocate must report suspicion of abuse.
 - Provide facts and circumstances
 - Prepare and collect evidences
- Develop a safety plan

SUBSTANCE ABUSE AND WITHDRAWAL

- **Epidemiology**
 - In 2021, the estimated number of illegal drug users worldwide was around 296 million.
 - Among these users, 39.5 million could be considered "problem drug users" or categorized as having a drug use disorder.
 - Cannabis is the most commonly used illegal drug worldwide, followed by opioids and opiates.
 - The estimated number of cannabis users worldwide was around 219 million.
 - In 2022, the number of opioid overdose deaths in the U.S. reached over 80,000, the highest number ever recorded.
 - Drug capital of the world - United States.
 - Drug production in the world - Afghanistan.
 - Opium poppies are cultivated in 57 countries, 95% of the world's opium comes from a mere three nations: Afghanistan (the world leader), Mexico, and Myanmar.
- **Characteristics of Substance Use Disorder**
 - Loss of control
 - Social Impairment
 - Risky use
 - Tolerance -
 - Withdrawal - when you stop using the substance, you feel a cluster of symptoms.
 - *The number of symptoms determines whether the substance use disorder is:
 - Mild
 - Moderate
 - Severe
- **Factors Influences Risk for Substance Use Disorder**
 - Biology
 - Sex and Gender - more men than women

- Environment - influences from family, friends, and economic status; physical and sexual abuse, lack of parental guidance.
- Development - the earlier you start the abuse, the earlier it will progress to addiction.
- Mental conditions

DIAGNOSING

- "Am I using more than I intended to use or for longer periods?"
- "Have I tried to cut back or cut down on my use and have had a very hard time doing that?"
- "Am I spending less time doing something that I used to really like to do because I'm spending more time using substances or recovering from substances?"
- "When I am not using the substance, I am thinking about a lot and craving a lot of that substance?"
- "Is this substance use creating a problem for me in some of the major ways in which I spend my life such as at work, school, family, or my community?"
- "I have noticed that when I abruptly stop using the substance I develop symptoms that might be consistent with some type of withdrawal." *Under stress, people may need to use substance as coping mechanism.*

SUBSTANCE ABUSE TERMINOLOGY

- **Intoxication** — symptoms that occur with excessive use of a substance.
- **Tolerance** — means that larger amounts of a given substance are required to elicit the desired effects.
- **Dependence** — includes both physical and psychological dependence
 - **Physical dependence** — means the body requires the substance to avoid the physical symptoms of withdrawal.
 - **Psychological dependence** — means that the absence of the substance causes significant distress or anxiety.
- **Withdrawal** refers to the physiological symptoms that occur upon discontinuation of a substance
- **Dependence (Drug)**
 - One may develop a tolerance for the drug and experience withdrawal symptoms without it, and there is a noticeable decline in their daily function.
- **Addiction**
 - Brings about mental and behavioral impairments, slowing down emotional reactions and physical movements.
 - Another marked trait is how a person compulsively needs to have the drug despite harmful consequences.
- **Misuse**
 - Manifest a little differently a person who misuses drugs doesn't have to be addicted to them; no signs of physical or mental impairments either.

- Using drugs in unhealthy or improper way; repeatedly consuming substances intending to induce pleasure avoid or alter reality or ease nervous tension

SUBSTANCE USE DISORDERS

- **Alcohol Use Disorder**
 - Most common, affecting 29.5 million people.
 - **Intoxication:** slurred speech, unsteady gait, facial flushing, impaired judgment, and impaired motor coordination.
 - **Withdrawal:** includes tremors, insomnia, anxiety, GI upset, palpitations, headache and the possibility of seizures.
 - starts approximately 5 to 10 hours after the patient's last drink and typically peaks around 24 to 48 hours.
 - *When did you last take the substance?* – to know the peak
 - **Delirium tremens:** severe alcohol withdrawal
 - Usually occurs about 48 to 72 hours after the patient's last drink.
 - **Symptoms:** hallucinations (auditory, visual, and tactile), tachycardia, hypertension, diaphoresis
 - **Goals:**
 - Stabilizing and monitoring of vital signs.
 - Prevent seizures and delirium
 - **Treatment**
 - IV Fluids and electrolytes - to flush the alcohol off the body
 - Benzodiazepines (Diazepam, Anticonvulsants Anxiolytics)
 - Give vitamins such as thiamine, folate, multivitamins – vit B complex
 - **Nursing Considerations**
 - History taking of last alcohol intake
 - Asses for severity of patient's withdrawal
- **Acute Alcohol Intoxication**
 - Alcohol or Ethanol
 - Multisystem toxins and CNS depressants cause drowsiness,
 - impaired coordination, slurring of speech, sudden mood changes, aggression, grandiosity, and uninhibited behavior.
 - Grandiosity - mayabang
 - Stupor and eventually coma and death.
 - Impaired breathing associated with CNS depression
 - Impaired impulse control associated with severe intoxication from alcohol
 - **Treatment**
 - Detoxification
 - Ensure patent airway and observation for symptoms of CNS depression
 - Keep them with warm blankets
 - Examine the patient for alcohol withdrawal symptoms

- **Alcohol Withdrawal Syndrome**

- As a result of the sudden cessation of alcohol intake after a bout of heavy drinking or more typically after prolonged intake of alcohol.
- Delirium tremens — severe form of alcohol withdrawal syndrome precipitated by acute injury, infection, pancreatitis, hepatitis.

- **Common Withdrawal Symptoms**

- Irritability
- Trouble sleeping
- Tremors
- Sweating
- Depression or dysphoria
- Restlessness

- **Substances that may lead to withdrawal**

- Alcohol
- Heroin
- Marijuana
- Nicotine
- Oxycontin - opioid agonist; somewhat pain-reliever but enhances opioid action

- **Drug types that can result in withdrawal**

- Antidepressants
- Barbiturates
- Cannabis
- Depressants
- Hallucinogens
- Inhalants
- Opioids
- Stimulants

- **Treatment**

- Supportive care
- Patient is sedated
- Maintain open airway
- Place patients in a calm, non-stressful environment and close monitoring.
- Hydration IV therapy
- Monitor for hypoglycemia
- Vitamins and high protein diet

- **Medications to Help with Withdrawal**

- Catapres (clonidine)
- Librium (chlordiazepoxide)
- Buprenex (buprenorphine)
- Valium (diazepam)
- Ativan (lorazepam)
- Methadone

- **Nursing Interventions**

- Ask for help
- Eat well
- Exercise

- First three: may cause the release of Dopamine floods pathway than personal experiences → happiness

- Drink plenty of water
- Sleep
- Stress management activities
- Take home medications

- **Seek help immediately**

- Delusions
- Difficulty breathing
- Hallucinations
- Loss of consciousness
- Rapid heartbeat
- Tremors or seizures

- **Drug Use Disorder**

- Affects 27.2 million people
- **Methamphetamine** “harmless high” (Ecstasy)
- **Spice** – synthetic cannabinoid, smoking mixture (same as Marijuana)
- **Bath salts** – synthetic stimulants similar to ecstasy. These may be swallowed, snorted, smoked, injected
- **Cannabis/ butane honey oil (BHO) or dabs**
 - Heating cannabis with butane to strip the chemical from the plant, which is then heated to remove the butane further, a vacuum is placed to remove any residual butane, the product results in a “dab”.

- **Methods How to Intake Drugs**

- Inhalation — sniffing, snorting, bagging, huffing, dustin
- Swallowed
- Injected
- Smoked
- Combination — Sextacy (Meth and Sildenafil)

- **Treatment Goals**

- Support the cardiovascular and respiratory functions
- Enhance clearance of the agent
- Safety of both patient and staff

- **Illicit Drug Use disorder**

- Around 70.3 million people aged 12 or older used illicit drugs. Marijuana is the most common illicit drug used by 61.9 million.
- Illicit means illegal medications/*pinagbabawal na gamot*.

- **Mental health and substance use**

- Nearly 1 in 4 adults (59.3 million) has mental illness closely linked to substance abuse.
- Adolescents (12-17) 4.8 million have major depressive episodes.

PSYCHIATRIC EMERGENCIES

- Move or action that causes sudden distress to self or may cause sudden death
- **Common Psychiatric Emergencies**
 - Suicidal attempt, deliberate harm to self or others.
 - An acute psychotic episode with excited behavior and violence.
 - Alcohol and drug withdrawal syndrome and delirium tremens.
 - Depressive stupor or catatonic syndrome
 - Acute stress reaction with a dissociative conversion disorder.
 - Panic disorder with panic attacks.
 - Dystonic reaction due to psychotropic drugs

ASSESSMENT

- History — from patient and informant of the patient
- Examination — general physical and systemic examination
- **Mental Status Exam**
 - GCS
 - Mini mental state examination
- **Mental State Examination**
 - **Appearance and Behavior**
 - LOC
 - Dress
 - Psychomotor activities
 - Cooperativeness
 - Rapport
 - Speech
 - Mood
 - Perception
 - Thoughts
 - **Cognitive Function**
 - Attention and concentration
 - Orientation to time, place, person
 - Memory
 - General information and intelligence
 - Judgement
 - Insights

MANAGEMENT

- **General Management**
 - Secure the safety of the patient
 - Nutrition and hydration
 - Psychosocial support
 - Medication
 - Investigation
 - Notification
 - Inform
 - Consult a senior colleague
 - Refer if necessary
- **Specific Management**
 - **Suicidal Attempt, deliberate harm to self or others**
 - Determine method of suicide attempt.
 - Attend to the physical needs.

- Manage according to the method of attempt
 - Assess for mental state examination (Suicide Intent Scale)
 - If actively suicidal, admit the patient for further treatment.
 - If not actively suicidal and the cause of the problem is determined, start appropriate treatment and refer.
- **Alcohol and Drug Intoxication, Withdrawal syndrome and delirium tremens**
 - Assess the time lapse from the last intake of alcohol or drugs
 - Symptoms: confusion, clouded thinking, decreased awareness, poor memory, emotionally upset, the tendency to wander, suspiciousness, agitation, disorientation, hallucinations, disturbed sleep.
 - For withdrawal seizures give Diazepam detoxification 10mg/ IV slowly, Thiamine 100 mg/IV.
 - For drug abuse, determine the type of drug, and give symptomatic treatment:
 - Pain - non-opioid painkillers
 - Intestinal cramping — dicyclomine, antispasmodic
 - Insomnia - chlorpromazine, tricyclic antidepressants
 - **Depressive Stupor and catatonic syndrome**
 - Loss of pleasure or enjoyment, decreased interest and associated with physical symptoms: such as a change in body movement, bowel functions, appetite or psychological symptoms such as hopelessness, or reduced self-esteem.
 - Extreme slowing of psycho-motor functioning and social withdrawal.
 - Risk for starvation and dehydration; oral medication.
 - Start IV fluids
 - Diet to NGT
 - Medications: Oral antidepressant and antipsychotic drugs –through NGT
 - Amitriptyline 100 mg OD, Chlorpromazine 100 mg OD- for psychotic symptoms
 - Admit patient until condition stabilizes
 - **Acute Stress Reaction with Dissociative Conversion Disorder**
 - Disrupted
 - Characterized by presence of physical and psychological symptoms in the absence of physical pathology.

- They dissociate themselves from the psychological conflicts or stressors subconsciously and convert them into physical symptoms.
 - Common among adolescents - hyperventilation and tetany, loss of consciousness
 - Calming down the patient.
 - Finding out the stressors that may trigger the symptoms.
 - Teaching adaptive techniques like muscle relaxation, abdominal breathing exercises, mindfulness practice and positive self-talk.
 - Rarely: short course anxiolytics like diazepam.
- **Panic Disorder with Panic Attack**
- Causes so much fear and distress the symptoms mimic so much like ischemic heart attack.
 - Panic disorder is characterized by a white-knuckled, heart pounding terror that strikes with the force of a lightning bolt, without warning. Most panic attacks last only a few minutes but could last up to ten minutes in rare cases.
 - Brief history and examination.
 - Calm the patient and relatives, reassure them it is not a life-threatening condition like ischemic heart attack.
 - Teach Breathing and relaxation techniques positive-talk
 - Short course anxiolytic drugs like Diazepam.
- **Dystonic reaction due to psychotropic drugs**
- Acute adverse extrapyramidal effect to use of antipsychotic drugs like haloperidol and chlorpromazine.
 - Extrapyramidal - involuntary movements, tremors
 - Dystonic reactions are intermittent spasmodic or sustained involuntary contractions of muscles in the face, neck, trunk, pelvis and extremities.
 - Use of antipsychotic drugs — Risperidone, Olanzapine.
 - Taking relevant history to confirm prior antipsychotic drug intake or overdose and brief examination.
 - Give Diazepam 10mg/IV slowly, and Phenergan 10mg/IM.
 - Future prevention: Give Trihexyphenidyl 2mg /tab TID orally
 - Review and revise the antipsychotic drug regimen.