

CEN Review Course Agenda

Day 1

Format: Description Presentation Treatment

Unit #	Topic	Item #	Duration	Start time	End time	speaker
1	Neuro	3	120	800	1000	Dr. Kelly Urban UAMS
	Break		10	1000	1010	
4	Cardiovascular	1	90	1010	1140	Lynnette Flynn - AHH
	Lunch			1140	1215	
3	Ocular	6B	45	1215	1300	Dr. David Warner - UAMS
2	Maxillofacial	6A	45	1300	1415	Lynnette Flynn - AHH
	Break		15	1415	1430	
10	Orthopedic	6C	60	1430	1530	Traci Motes APRN
6	Gastrointestinal	4A	60	1530	1630	Lynnette Flynn - AHH
Q&A						

Day 2

August 9th Wed

5	Respiratory	2	120	800	1000	Dr. Kelly Urban - UAMS
	Break		15	1000	1015	
8	Gynecology	4C	60	1015	1115	Dr. Kelly Urban UAMS
	Lunch		45	1115	1200	
9	Obstetrical	9	60	1200	1300	Dr. Kelly Urban UAMS
	Break		15	1300	1315	
11	Wound	6D	75	1315	1445	Dr. Kelly Urban UAMS
	Break		15	1445	1500	
7	Genitourinary	4B	60	1500	1600	Lynnette Flynn
Q&A			10	1600	1630	

Day 3

August 10th Thurs

12	Psych/Social	5A	60	800	900	Lynnette Flynn
	Break					
13	Medical Emergencies	5B	120	910	1110	Patti Esmail - SVI
	Lunch		35	1110	1145	
14	Environmental	7A	60	1145	1245	Jeremy Stogner - UAMS
15	Toxicological	7B	60	1245	1345	Jeremy Stogner - UAMS
	Break			1345	1400	
16	Communicable Diseases	7C	45	1400	1445	Jeremy Stogner - UAMS
	Break					
17	Professional issues	8	75	1500	1615	Dr. Kelly Urban UAMS
Q&A			15	1615	1630	



**Certified
Emergency
Nurse**

Mary Jane Willard, PhD, MBA, MA, RN, CCRN,
CNRN

Little Rock Critical Care Program
August 8, 9, 10, 2023

1

- Alzheimer's disease/dementia
- Chronic neurological disorders (e.g., multiple sclerosis, myasthenia gravis)
- Guillain-Barre syndrome
- Headache (e.g., temporal arteritis, migraine)
- Increased intracranial pressure (ICP)
- Meningitis
- Seizure disorders
- Shunt dysfunctions
- Spinal cord injuries, including neurogenic shock
- Stroke (ischemic or hemorrhagic)
- Transient ischemic attack (TIA)
- Trauma

Test Outline

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Alzheimer's Disease/Dementia

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Dementia

Symptoms of Dementia can vary, at least two of the following mental functions must be significantly impaired to be considered dementia:

- Memory
- Communication & language
- Ability to focus and pay attention
- Reasoning & judgment
- Visual perception



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Dementia

- Alzheimer's Disease accounts for 60-80% of Dementia cases. They have trouble remembering recent events.
- Vascular Dementia is caused by microscopic bleeding and blood vessel blockages in the brain
- Lewy Body Dementia may have movement or balance problems like stiffness or trembling. May experience visual hallucinations (seeing people, objects).
- Fronto-temporal Dementia leads to changes in personality and behavior.

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Chronic Neurological Disorders

Multiple Sclerosis

Myasthenia Graves

Amyotrophic Lateral Sclerosis (ALS)

Guillain-Barre'

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Multiple Sclerosis

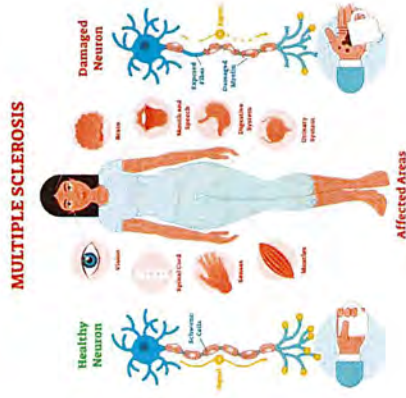
- An autoimmune disorder of the cerebral nervous system in which the myelin sheath around the nerves is damaged and replaced by scar tissue causing preventing of nerve conduction impulses.

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Multiple Sclerosis Symptoms

- The symptoms vary based upon the location of the MS plaques.
 - Balance & coordination
 - Tremors
 - Slurring speech
 - Cognitive impairment
 - Vision impairment, Nystagmus
 - Pain
 - Bladder & bowel dysfunction

<https://www.sclerossociety.org/health/symptoms-of-multiple-sclerosis/>



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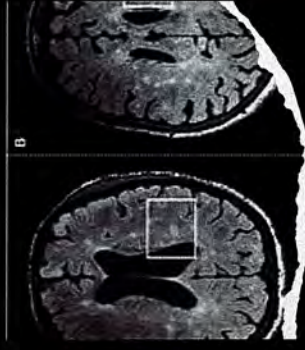
Types of MS

- Relapsing-remitting MS** is the most common, with symptoms that relapse over days or weeks and remissions that may last months or even years with very little or no symptoms.
- Secondary Progressive MS** typically occurs in the relapsing-remitting MS population, who will then continue to have symptoms without remission. Typical symptom progression usually occurs with mobility and walking.
- Primary Progressive MS** is not very common and has a gradual progressive onset of symptoms without any remissions.
- Progressive-Relapsing MS** is a rare form of MS that steadily worsens from the beginning, with acute relapses but no remissions.

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Multiple Sclerosis Diagnosis

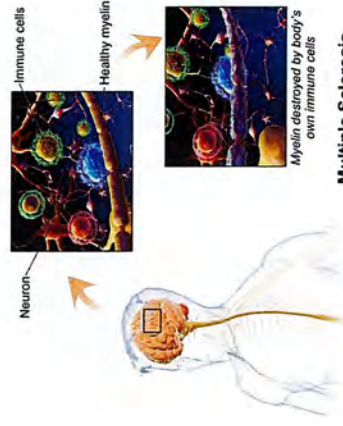
- Clinical exam
- Neurological exam
- MRI



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Multiple Sclerosis Treatment

- Treatment may be symptomatic or episodic
- Glucocorticoids
- Immunomodulator
- Immunosuppressant
- Hormone

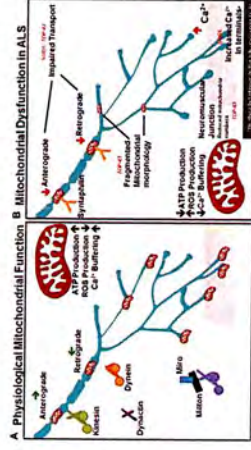


Multiple Sclerosis

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Amyotrophic Lateral Sclerosis (ALS)

- Progressive degenerative disease of the upper & lower motor neurons resulting in progressive severe symptoms.
 - Spasticity
 - Hyperreflexia
 - Muscle weakness
 - Paralysis
 - Dysphagia
 - Cramping
 - Muscular atrophy
 - Respiratory dysfunction



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ALS Symptoms

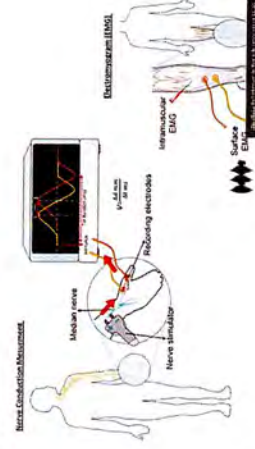
- Additional symptoms may include the following:
 - Monotone speech
 - Immobile
 - Cannot breathe independently
 - Cognitive function remains intact

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ALS

Diagnosis

- History
- Electromyography
- Nerve conduction study
- MRI

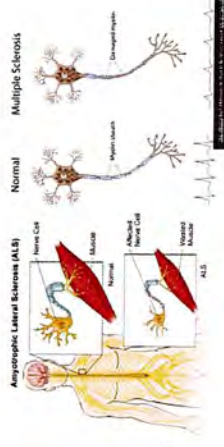


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ALS

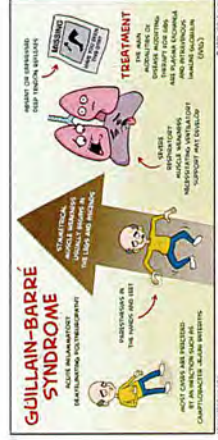
Treatment

- Riluzole (delay progression)
- Acute Complication Treatments
 - Nebulizer treatment with bronchodilators and steroids
 - Antibiotics (infection)
 - Mechanical ventilation



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Guillain-Barre' Syndrome



- An autoimmune disorder of the myelinated motor peripheral nervous system causing ascending and descending paralysis.
- Frequently triggered by a viral infection.

Image: <https://www.medicinenet.com/medimages/guillain-barre-syndrome/>

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Guillain-Barre' Syndrome Diagnosis

- History
- Clinical symptoms
- Lumbar puncture
 - Increased protein with normal glucose
 - Protein may take one week or more to increase



Image: <https://www.nationalhealth.com.au/health/2018/03/guillain-barre-syndrome.jpg>

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Guillain-Barre' Syndrome

- Numbness and tingling with increasing weakness in lower extremities (may become generalized)
- Complete paralysis and inability to breathe without ventilatory support
- Deep tendon reflexes are usually absent, facial weakness
- Ophthalmoplegia (paralysis of muscles controlling eye movement)

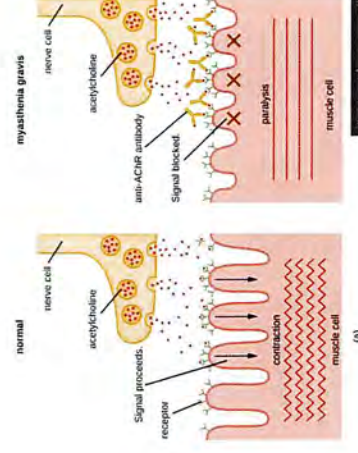


Image: <https://www.medicinenet.com/medimages/guillain-barre-syndrome-treatment/>

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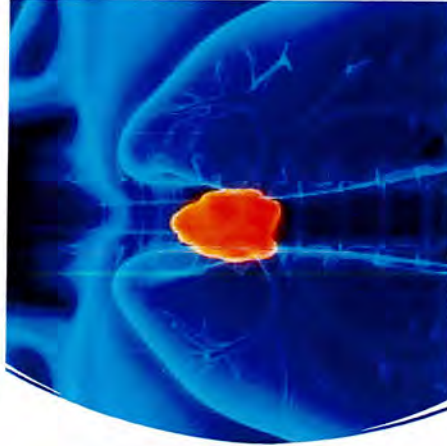
Myasthenia Gravis

- An autoimmune disorder resulting in sporadic, progressive weakness of striated skeletal muscles due to impaired transmission of nerve impulses.
- Affects muscles controlled by the cranial nerves although muscle groups may be affected.
- Patients may have thymomas.



Myasthenia Gravis Thymomas

- Thymus cancer can cause:
- A cough that doesn't go away
 - Chest pain
 - Trouble breathing



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Myasthenia Gravis Symptoms

- Weakness & fatigue (worsens throughout the day)
- Ptosis, diplopia
- Trouble chewing, swallowing
- Respiratory muscles may be involved & cause respiratory failure.
- Myasthenia crisis is when a patient can no longer breathe independently.



Image: <https://www.ahajournals.com/doi/full/10.1161/01.STR.0000000000.00000.00>

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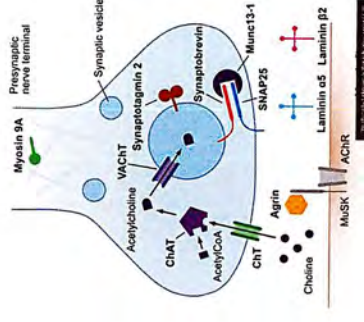
Myasthenia Gravis Diagnosis

- Electromyography and Tensilon test IV injection of edrophonium or neostigmine) which improves function if the patient has MG but does not improve function if the symptoms are from a different cause).
- CT or MRI (thymoma)



Tensilon test: Before (left); After (right)

Cogan



Myasthenic or Cholinergic Crisis

- If signs and symptoms begin about 1 hour after an anticholinesterase drug was given, it is most likely a cholinergic crisis, or too much drug.
- Signs and symptoms beginning 3 or more hours after medication is given is more likely to be a myasthenic crisis, or too little drug.
- A Tensilon test can be done if unable to differentiate between the two conditions.

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Myasthenia Gravis Treatment

- Anticholinesterase drugs (Neostigmine, pyridostigmine)
 - Relieve muscle weakness, however, these drugs can lose effectiveness as the disease progresses
 - Corticosteroids may also be used.
 - Thymectomy
 - Tracheostomy & mechanical ventilation

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Headache

Sinus: pain is behind browbone and/or cheekbones	Cluster: pain is in and around one eye	Tension: pain is like a band squeezing the head	Migraine: pain, nausea and visual changes are typical of classic form
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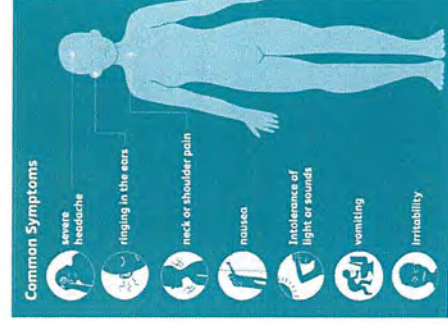
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Headache

- Temporal arteritis (giant cell arteritis/cranial arteritis) is a systemic inflammatory vasculitis of medium or large sized arteries.
- Unknown etiology
- Symptoms: Headache, jaw pain, vision loss, fever, fatigue
- **Treatment: Steroid medications**



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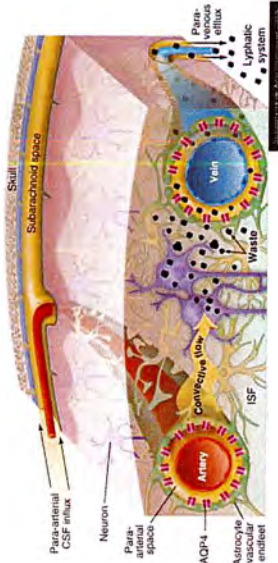


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Migraine Headache

- Recurrent attacks of moderate to severe throbbing and pulsating pain on one side of the head
- Often accompanied by nausea, vomiting, and light/sound sensitivity
- Can last a few hours to several days

Increased Intracranial Pressure (ICP)



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Normal ICP

0-15 mm Hg



Figure 8. Anatomical location of tragus



Figure 9. Transducer inserted with the tragus

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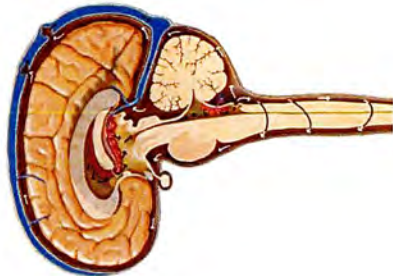
Cerebral Spinal Fluid (CSF)

- 10%
- CSF - colorless, odorless fluid that fills the cerebral ventricle and arachnoid spaces
- Provide cushion for the central nervous system
- Approximately 150 ml circulating in the adult (25-30 ml/hr excreted)
- Formed primarily in the choroid plexus of the lateral ventricles

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Circulation of Cerebrospinal Fluid



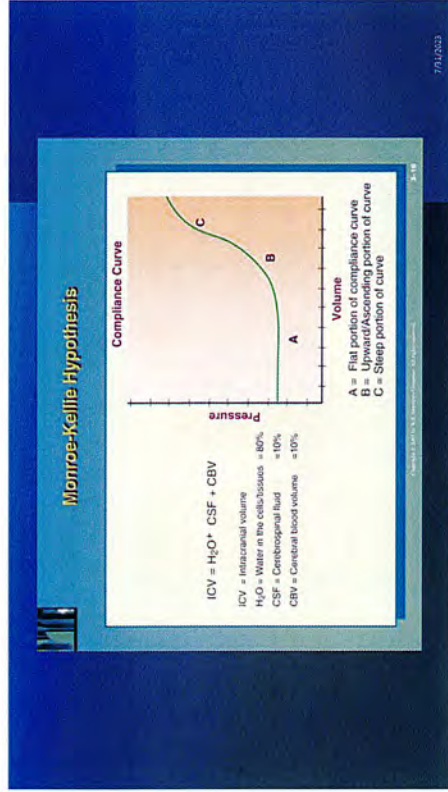
ICP Values

- Normal range: 0 - 15 mm Hg
- Moderate elevation: 15 - 40 mm Hg
- Greater than 40 mm Hg - markedly elevated
- 40 - 50 mm Hg - Ischemic
- Greater than 50 - Irreversible (Infarct)

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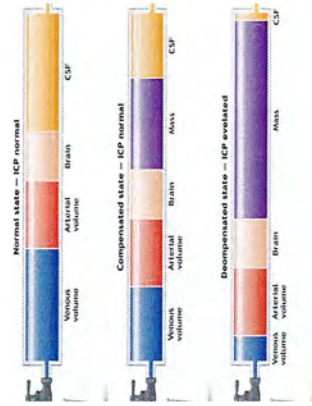
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Monroe-Kellie Hypothesis

- > If volume of one constituent of intracranial cavity increases, a reciprocal decrease in volume of one or both of the others must occur or an overall increase in ICP will result.

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Cerebral Perfusion Pressure (CPP)

The pressure required to maintain adequate blood flow to the brain.

CPP is based upon the mean arterial pressure (MAP) and the intracranial pressure (ICP).

An elevated ICP can be associated with a reduction in CPP.

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Cerebral Perfusion Program

Normal CPP: 60 – 100 mm Hg

< 60 mm Hg: Hypoperfusion occurs

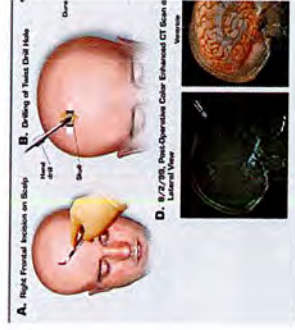
< 30 mm Hg: Hypoperfusion incompatible with life

> 100 mm Hg: Leads to hypertensive encephalopathy and cerebral edema

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Common Causes of Increased ICP

- Space occupying lesions, brain tumor, abscess
- Hemorrhage, epidural & subdural hematoma
- Trauma, infarction, HTN, Hydrocephalus



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Signs & Symptoms of ↑ ICP

INCREASED INTRACRANIAL PRESSURE

- Changes in LOC
 - Eyes
 - Papilloedema
 - Pupillary Changes
 - Impaired Eye Movement
 - Fluctuating
 - Consciousness
 - Disorientation
 - Flaccid
 - Decreased Motor Function
 - Change in Motor Ability
 - Flaccid
- Headache
 - Seizures
 - Impaired Sensory & Motor Function
- Changes in Vital Signs:
 - Bradycardia
 - Hypertension
 - Irregular RR
 - Vomiting
- Changes in Speech
 - Slurred Speech
 - High Pitched Cry
- Infants:
 - Bulging Fontanelle
 - Cranial Suture Separation
 - Head Circumference
 - High Pitched Cry

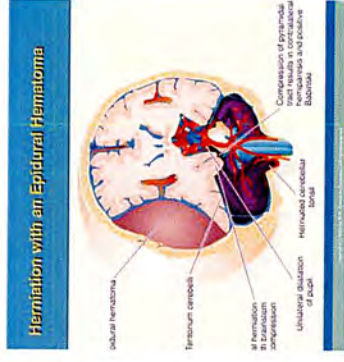
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Herniation

Displacement of brain tissue. Most **lethal** stage of compensation. Process often results in death from brain stem compression.

Always an emergency!



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Cushing's Triad

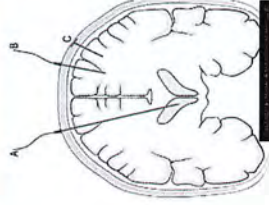
- Widening pulse pressure, Increased BP
- Bradycardia
- Changes in Respirations (irregular)

Cushing's triad indicates increased severe ICP (Late Sign)

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Nursing Management in Controlling ICP

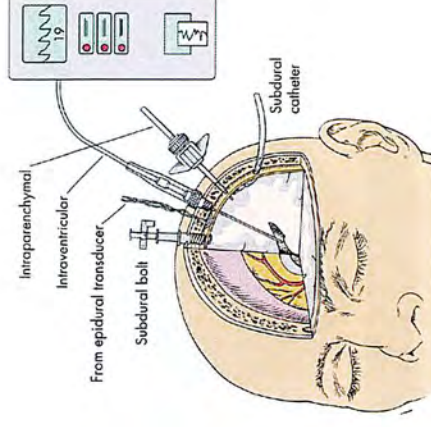
- Elevate HOB
- Monitor vital signs & maintain body temp
- Maintain head & neck in neutral alignment
- Prevent Valsalva maneuver
- Administer prescribed meds to reduce ICP
- Maintain fluid balance with 0.5% NaCl solution
- Avoid noxious stimuli
- Administer sedation to reduce metabolic demand
- Maintain cerebral perfusion pressure >70mmHg
- Serum Na levels should be elevated (3% IV infusion or 23% IVPB)
- Serum OSM may be elevated (mannitol 20% IVPB or 25% IVP)
- Barbiturate coma with burst suppression (pentobarbital)
- Surgery (craniotomy and/or decompressive craniectomy)



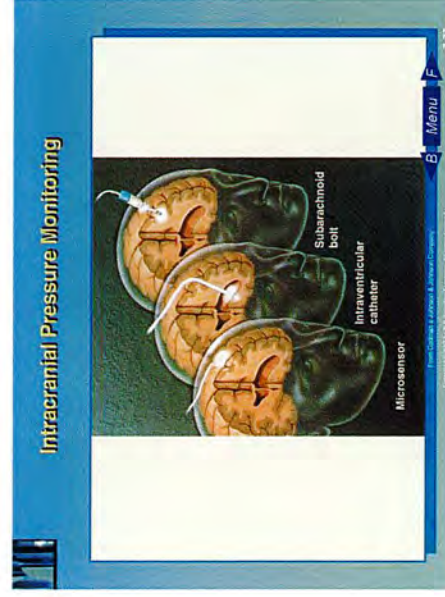
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Purpose of ICP Monitoring

- > Diagnosis of increased ICP
- > Monitor treatment of ICP
- > Treat Increased ICP
- > Monitor effect of nursing interventions



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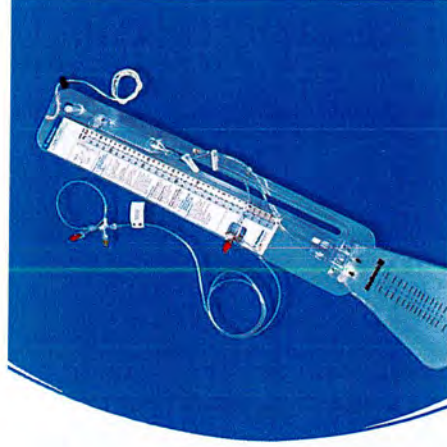
- > **Intraventricular Catheter** - inserted into lateral ventricle via a twist drill - connects to a fluid filled transducer with the transducer zero and leveled at the foramen of Monro (tragus) (EAM)
- > **Subarachnoid Screw** - Hollow bolt inserted through a twist drill hole into the subarachnoid or subdural space - fluid filled transducer
- > **Epidural** - inserted in the epidural space beneath the skin above the Dura via burr hole
- > **Subdural** - inserted into the subdural space (does not drain CSF)

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Intraventricular Catheter

- Advantages
 - Ability to measure CSF directly - most accurate
 - Access for CSF drainage therapeutically
 - Decrease intracranial volume
 - Access to administer intrathecal medications (MD)

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Epidural Sensor

- Advantages
 - Easy and safe to insert
 - Less risk of infection
 - Less risk of brain tissue damage

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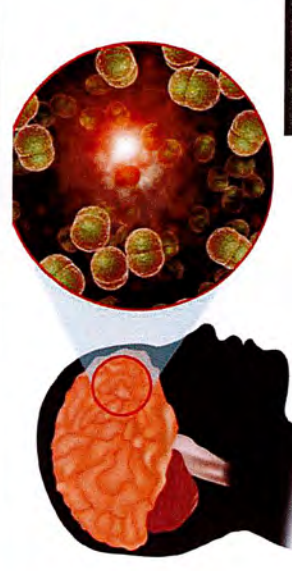
➤ Advantages (Subdural or subarachnoid bolt)

- Useful with small distorted ventricles
- Quick and easy to insert
- Catheter is placed in Subarachnoid space via burr hole in the frontal lobe (dura entered)
- No disruption of brain parenchyma
- Accurate readings

Intraparenchymal Catheter

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Meningitis



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Meningitis

- Bacterial
- Viral
- Fungal
- Parasitic
- Noninfectious conditions (cancer, lupus, etc)



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Bacterial Meningitis

- Infection of the meninges & subarachnoid space
- Can appear quickly and progress
- Medical Emergency (can cause death within a few hours)
- Cause: Bacteria in the bloodstream from an infection from another part of the body (penetrating head wound, sinusitis, mastoiditis, skin infection, abscess, pressure injury, large burn, infected shunt, neurosurgery procedure)
- Diagnosis: Lumbar puncture
- Treatment: Antibiotics, Corticosteroid (Dexamethasone)
- Prevention: Pneumococcal vaccine, meningococcal vaccine, haemophilus influenzae type b (Hib) vaccine



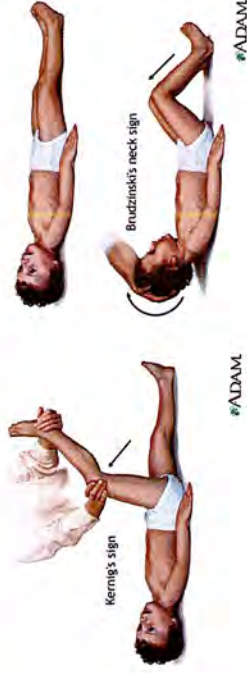
- Most common form of meningitis/usually less severe
- Causes: Non-polio enteroviruses (GI tract & very contagious), Herpes Simplex type 2, Varicella-zoster, HIV, West Nile & other mosquito viruses, measles, mumps, influenza, lymphocytic choriomeningitis
- Symptoms: fever, respiratory symptoms, headache, painful stiff neck, muscle aches
- Diagnosis: CSF from lumbar puncture, additional cultures (throat, nasal, blood, stool)
- Treatment: Supportive
- Prevention: No vaccines, good hand hygiene, avoid contact

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Meningeal S & SX Brudzinkski's & Kernig's



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Seizures

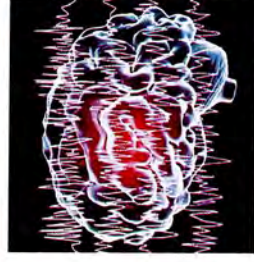
- Partial seizures caused by electrical discharges to a localized area of the cerebral cortex (frontal, temporal, parietal)
 - Simple partial: Unilateral motor symptoms
 - Aversive: Eyes and head turned AWAY from focal side
 - Sylvan (usually while sleeping): Tonic-clonic movement of face, speech, salivation
 - Special sensory: Numbness, tingling, prickling, pain. Could be visual also.
 - Complex (psychomotor): No loss of consciousness, may have complex sensorium with bad tastes, auditory, or visual hallucinations, rarely aggressive, can have prolonged drowsiness and confusion



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Seizures

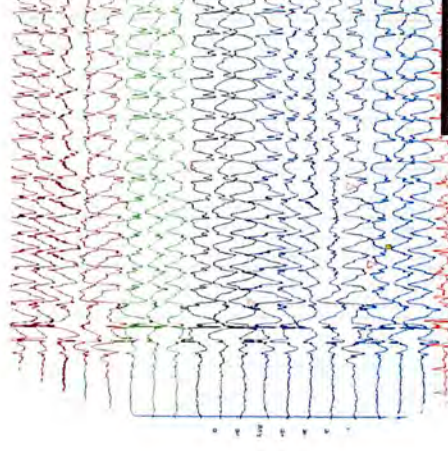
- Generalized seizures lack a focal onset and appear to involve both hemispheres, most often associated with a loss of consciousness and no preceding aura.
- Tonic-clonic (Grand Mal) occurs WITHOUT warning
 - Tonic period (10-30 seconds): Eyes roll upward with LOC, arms flex and stiffen in tonic concentration of body, apneic, with cyanosis, salivating.
 - Clonic period (10 seconds to 30 minutes): violent rhythmic jerking with contraction and relaxation. Could be incontinent of urine and feces. Contractions slow and then stop.
- Absence (Petit Mal): Onset is ages 4-12. onset is abrupt with brief loss of consciousness for 5-10 seconds and loss of muscle tone (appears to be daydreaming). Lip smacking or eye twitching may happen.



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Causes of Seizures

- Development defect
- Cerebrovascular disease
- Hypoxemia
- Fever (especially in childhood)
- Head injury
- Hypertension
- Central nervous system infections, such as meningitis
- Metabolic and toxic conditions
- Brain tumor
- Drug and alcohol withdrawal
- Allergies
- Idiopathic



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Seizures

- Following seizures, the patient could have some confusion, disorientation, and impaired motor activity, speech, vision. Additionally, headache, nausea, vomiting can occur.



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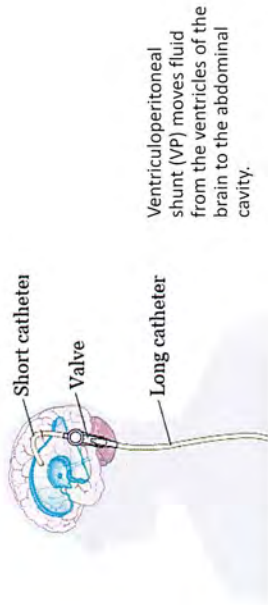


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Shunt dysfunctions

- A shunt is the most common way to treat hydrocephalus. A shunt will drain excess cerebral spinal fluid from the brain to another part of the body (ventriculoperitoneal, etc).

Shutterstock



Ventriculoperitoneal shunt (VP) moves fluid from the ventricles of the brain to the abdominal cavity.

Shunt Placement

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Type of Shunts

- Fixed Pressure Valves
- Adjustable (programmable) Valves



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Shunt Malfunction Signs/Symptoms

Symptoms

- Lethargy, drowsiness
- Nausea, vomiting, headache
- Seizures
- Neck pain

Signs

- Bradycardia, hypertension
- Swelling at shunt site
- Memory disturbances
- Decreased LOC

Shunt Complications

- Malfunction
 - Undershunting/Obstruction
 - Overshunting
 - Pseudocyst Formation
 - Bowel Perforation
- Infection
 - 8-15%

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Spinal Cord Injuries



Acute Spinal Cord Injury

Causes

- Blunt Force Trauma (MVC), Falls from significant height, sports injuries
- Penetrating Trauma, GSW, Knife

Symptoms depend upon injury site

- 50% C4-C7 (20% mortality/50% quadriplegia)
- Neurogenic shock may occur with injury above T6
- Bradycardia, Hypotension, Autonomic Instability, Hypoxia related to respiratory dysfunction

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Neurogenic shock

- Spinal cord injury consequence manifested by hypotension, bradycardia, and temperature dysregulation.
- Associated with cervical and high thoracic spinal cord injury
- Sudden loss of sympathetic tone, preserving parasympathetic function leading to autonomic instability
- Neurogenic shock is not spinal shock which is associated with flaccidity of muscles and loss of reflexes in the spinal cord

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Spinal Cord Injury: The 3 Big Emergencies

- #1 Neurogenic Shock
 - Immediately after injury
 - Cause: Sympathetic Blockade
 - Clinical Signs & Symptoms
 - ✶ **Hypotension**
 - ✶ **Vasodilatation**
 - ✶ **↓ Venous Return**
 - ✶ **↓ Cardiac output**
 - ✶ **Loss of muscle tone and movement**
 - ✶ **Bradycardia**

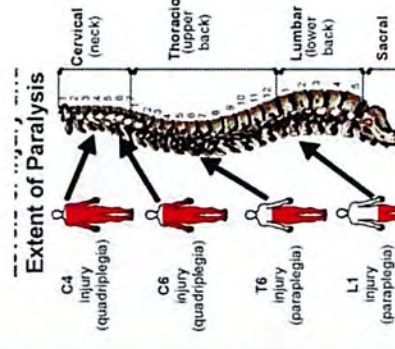
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Spinal Cord Injury: The 3 Big Emergencies

- #1 Neurogenic Shock
- Treatment
 - ✶ **Hypotension:**
 - Fluids
 - Vasopressors (start early)
 - Elevate lower extremities
 - ✶ **Bradycardia: Atropine**

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Levels of Injury and Paralysis

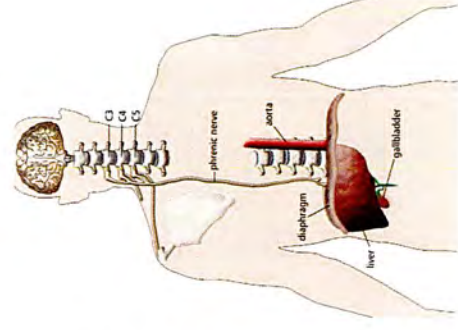


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Spinal Cord Injury: The 3 Big Emergencies

- #2 Autonomic Dysreflexia (T6 or above)
 - Cause: Parasympathetic Blockade
 - Clinical Signs & Symptoms
 - Pounding Headache
 - Severe Hypertension
 - Flushing and diaphoresis above level of injury
 - Treatment
 - ↑ HOB
 - Search for cause (source of pressure)
 - Vasodilator

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Spinal Cord Injury: The 3 Big Emergencies

- #3 Spinal Cord Injury at C4-5
 - Injury to Phrenic Nerve
 - Respiratory Arrest

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TIA & Ischemic Stroke Etiology

An illustration of a human torso with a semi-transparent blue body, showing the internal organs and skeletal structure. A prominent red ECG (heart rate) line is overlaid across the chest area. The heart is highlighted with a bright red glow.

- Atrial fibrillation
- Atherosclerosis
- Coronary artery disease (CAD)
- Hypercoagulable states
- Drug use

71

Strokes: Ischemic & Hemorrhagic

A photograph of a doctor in a white lab coat and stethoscope, holding a white sign with the words "STROKE RISK" written in bold, black, handwritten-style letters. The background is dark and out of focus.

72

Ischemic Stroke

- Focal neurological deficit caused by the interruption of blood flow to the brain lasting longer than 24 hours.



https://www.health.ny.gov/imaging/infographic/infographic_stroke_bfast_practitioner_toolkit_2_19_2020.pdf

73

Ischemic Stroke

- Ischemic (80% of all strokes, Interruption in blood flow to an area of the brain)
- Thrombosis: atherosclerosis may block circulation to a large area of the brain.
- Lacunar infarct: (usually small artery) most common in diabetes mellitus and/or hypertension
- Embolism: travels through a small artery and lodges in the brain (left middle cerebral artery most common). Could be cardiogenic (Atrial Fib/Surgery) Usually occurs rapidly without warning.
- Cryptogenic: no identifiable cause



Illustration of the human brain and blood supply. Adapted from: https://www.health.ny.gov/imaging/infographic/infographic_stroke_bfast_practitioner_toolkit_2_19_2020.pdf

74

Thrombolytic

Antihypertensives

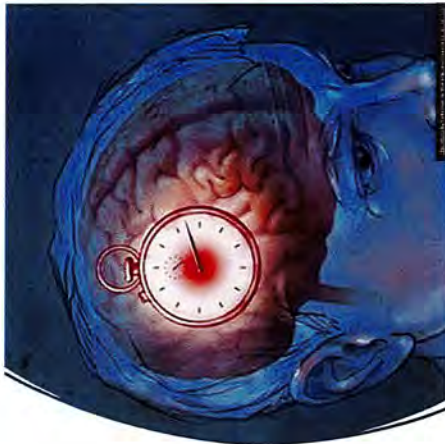
Cooling

Osmotic Diuretics

Aspirin/Anticoagulation

Surgical Intervention

Ischemic Stroke Management



75

Ischemic Stroke Treatment

- Airway protection
- Blood pressure
- Sedation
- Seizure precaution
- ICP management

76

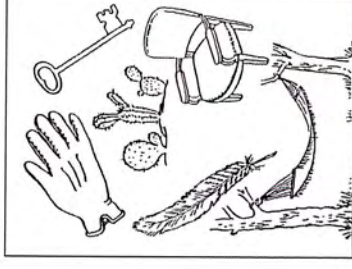
You know how.

Down to earth.

I got home from work.

Near the table in the dining
room.

They heard him speak on the
radio last night.



MAMA
TIP – TOP
FIFTY – FIFTY
THANKS
HUCKLEBERRY
BASEBALL PLAYER

Trauma

Trauma

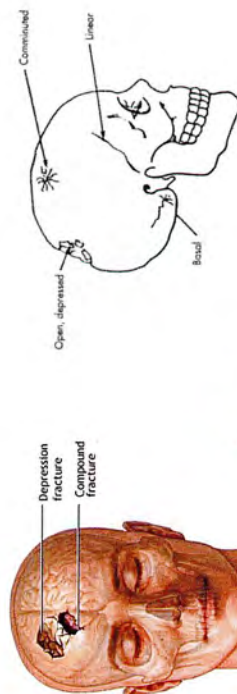


Glasgow Coma Scale		
Response	Score	Score
Eye Opening Response	Eyes open spontaneously	4 Points
	Eyes open to verbal command, speech, or shout	3 Points
	Eyes open to pain (not applied to face)	2 Points
Verbal Response	No eye opening	1 Point
	Oriented	5 Points
	Confused conversation, but able to answer questions	4 Points
Motor Response	Inappropriate responses, words discernible	3 Points
	Incomprehensible sounds or speech	2 Points
	No verbal response	1 Point
Motor Response	Obeys commands for movement	6 Points
	Purposeful movement to painful stimulus	5 Points
	Withdraws from pain	4 Points
Motor Response	Abnormal (spastic) flexion, decorticate posture	3 Points
	Extensor (rigid) response, decerebrate posture	2 Points
	No motor response	1 Point



89

90

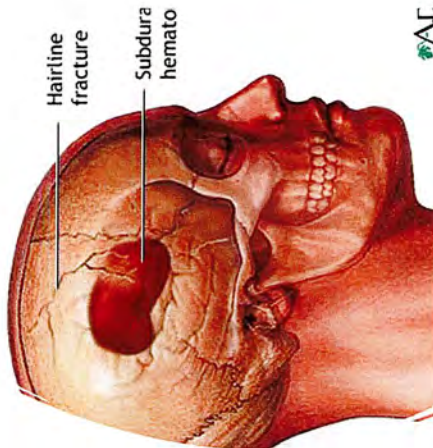


Head Injury

- Skull Fractures
- Linear
- Depressed
- Basal

Linear Skull Fractures

- Linear (hairline):
- Single fracture line
- More common in infants, associated with mild brain injuries
- Usually requires no intervention



91

92

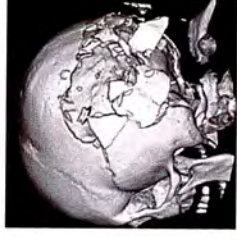
Depressed Skull Fractures

- Fracture displaced more than half the width of the bone, often with contusions under the fracture, high incidence of post traumatic seizures, risk of infections, treatment includes surgical repair to control bleeding, irrigation & debridement, dural repair and elevation (if > 1 cm) or replace bone pieces



Photo from NIOS Institute of Trauma & Injury Management 2006

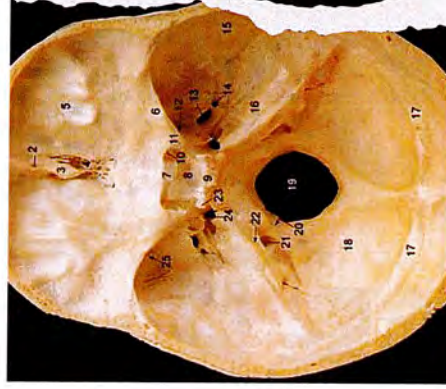
93



Comminuted Skull Fractures

The skull is shattered into pieces

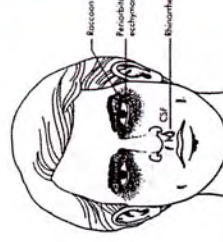
94



Basilar Fx

- Anterior Fossa
- Middle Fossa
- Posterior Fossa

95



Basal Fracture: Anterior Fossa

- Ecchymosis of periorbital areas
- Cerebral Spinal Fluid Rhinorrhea
- NO NG tube!

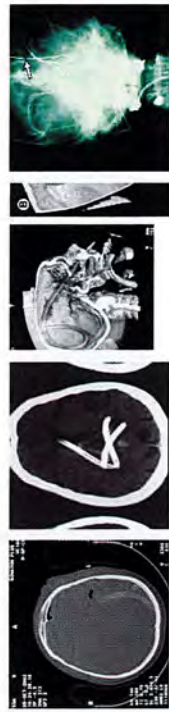
96



97

Basilar Skull Fractures (observation 24-28 hours)

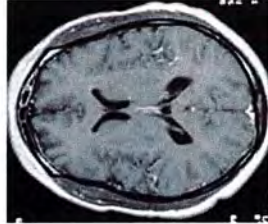
- Basilar: In the base of the skull (may be linear or depressed)
- Anterior (frontal, ethmoid, sphenoid)
 - Raccoon or panda eyes-periorbital ecchymosis
 - Rhinorrhea-CSF from the nose
 - Loss of smell (anosmia), oculomotor palsies



What's wrong?

98

Intracranial Hematoma



99

- A - Subdural Hematoma (below dura)
- B - Epidural Hematoma (above dura)
- C - Intracerebral Hematoma

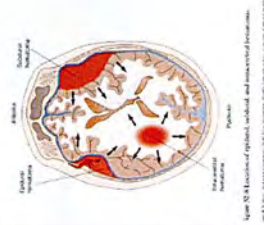
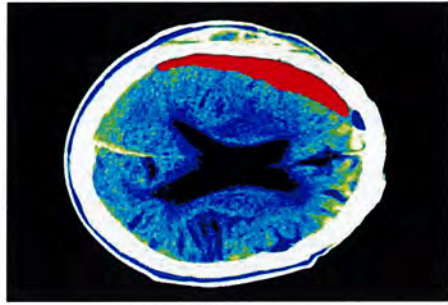


Figure 12-14 Locations of epidural, subdural, and intracerebral hematomas.



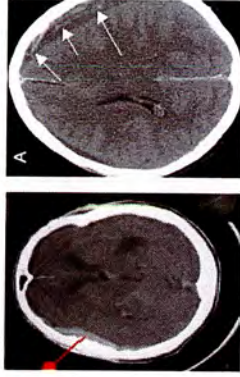
100

Subdural Hematoma

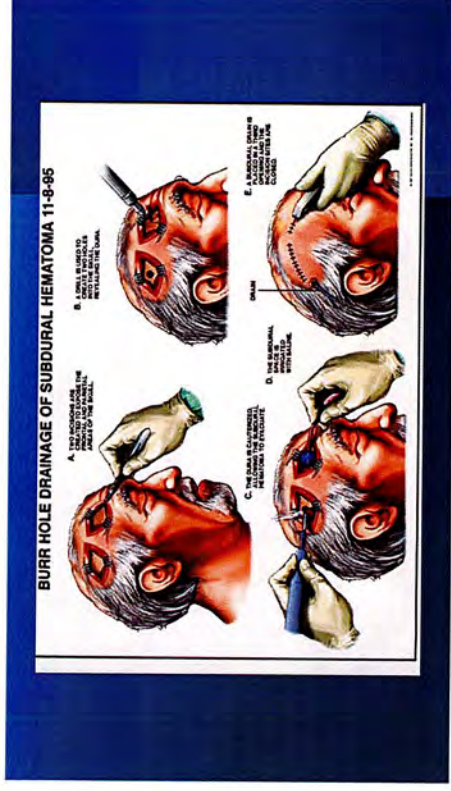
- Usually, a venous bleed
- Most common type of hematoma
- Present with signs of:
 - Increasing ICP
 - Decreasing LOC
 - Ipsilateral pupil dilation
 - Contralateral hemiparesis

Subdural Hematoma

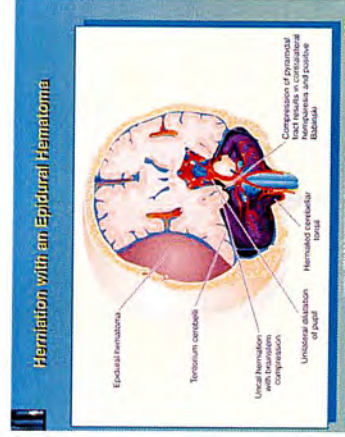
- May occur spontaneously in patients on anticoagulant therapy or in those with clotting dysfunction
- CT provides diagnosis
- Surgery is treatment of choice



101



102



103

Epidural Hematoma

True neurosurgical emergency

- Associated with temporal or parietal skull fractures
- Laceration of middle meningeal artery



104

- Clinical manifestations may include:
 - Short period of unconsciousness,
 - Followed by lucid period
 - Then ↓ LOC:
 - ✗ Increasing restlessness, agitation, and confusion
 - ✗ ↓ GCS
 - ✗ Ipsilateral pupil dilation
 - ✗ Cushing's Triad: ↑ BP, ↓ heart rate, widening pulse pressure, change in breathing pattern
 - Nausea/vomiting during period of lucidity

Question

Viruses that can cause viral meningitis include which of the following:

1. HIV and varicella zoster
2. Influenza and herpes simplex type 2
3. Measles and mumps
4. All of the above

109

For most patients, Guillain-Barre' syndrome typically begins with...

1. Descending tingling and weakness that starts in the face or neck
2. Ascending, relatively symmetric flaccid weakness
3. Instability when walking and paralysis
4. Elevated heart rate and high or low blood pressure

Question

111

Question

Upon reviewing the MRI of an elderly patient who suffered a stroke to the right hemisphere of the brain, you can expect:

1. Weakness to the left side of the body
2. Weakness to the right side of the body
3. Weakness to both sides of the body

110

Question

Which treatment seems to reduce the autoimmune response that occurs with GBS if given in the first two weeks of disease onset?

1. Antibiotics
2. Corticosteroids
3. IV immunoglobulin therapy & plasmapheresis (plasma exchange)
4. Intubation and mechanical ventilation

112

Myasthenia gravis is a chronic disease that results from an autoimmune response that destroys _____ receptors at the neuromuscular junction, causing _____.

1. Muscarinic; muscle contraction
2. Adrenergic; muscle contraction
3. Acetylcholine; muscle weakness
4. Neuromuscular; muscle weakness

Question

113

A neurologist is conducting a Tension test using Edrophonium on a patient who is experiencing unexplained muscle weakness, diplopia, and slurred speech. Which of the following findings would indicate that the patient has myasthenia gravis?

1. The patient experiences nausea and vomiting.
2. The patient experiences wheezing and shortness of breath.
3. The patient experiences improved muscle strength.
4. The patient experiences worsening of the muscle weakness.

Question

114

Which MG patient is most at risk for developing a cholinergic crisis?

1. A patient that recently had knee surgery and developed pneumonia.
2. A patient who reports taking too much of their anticholinesterase medication.
3. A patient who reports forgetting to take their Pyridostigmine medication for several days.
4. A patient who is not receiving adequate amounts of their anticholinesterase medication.

Question

115

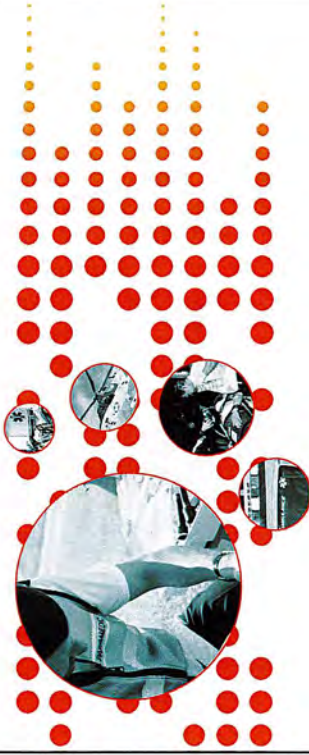
The best way to prevent febrile seizures in children is to:

1. Make sure they get enough sleep
2. Make sure they get enough stimulation
3. Make sure to keep fever down with tepid bath
4. Make sure to keep fever down with antiepileptics

Question

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CEN Review Course



Little Rock Critical Care Program & Arkansas Heart Hospital
November, 2025
Coordinator: Lynnette Flynn

1

Cardiovascular Emergencies 20%

2

Cardiovascular Emergencies

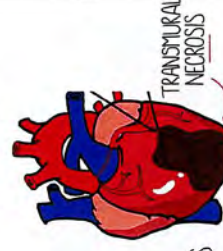
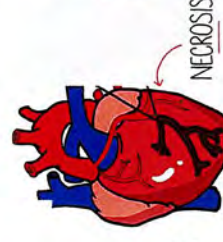
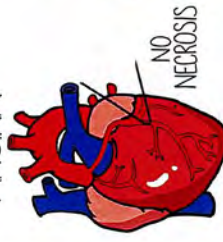
Acute Coronary Syndrome

Description & Presentation:

- Decreased myocardial perfusion
 - May be Angina *Pain relieved with TNG and/or rest*
 - Negative enzymes
 - ST segment depression with symptoms
 - Stable
 - Reproducible with increased workload
 - Unstable
 - New onset, occurs with less workload, after meals or sleep
 - NSTEMI *Pain not relieved with TNG / rest*
 - + enzymes, non-transmural, dynamic ECG Δ
 - STEMI *Pain not relieved with TNG/rest*
 - + enzymes, transmural, ST elevation
 - Develops Q waves as muscle dies



UNSTABLE ANGINA vs NSTEMI vs STEMI



4

3

Lead	Location	Artery	Noted Sx.	
II, III, avF	Inferior	RCA	Nausea, hypotension Bradycardia	Watch for RV and post wall involvement
V1-V6	Anterior	LAD	VT/VF Pulmonary edema	Watch for advanced blocks if V1-V3 are involved (septal)
I, avL	Lateral	Circumflex	Commonly not seen on ECG	
V7-V9	Posterior	RCA or LCX	Suspect when ST depression in V1-V3	
V1R-V6R	Right Ventricle	RCA	Hypotension with TNG/MISO4	



5

Pain



- **P** Provocative or Palliative
- **Q** Quality
- **R** Region or Radiation
- **S** Severity &
 - associated Symptoms
- **T** Timing

6

Provocative or Palliative



- **Ischemic onset causes:**
 - Exertion is classic onset
 - Cold
 - Emotions
 - Intercourse
 - Smoking
 - Meals eating=UGI, swallowing=esophageal
- **Non Ischemic chest pain**
 - GI with meals, gallbladder, Hiatal hernia, reflux
 - Dissection burning ripping tearing, radiates to back
 - PE localized with finger, occurs with SOB
 - Pericarditis changes with position
 - Musculoskeletal
- **Palliation** TNG, rest GI cocktail position change

7

Quality



- Squeezing, tightness, pressure, dull **Cardiac**
- Localized, sharp stabbing **PE**
- Burning, ripping, tearing **Dissection**

Region - Radiation

- Localized **Pulmonary**
- Diffuse **Cardiac**
- → to neck, jaw, teeth, arms, shoulder **Cardiac**
- → to several areas **Cardiac**

8

Severity & associated Symptoms

Severity	Associated Symptoms
0	No Hurt
2	Hurts Little
4	Hurts Little More
6	Hurts Even More
8	Hurts Whole Lot
10	Hurts Worst

zero to worst imaginable

- **1-10 scale**
- **Symptoms**
 - Nausea/vomiting
 - Diaphoresis
 - Dysrhythmias
 - Exertional dyspnea
 - Fatigue / Weakness
 - Dizziness / Light-headedness

Sx = Syncope/Palpitations

9

Timing



- **Crescendo pattern**
 - Cardiac
 - Esophageal
- **Abrupt, most intense initially**
 - Pneumothorax
 - Aortic dissection
 - Acute PE
- **Duration**
 - Ischemia: minutes, not seconds, days or weeks
 - MI: > 20 minutes
 - common in the arm due to SNS tone pattern not followed in diabetics or BBLkr
- **Elderly** – 50% atypical symptoms
 - Exertional dyspnea (most common)
 - Fatigue, syncope, nausea, anorexia, confusion or SOB at rest

Ask questions with options, do not lead to answers

[Pain summary flow diagram](#)

10

Cardiovascular Emergencies

Acute Coronary Syndrome

Presentation: Chest pain above the waist

- **Other symptoms:**
 - SOB
 - Diaphoresis
 - Nausea
 - Indigestion
- **Onset:**
 - Activity
 - Anxiety
 - Sex
 - Heavy meal
 - Smoking
 - At rest



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Cardiovascular Emergencies

Acute Coronary Syndrome

Treatment: O₂, IV, Monitor

- **MONA – BATH**
 - Morphine, Oxygen, TNG, ASA
 - Beta blocker IV then PO
 - ACEi if EF < 40%
 - Heparinoid
- **IIB/IIIA if PCI planned**
- **Positive enzymes (STEMI or NSTEMI)**
- **PCI if D to B < 90 minutes**
- **Thrombolytics if PCI unavailable**



12

Aneurysm Dissection



Artery Wall

Aortic lumen

Aortic aneurysm

Aortic dissection

Aortic lumen

Aortic aneurysm

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Cardiovascular Emergencies

Aneurysm/dissection

Description:

- Bulging or tearing of all or part of the aorta wall
- when diameter > 6cm thoracic or 5cm abdominal, rupture and death likely

Classification of aortic dissection

DeBakey I	DeBakey II	DeBakey III
Stanford A (Proximal)	Stanford A (Proximal)	Stanford B (Distal)

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Cardiovascular Emergencies

Aneurysm/dissection - Presentation:

- Pain always burning, ripping searing, continuous and severe - radiates to back, neck or shoulders. Writhing in pain.
- Other Sx. Hypotension, diaphoresis, syncope, unequal pulses



Normal

Root

Ascending

Fusiform

Type A

Type B

Directions

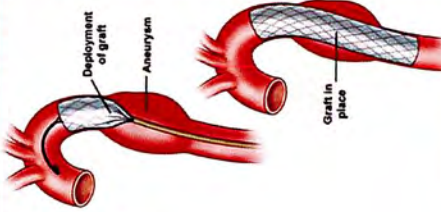
15

Cardiovascular Emergencies

Aneurysm/dissection

Treatment:

- Control BP - goal 100-120
- OR or cath lab repair
- Check bilateral pressures - one may be lower due to decreased perfusion.



Deployment of graft

Aneurysm

Graft in place

16

Cardiovascular Emergencies

Cardiopulmonary arrest

Know your ACLS algorithms

- **Bradycardia:** Atropine, Epi, Pacing, Dopamine
- **Tachycardia - Narrow:** Adenosine 6, 12; Calcium channel blockers, Amiodarone, Cardioversion
- **Tachycardia - Wide:** Amiodarone 150, Cardioversion with a pulse, defib if no pulse
- **Vfib:** CPR with Immediate defibrillation, Epi 1mg after 2nd shock, amio 300 after 3rd shock
- **PEA:** Epi 1 mg q3-5" and find/fix cause

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Cardiovascular Emergencies

Endocarditis

Description:

- Acute or chronic infection of the endocardial surface including the valves, chordae tendineae, septum and mural endothelium.
- Left side more common, right
- Usually due to IV drug abuse.



18

Presentation:

- Fever > 100.4
- Signs of infection & arterial occlusion
- Petechiae and thrombocytopenia, splenomegally
- Osler's nodes - small tender red raised nodules on finger and toe pads

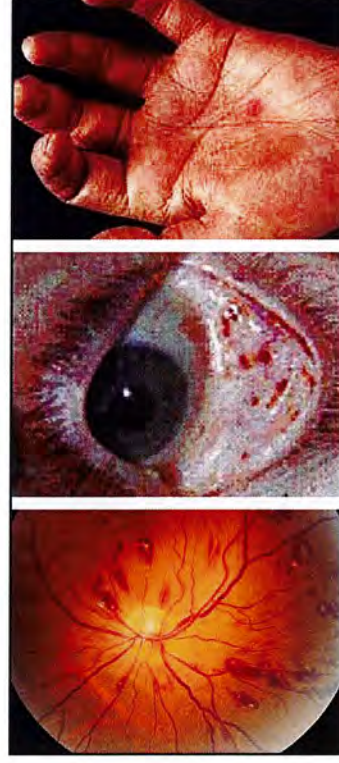


19

Cardiovascular Emergencies

Endocarditis Presentation:

- Roth's spots - round oval white spots on the retinae
- Janeway lesions - large nontender nodules on palms of hands toes and soles of feet
- Purpuric pustular skin lesions from emboli
- Hf: sx due to valvular regurg



20

Cardiovascular Emergencies

Endocarditis

Treatment:

- Antipyretics
- Blood cultures, antibiotics
- Push fluids (unless in HF)
- Protect endothelium from harm

21

Cardiovascular Emergencies

Heart Failure Presentation:

Systolic = decreased contractility (HFrEF)

Diastolic = Decreased relaxation or increased stiffness (HFpEF)

Left sided = wet lungs, crackles, arterial hypoperfusion

Right sided = venous engorgement, NVD, hepatic engorgement

Ordered shutdown – Diving reflex
Skin, Peripheral pulses, gut, kidneys, liver, brain

23

SYSTOLIC DYSFUNCTION

IMPAIRED CONTRACTILITY

THIN/WEAK HEART MUSCLE

53 GALLOP

LOW EJECTION FRACTION

SYS-TOL-IC

SYSTOLIC AND DIASTOLIC DYSFUNCTION CAN APPEAR IN COMBINATION

IMPAIRED FILLING/RELAXATION

STIFF/TICK HEART MUSCLE

54 GALLOP

NORMAL EJECTION FRACTION

DIAS-TOL-IC

Heart Failure Description:

- Right or left sided
- Systolic or diastolic
- Reduced EF or preserved EF
- Failure of the heart to generate forward flow

Cardiovascular Emergencies

DIASTOLIC ETIOLOGIES: ISCHEMIC HEART DISEASE, CHRONIC HYPERTENSION, DILATED CARDIOMYOPATHY, AND MYOCARDITIS

DIASTOLIC ETIOLOGIES: HYPERTENSION WITH LV HYPERTROPHY, RESTRICTIVE AND HYPERTROPHIC CARDIOMYOPATHIES, FIBROSIS, AMYLOIDOSIS, SARCIDOSIS, CONSTRUCTIVE PERICARDITIS, HEMOCHROMATOSIS, VALVULAR DISEASE, AND AGING

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22

Rapid Assessment of Hemodynamic Status

Estimate GFR: Rev Cardiology

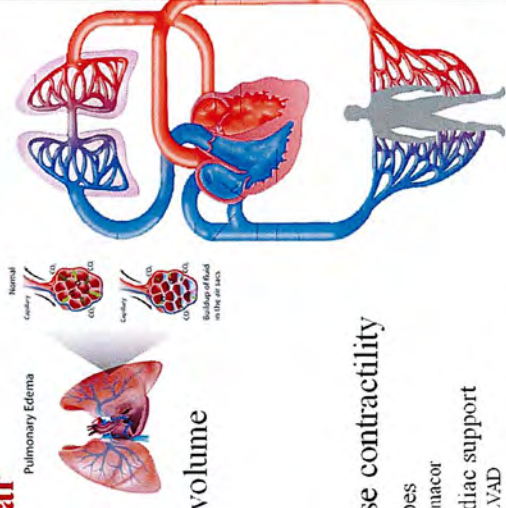
24

Cardiovascular Emergencies

Heart Failure

Treatment:

- **Wet** – reduce volume
 - elevate HOB,
 - diuretics,
 - BiPAP,
 - vasodilators
- **Cold** – increase contractility
 - positive inotropes
 - dobutamine, primacor
 - mechanical cardiac support
 - IABP, ECMO, LVAD



25

Cardiovascular Emergencies

Hypertension

Description:

- BP > 140/85
- Extreme may cause stroke or left sided HF
- Always r/o CVA, amphetamine as causative factor

Presentation:

- Hypertensive, tachycardic, ACS, acute LVF

Treatment:

Decrease arterial tension with arterial dilators or alpha antagonists –

- *Nitride* is most commonly used. Nitride breaks down to thiocyanate and needs to be protected from light.
- *Cardene* (Calcium Channel blocker)
- *Beta Blockers* (Metoprolol, Atenolol etc)



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Cardiovascular Emergencies

Pericardial Tamponade

Description:

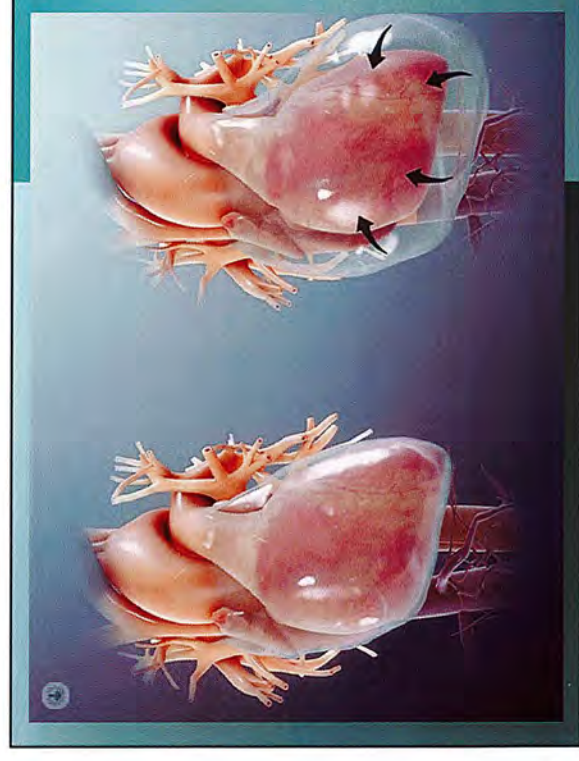
Obstructive shock due to prevention of the heart from filling during diastole due to compression

May be caused by:

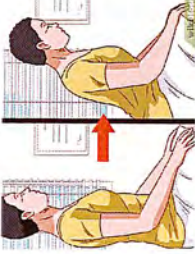
- Pericarditis
- Trauma
- Hemo/pneumothorax
- Pericardial effusion
- Tumor



27



28




Cardiovascular Emergencies

Pericardial Tamponade

Presentation:

- Tachycardia, venous engorgement, *distant heart sounds, *pulsus paradoxicus, positional chest pain
- Very preload dependent – if venodilator given, rapid decompensation
- ECG S2Q3T3 pattern
- Beck's triad (*muffled heart sounds, venous engorgement, hypotension*)

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Cardiovascular Emergencies

Pericardial Tamponade

Treatment:

- Emergent decompensation treat with volume to support preload and relief of obstruction with pericardiocentesis.
- Subxyphoid stick to drain pericardium
- Large volume returns indicate likely a chronic condition

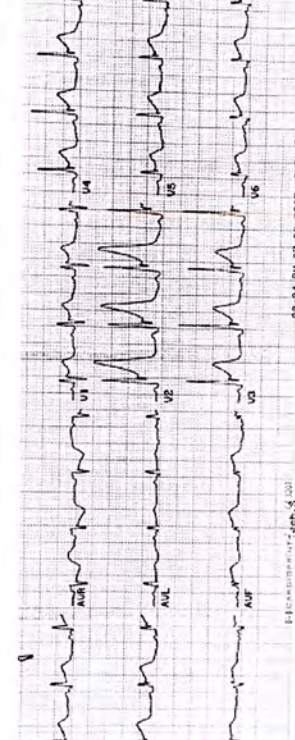
30

Cardiovascular Emergencies

Pericarditis

Description:

infection of pericardium



31

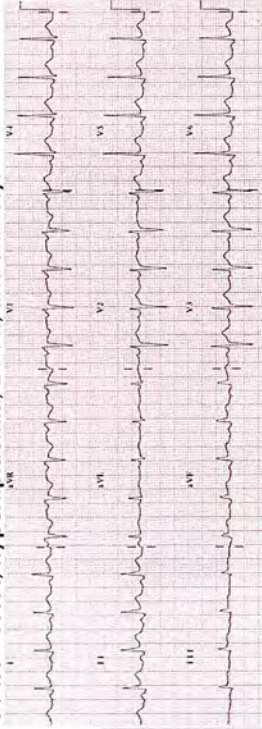
Cardiovascular Emergencies

Pericarditis Presentation

- Positional chest pain - *trapezius ridge pain, friction rub, Kussmaul's sign - JVD on inspiration
- Hepatojugular reflux
- * heartsounds muffled and distant
- May have elevated troponin, moderate leukocytosis, increased sed rate, CRP
- **equalization of pressures in cardiac chambers, CVP = RV diastolic = PA diastolic = PaOp
- Beck's triad - *low blood pressure (weak pulse or narrow pulse pressure) muffled heart sounds. raised jugular venous pressure*

32

A 45-y/o M presents with a 1D hx. of chest pain. The patient's PMH = HTN, hyperlipidemia, DM II, and anxiety.



The ECG is shown above. What is the likely diagnosis?

- Myocarditis
- Pericarditis
- Pneumothorax
- ST elevation myocardial infarction

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Cardiovascular Emergencies

Pericarditis

Treatment:

- Get cultures
- ANA test
- BUN
- test for TB
- Pericardiocentesis
- Echo
- CT
- MRI

Pain can usually be treated with **OTC NSAIDS aspirin or ibuprofen**

Prescription-strength pain relievers also may be used.

Colchicine (Colcrys, Mitigare) reduces inflammation.

34

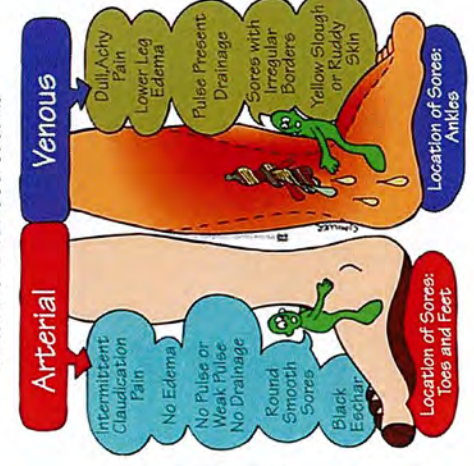
Cardiovascular Emergencies

Description:

- Arterial** = decreased blood flow to a body part due to atherosclerosis of an artery
- Venous** - diminished blood return due to venous insufficiency

PERIPHERAL VASCULAR DISEASE (PVD)

ARTERIAL vs VENOUS ULCERS



Arterial

- Intermittent Claudication
- Pain
- No Edema
- No Pulse or Weak Pulse
- No Drainage
- Round Smooth Sores
- Black Eschar
- Location of Sores: Toes and Feet

Venous

- Dull/Achy Pain
- Lower Leg Edema
- Pulse Present
- Drainage
- Sores with Irregular Borders
- Yellow Slough or Bloody Skin
- Location of Sores: Ankles

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Cardiovascular Emergencies

Peripheral Vascular Disease

Presentation:

- Arterial - 6 Ps, Pallor, Poikilothermia, pulseless, pain, parasthesias, paralysis



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Cardiovascular Emergencies

Shock Cardiogenic Causes

- Left ventricular infarct
- Right ventricular infarct
- Endocarditis of mitral valve
- Ventricular tachycardia

41

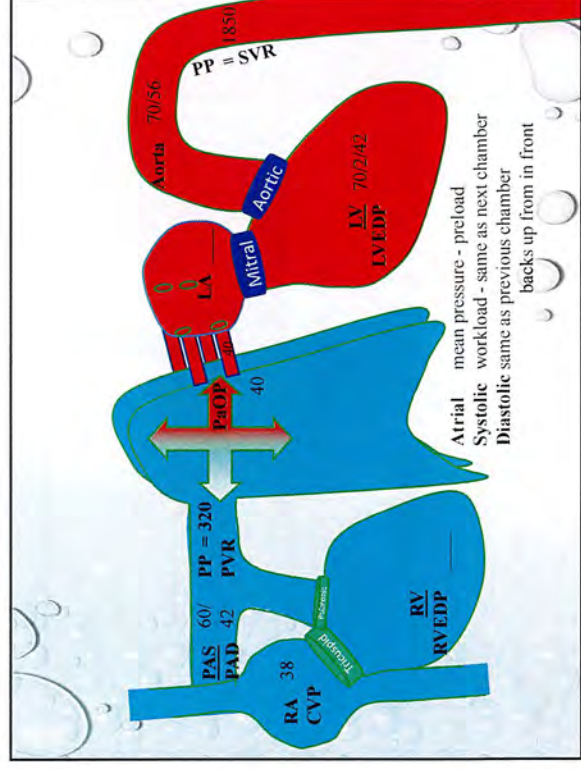
Case two

Your patient had a massive anterior MI and has gotten progressively short of breath. His hemodynamics are:

Preload		Afterload		Output	
HR	130	RR	36	PAP	60/42 (20/8)
CVP/RA	38 (8)	PVR	320 (250)	B/P	70/56 (120/80)
PaOP	40 (8)	SVR	1850 (800-1200)		

What is the problem?
 What type of shock?
 What are the priorities for treatment?
 What is the best position for this patient?

42



43

Cardiovascular Emergencies

Shock – Cardiogenic & Obstructive

Presentation:

Obstructive: PE VCI, ^CVP, ^SVR, vPaOP Narrow pp

- Tx: relieve obstruction with embolectomy or thrombolytic
- EKOS
- Fluids until obstruction relieved
- <https://youtu.be/EHrWNnCFKJE>

44

• An elderly female client presents to the ED with c/o chest pain and a history of angina. After initial triage, what would be the next appropriate interventions?

- A. Cardiac monitor, oxygen and sublingual nitroglycerine
- B. Cardiac monitor, sublingual nitro and foley catheter
- C. Cardiac monitor, IV, oxygen and sublingual nitroglycerine
- D. Oxygen, sublingual nitroglycerine and foley catheter

49

• What constitutes the description or definition of ventricular tachycardia?

- A. One or two premature ventricular contractions in a one-minute span
- B. Any heart rate over 100
- C. A run of three or more PVCs with or without symptoms
- D. Two PVCs together as a couplet

50

• Which rhythm would be identified on an ECG/EKG 6 second strip by a heart rate of 76 and a PR interval of 0.24, the P:QRS ratio is 1:1 and the P and the QRS are normal and regular?

- A. Sinus arrhythmia
- B. First degree AV block
- C. Sinus rhythm
- D. Second-degree type I block

51

• Which rate may indicate possible paroxysmal supraventricular tachycardia from what is understood about normal vital signs?

- A. One hundred thirty beats per min in a three-year-old
- B. One hundred beats per min in an adult with anxiety
- C. One hundred and fifty beats per min in a newborn
- D. One hundred and thirty beats per min in an adult

52

41. A patient presents in cardiogenic shock. The patient has a long history of heart failure, dysrhythmias, and valvular issues. The patient is in SVT with a heart rate of 200. No ST elevation noted on ECG. The patient is extremely dyspneic. Which of the following treatments would NOT be appropriate at this time?

- ☐ mechanical ventilation
- ☐ initiate hemodynamic monitoring
- ☐ antidysrhythmics
- ☒ thrombolytics

50. Which of the following medications for tachycardia can cause a brief episode of asystole after IV administration?

- ☐ atropine
- ☒ adenosine
- ☐ lidocaine
- ☐ verapamil

53

29. A client is in the ED after a blunt cardiac injury when the nurse notes a rhythm change. On investigation the nurse realizes the patient is having pulseless electrical activity (PEA). After CPR has been in progress for some time, without successful resuscitation the physician decides to do an emergency thoracotomy. Which of the following is NOT true about this procedure?

- ☐ closed chest compression should continue until the incision is made.
- ☐ incision is usually anterolateral into the 4th intercostal space.
- ☒ keep ventilating the patient during the opening of the pleura.
- ☐ be prepared to remove clots from a hemothorax manually, with suction and towels.

33. Which of the following would NOT be considered a major risk factor for coronary artery disease?

- ☐ smoking
- ☒ female sex
- ☐ hypertension
- ☐ diabetes

54

24. A client with asystole has been intubated and had an IV placed. What is the first medication to be used in the code for this client?

- ☐ bretylium
- ☐ morphine
- ☒ epinephrine
- ☐ cardizem

27. What infectious heart condition is commonly seen in IV drug users?

- ☐ pericarditis
- ☐ cardiac tamponade
- ☒ endocarditis
- ☐ myocarditis

55

Cardiovascular

•Questions?

56

Dr. David Warner

Associate Professor UAMS

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Ocular Emergencies

1

LRCOP Certified
Emergency Nurse
Review Course
August 8-10, 2023

Ocular Emergencies

B. Ocular

1. Abrasions
2. Burns
3. Foreign bodies
4. Glaucoma
5. Infections (e.g., conjunctivitis, iritis)
6. Retinal artery occlusion
7. Retinal detachment
8. Trauma
9. Ulcerations/keratitis

2

Abrasions

Symptoms

- Pain
- Intense Photophobia
- Tearing

Diagnosis

- Topical anesthetic prior to testing for visual acuity
- Fluorescent staining and exam with cobalt blue light
- Eversion of lid to check for foreign body
- Examine cornea and assess anterior chamber with slit lamp

Treatment

- Cycloplegic agent to relieve spasm and pain (*cyclopentolate 1%*)
- Erythromycin ophthalmic oint 4x/d
 - With or without eye patch if r/t contact lens
 - Without eye patch if r/t organic source
- Tobramycin ointment 4x/d without patch if r/t contact lens

3

Chemical Eye Burns

Symptoms

- Pain
- Blurring of vision
- Tearing
- Edema of eyelids

Diagnosis

- History of event
- Eye exam showing cornea irritation

Treatment

- Irrigation of eye and other areas of contact with copious amounts of water or normal saline
- Litmus paper exam of eye to determine residual pH
- Continue irrigation until pH returns to neutral
- Cycloplegic agent to relieve spasm and pain: (*Cyclopentolate 1%*)
- Antibiotic ointment to prevent infection

4

Foreign Bodies



Symptoms

- Mild to severe distress
- Mild to moderate conjunctival irritation
- Tearing/blinking
- Visible rust ring if metallic (2-4 hrs)

Diagnosis

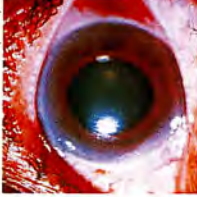
- Visual acuity normal or slightly abnormal
- Fluorescein stain abnormal
- Slit lamp exam
- Orbital CT scan
- MRI contraindicated if metallic

Treatment

- Gentle eye irrigation with NS
- FB removal with wet cotton swab, 25 GA needle or FB spud
- Rust ring removal with ophthalmic drill
- Topical anesthetic, analgesics, narcotics, tetanus

5

Acute Angle-Closure Glaucoma



Symptoms

- Periorbital eye pain
- Headache, N/V
- Decreased visual acuity with halos

Diagnosis

- Intraocular pressure 21-50mmHg
- Edema of epithelium of cornea, pupil nonreactive and mid-dilated with shallower anterior chamber

Treatment

- Topical beta-blocker (timolol 0.5%, 1gtt)
- Topical alpha-adrenergic agonist (apraclonidine 1%, 1gtt)
- Topical steroid (prednisolone 1%, 1gtt q15 min for 1hr then QH)
- Acetazolamide 500 mg IV or PO
- Mannitol 1-2 G/Kg IV
- Pilocarpine 1-2% after pressure reduced & before iridotomy
- Monitor intraocular pressure every 30-60 min

6

Infections-Infections Conjunctivitis



Bacterial or Viral

- Staph, Strep, Pneumococci or viruses
- Extremely contagious

Symptoms

- Red swollen itchy conjunctiva
- Eye pain
- Purulent discharge
- Scratchy feeling under eyelids
- Mild photophobia

Treatment

- Antibiotic drops or ointment & cool compresses
- Clears in 3-5D

7

Infections-Anterior Uveitis (Iritis)



r/t autoimmune disorders, MS, Reiter syndrome, Juvenile idiopathic arthritis and Chron's disease

Symptoms

- Pain and Headache
- Photophobia with increased pain
- Reddening of eye
- Irregularly shaped pupil
- Decreased visual acuity

Diagnosis

- WBCs shed into anterior chamber
- Graded 1-4
- Shining a bright light in unaffected eye causes affected eye pupil to constrict with increase in pain

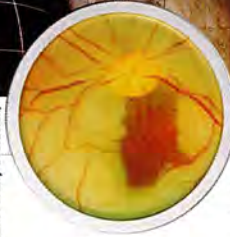
Treatment

- Topical anesthetic and steroid
- Cycloplegic agent to relieve spasm and pain
- Dark glasses to reduce photophobia
- Analgesia: Acetaminophen or ibuprofen

8

Retinal Artery Occlusion CRAO

- Symptoms**
 - Sudden painless vision loss on one side
 - History of episodes of temporary visual deficits
- Diagnosis**
 - Slit lamp exam shows whitening of retina in affected area
 - Sometimes shows retinal edema,
 - Embolus may be visible with BRAO (*branch retinal artery occlusion*)
 - ESR to r/o temporal arteritis
 - CBC to evaluate for blood disorders
 - Blood culture to r/o endocarditis or sepsis
 - Fluorescein angiography
- Treatment**
 - Supportive without intervention
 - TPA may be used for CRO
 - Transluminal YAG laser embolysis to clear embolus



9

Retinal Detachment

- Symptoms**
 - Painless visual changes such as:
 - floaters, cobwebs, photopsia (flashes of light)
 - Shadow over vision
 - Loss of central vision
- Diagnosis**
 - Assess visual acuity
 - Dilated fundus exam with indirect ophthalmoscope and Goldman 3-mirror for detailed retinal diagram
- Treatment**
 - Generally requires a referral to retinal surgeon for surgical repair



11

Retinal Detachment

Occurs when the Retinal pigment epithelial layer separates from the underlying sensory layer.

4 types:

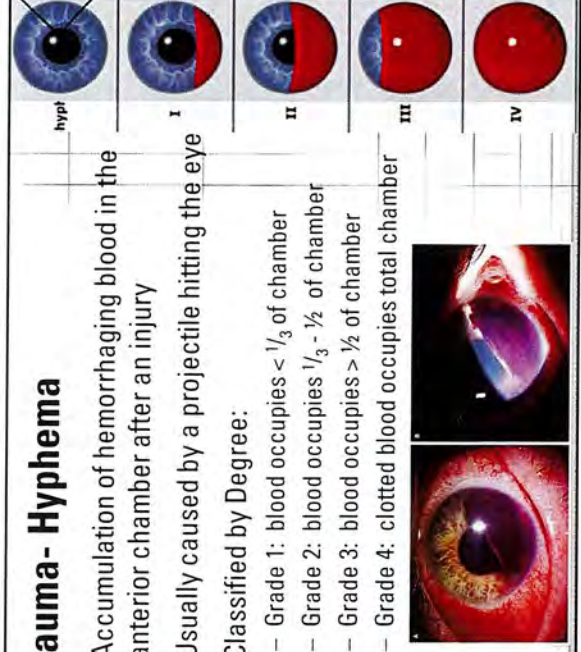
- Rhegmatogenous**
 - A tear occurs in the sensory retina and liquid vitreous seeps through detaching the RPE
- Traction**
 - Bands of scar tissue provide traction that pulls on retina
 - Usually r/t diabetes, vitreous hemorrhage or retinopathy of prematurity
- Exudative**
 - The choroid produces serous fluid under the retina, usually r/t uveitis or macular degeneration
- Combination**



10

Trauma- Hyphema

- Accumulation of hemorrhaging blood in the anterior chamber after an injury
- Usually caused by a projectile hitting the eye
- Classified by Degree:
 - Grade 1: blood occupies $< \frac{1}{3}$ of chamber
 - Grade 2: blood occupies $\frac{1}{3} - \frac{1}{2}$ of chamber
 - Grade 3: blood occupies $> \frac{1}{2}$ of chamber
 - Grade 4: clotted blood occupies total chamber



12

Trauma- Hyphema

Symptoms

- Intraocular pressure > 22 mmHg initially followed by reduction in 2-6 days Grades 1-3.
- Rebleeding may occur esp in children and African-Americans

Treatment

- Patch and shield
- Tylenol for pain (avoid NSAIDS)
- Topical steroids
- Systemic aminocaproic acid to prevent 2° bleed
- Anti-glaucoma topical med i.e. brimonidine for IOP

13

Trauma- Penetrating or Blunt Ocular Trauma with Ruptured Globe

Symptoms

- Laceration of eyelid
- Shallow anterior chamber
- Pain varies in intensity, but may be severe
- Difficulty viewing optic nerve on exam
- Irregularity of pupil, esp. teardrop shaped
- Decreased visual acuity
- Hyphema

Diagnostic

- Careful eye exam
- Tetanus toc as needed
- Waters view x-ray to confirm FBO
- CT scan, MRI or ultrasound to confirm rupture

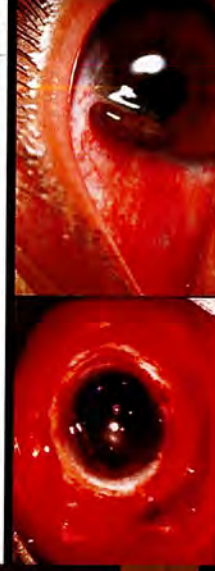


14

Trauma- Penetrating or Blunt Ocular Trauma with Ruptured Globe

Treatment

- DO NOT check IOP
- Place metal eye shield over eye for protection
- Administer cephalosporin
- Refer to ophthalmologist for surgical repair



15

Trauma- Laceration of the Eyelid

Five layers of the eyelid

- Skin
- SQ tissue
- Muscle
- Tarsal Plate
- Conjunctiva

Superficial horizontal lacerations are sutured in ED others refer to ocular plastic surgeon/Ophthalmologist

Treatment:

- Local anesthesia
- Wound irrigation with NS prior to suture
- Suture with 6-0 or 7-0 coated or plain nylon suture to be removed in 3-5 days
- Ophthalmic topical abx. in place of dressing



16

Trauma- Orbital Fractures

Occurs when blunt force against the globe causes a rupture through the floor of the orbital bone or a direct blow to the orbital rim

Symptoms

- Ecchymosis and edema of eyelid
- Infraorbital anesthesia from pressure or damage to infraorbital nerve
- Decrease sensation of cheek and upper gum on injured side
- Diplopia
- Enophthalmos (sunken globe)

Diagnosis

- Slit lamp and vision exam
- IOP measurement
- CT scan

17

Trauma- Orbital Fractures

Treatment

- Topical steroids for severe edema
- Patient advised not to blow nose for several wks.
- Surgical repair about two weeks after injury when edema subsides for extensive fracture (>33% of floor) or enophthalmos > 2 mm remaining 10-14 days post injury

18

Trauma- zygomatic fractures

- Involves the arch of bone that forms lateral border of the eye orbit and bony cheek.
- Associated with a blow to the lateral cheek
- May result in a tilting of the eye and flattening of the cheek



Diagnosis

- By CT scan

Treatment

- Refer to surgeon for open reduction with fixation and exploration and reconstruction as needed

19

Ulcerations/Keratitis

Inflammation of the cornea
May be superficial or deep (results in scarring)

Types include:

- bacterial, fungal, viral or parasitic
- Allergic type due to antigens and photokeratitis from UV ray exposure
- May arise from contact lenses
- Ulceration can allow pathogens to cause infection

Symptoms

- Pain and tearing
- Photophobia
- Decreased visual acuity
- Discharge

Diagnostic

- Careful exam with slit lamp
- Culture of discharge

20

Treatment

- Antifungal or antibacterial gtts as indicated
- Trifluridine Q 2-3 hours while awake to max of 9 gtts daily for herpes simplex until healing, the 4x/D for 1 week
- Artificial tears
- Analgesia



INFECTIOUS KERATITIS

Adenoviral keratitis, Bacterial keratitis, Acanthamoeba, Herpetic Keratitis, Fungal keratitis

21

Ultraviolet Keratitis

Injury to the corneal epithelium from exposure to UV rays from the sun

- Snow blindness
- Artificial light sources, tanning beds, halogen lights, welding torches

• **Symptoms**

- Pain and tearing
- Photophobia
- Decreased visual acuity
- Spasm of eyelids
- Exam shows punctate irregularities of corneal surface and corneal haze

• **Diagnostic**

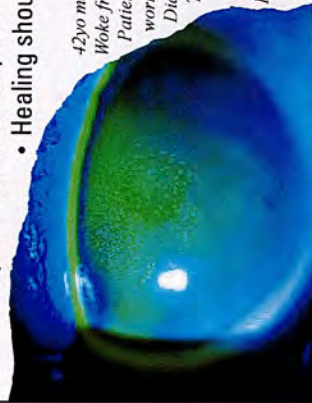
- Get accurate history that details exposure to UV rays
- Exam of eye and lids
- Slit lamp exam with fluorescein staining



22

UV Keratitis Treatment

- Cycloplegic agent to relieve spasm and pain: cyclopentolate 1%
- Antibiotic ointment i.e. erythromycin
- Analgesia: Opiate and NSAIDS
- Topical NSAIDS may be used
 - Healing should be evident 24-48 hrs



42yo male with bilat eye pain. HR=110. Woke from sleep with bilateral eye pain. Patient is a welder and did not wear eye protection work the day prior.

Diagnosis is UV keratitis. VA=20-40 in both eyes. Treatment is supportive with pain control. Pain from UV keratitis can be severe. The damaged cornea regenerates in 3 days. Erythromycin ointment is suggested to act as a lubricant and antibiotic prophylaxis.

23

Questions?



24



Maxillofacial

Lynnette Flynn
Aug 2023
CEN Review

BLUEPRINT 2023-2024

6. Maxillofacial, Ocular, Orthopedic and Wound Emergencies	21
A. Maxillofacial	
1. Abscess (i.e., peritonsillar)	
2. Dental conditions	
2a Avulsions	
2b Dental fractures	
3. Epistaxis	
4. Facial nerve disorders (e.g., Bell's palsy, trigeminal neuralgia)	
5. Foreign bodies	
6. Infections (e.g., Ludwig's angina, otitis, sinusitis, mastoiditis)	
7. Acute vestibular dysfunction (e.g., labyrinthitis, Ménière's disease)	
8. Ruptured tympanic membrane	
9. Temporomandibular joint (TMJ) dislocation	
10. Trauma	

Abscess - Peritonsillar

Description:

- PTA
- Usually derived from tonsillitis
- Progresses from cellulitis to abscess between palatine tonsil and capsule
- Usually, bilateral at ages 20-30
- Often polymicrobial

Complications:

- Obstruction
- Rupture with aspiration
- Septicemia
- Endocarditis
- Epiglottitis



Palatine tonsil

Tonsils

Abscess - Peritonsillar

Symptoms:

- Fever
- Pain
- Hoarseness
- Muffling of voice
- Dysphagia
- Tonsillar edema
- Erythema
- Exudate
- Edema of palate with displacement of uvula

Diagnosis:

- Aspiration of purulent material
- CT with contrast, ultrasound
- On exam: Displacement of the uvula with enlarged tonsils



Uvula

Tongue

TONSILLITIS

Abscesses form the deeper tissue peritonsillar abscesses called

Peritonsillar Abscess (cont)

Treatment:

- Needle aspirations with needle penetrating 1cm or less to avoid carotid artery
- Abscess I & D
- IV volume replacement
- ABX: IV ampicillin-sulbactam or clindamycin until culture results return
- If MRSA add vancomycin
- Switch to oral abx. when signs of improvement noted (needs 14 days)



5

Anatomical and Clinical parts of Teeth



- www.Mometrix.com/academy
- 682627

6

Dental Avulsions



Description:

- Complete displacement of a tooth from its socket.
- Permanent teeth may be reimplanted within 1-2 hrs

Procedure:

1. Tooth transported from to ED in Hank solution
2. Clean with sterile NS or Hank sol. handling only the crown and avoid disruption of fibers
3. If tooth dry for 20-60 min
 - soak in Hank sol. for 30min before reimplantation
 - soak in citric acid for 5 min., stannous fluoride 2% for 5 min. and doxycycline sol for 5 min.
4. If dry > 60 min,
5. Remove clot in socket and gently irrigate with NS, Place into socket firmly, cover with gauze and have pt. bite firmly on gauze until splinting applied
6. Apply splinting material & mold packing over tooth & 2 adjacent teeth (#5)

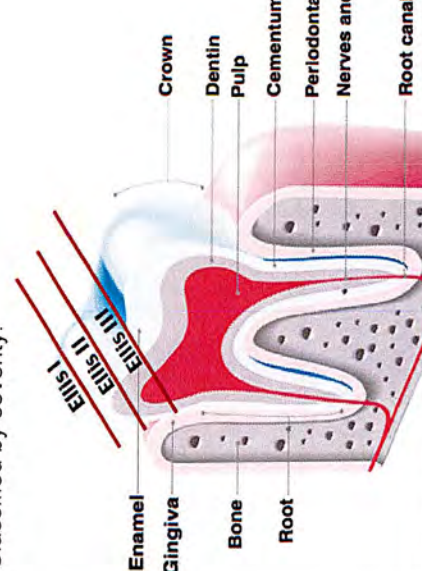
Component	Amount	Concentration
NaCl (mEq 58.44 grams)	1g	0.14 M
KCl (mEq 74.55 grams)	500 mg	0.005 M
CaCl ₂ (mEq 119.08 grams)	140 mg	0.001 M
MgSO ₄ ·7H ₂ O (mEq 246.47 grams)	100 mg	0.0004 M
MgCl ₂ ·6H ₂ O (mEq 203.303 grams)	100 mg	0.0003 M
Na ₂ HPO ₄ ·2H ₂ O (mEq 171.09 grams)	60 mg	0.0003 M
KH ₂ PO ₄ (mEq 136.096 grams)	60 mg	0.0003 M
Dextrose (Dextrose (mEq 182.166 grams)	1g	0.004 M
NaHCO ₃ (mEq 84.01 grams)	300 mg	0.003 M

7

Dental Fractures

Description: Maxillary most common.

Classified by severity:



8

Temporomandibular Fracture and/or Dislocation

Description:

- Can result from trauma, direct blow to the jaw, or chronic disorders
- Dislocations may be anterior (most common due to extreme mouth opening), posterior, lateral or superior

Symptoms:

- Acute pain
- Dysphagia
- Difficulty speaking
- Edema and rigidity of surrounding muscles
- Inability to open mouth



9

Temporomandibular Fracture and/or Dislocation

Diagnosis:

Complete head, neck, ear and dental exam

Radiography, x-rays or CT with significant trauma

Tongue blade test:

- Patient bites hard on tongue blade while examiner twists blade attempting to break it. If fracture present, patient opens mouth to release blade



10

Temporomandibular Fracture and/or Dislocation

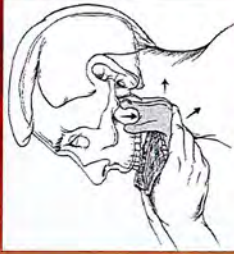
Treatment:

Short acting muscle relaxant

Narcotic analgesia/conscious sedation

Reduction:

- Pt on chair with head against hard surface
- Examiner in front of patient places thumbs in patient's mouth, posteriorly over the molars
- Pressure applied posteriorly and inferiorly
- Alternatively, examiner stands behind recumbent patient and applies pressure posteriorly and inferiorly



11

Nasal Fracture

Description: Results from blunt trauma. May be overlooked due to edema. Septal cartilage is often fractured as well as nasal bone

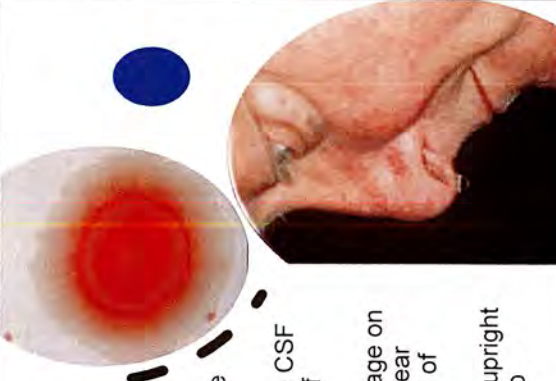
Symptoms:

- Edema
- Pain
- Crepitation
- Ecchymosis
- Deformity
- Nasal Bleeding



12

Nasal Fracture



Diagnosis:

- By clinical exam and otoscope
- X-rays not indicated
- Clear nasal discharge may be CSF from torn meninges from fx. of cribriform plate
- Place a drop of clear drainage on filter paper. Examine for clear area around a central stain of blood
- If CSF leak present, place upright and get CT scan with neuro consult.

13

Nasal Fracture



Treatment:

- Realignment if necessary
- Analgesia
- Nasal decongestant
- Protective covering
- Packing only for persistent epistaxis

14

Maxillary Fractures

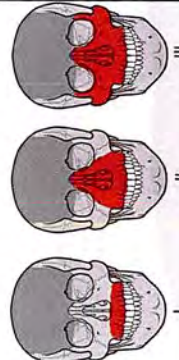
Description: Associated with significant other trauma

Classification:

- LeFort I: Horizontal (low downward force)
- LeFort II: Pyramidal (low or mid maxilla force)
- LeFort III: Transverse (force to bridge of nose/upper maxilla)

Symptoms:

- Malocclusion and open bite
- Apparent lengthening of face
- CSF rhinorrhea
- Periorbital ecchymosis



15

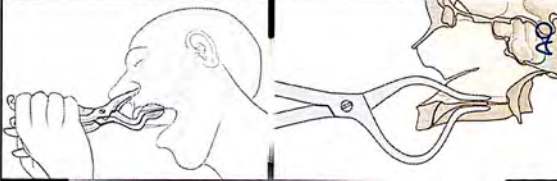
Maxillary Fractures

Diagnosis:

- Grasping and moving hard palate back and forth may shift the facial bones
- Complete head, neck, ear, oral and nasal exam with slit headlamp, suction as needed, nasal speculum and otoscope
- CT scans of face and brain

Treatment:

- Stabilize pt and ensure patent airway
- Disimpaction of displaced fragments manually
- Obtain pre-injury photo to guide surgical fixation
- Referral to surgeon for fixation



16



17



18

Recurrent Epistaxis

Description:

- Common in kids 2-10Y r/t picking, dry climate/central heat
- Common in 50-80Y r/t NSAIDS, anticoags, Kiesselback plexus in anterior nares very vascular
- Posterior bleed more dangerous
- Check H&H for any bleeding > :

Treatment:

- Upright position, leaning forward
- Apply pressure below nares/pin
- Severe bleeding: pack and top
- Humidifiers may decrease irrita

19

Bell's Palsy

Description:

- Inflammation of cranial nerve VII (facial)
- usually from herpes simplex I or II

Symptoms:

- Affects only one side
- Onset is sudden, peak sx. at 48 Hrs
- May persist for 2-6mos to year
- Mild weakness to complete paralysis with distortion of features
 - Drooping eyelid and mouth
 - Tearing in affected eye
 - Taste impairment

20

Trigeminal Neuralgia

Diagnosis:

- By history and neurologic exam

Treatment:

- **Carbamazepine** is the drug of choice.
Controls pain initially but effects decrease over time
- **Phenytoin** or **oxcarbazepine** may be used
- **Baclofen** (muscle relaxant) potentiates other drugs
- **Surgical Procedures** may be done if no response to meds



25

Foreign Bodies in the Ear

Description:

- ID type of FB before attempting removal.
May require conscious sedation. Irrigations should not be done if tympanic membrane is ruptured or cannot be seen.

Treatment:

1. Examine ear to determine if membrane is intact
2. Drown insects with 2% lidocaine and suction
3. Irrigate small nonorganics with pulsatile flow aimed at wall of the canal
4. Use cerumen loops, right-angle hooks or alligator forceps to remove
5. Carefully examine canal after removal for lacerations/abrasions
6. Topical abx if extensive abrasions or for organic material



26

Foreign Bodies in the Nares

Symptoms:

- Persistent obstruction, foul discharge or epistaxis is suggestive of foreign body. May require restraint or sedation to remove

Treatment:

1. Vasoconstrictor/topical anesthetic applied:

- 1mL phenylephrine with 3 mL lidocaine 4%
- Aerosolized racemic epi may be used for decongestion, to loosen foreign body
- Examine nares with speculum

2. Removal techniques

- Positive pressure: blowing nose on command.
- Block opposite nares and have caregiver blow puff of air in
- Use alligator or bayonet forceps to grasp
- Pass curette behind item, rotate and remove
- Pass Fogarty vascular catheter past item, inflate and pull



27

Ludwig Angina

Description:

- Cellulitis usually caused by strep or Staph of the submandibular spaces and lingual space that can obstruct the airway as swelling in the mouth floor pushes the tongue superior and posterior

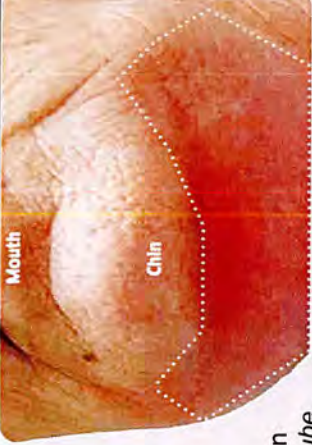
Symptoms:

- Poor dental hygiene and abscess (usually molar) that spread to soft tissue
- Dysphagia
- Odynophagia, trismus, edema of upper neck (midline)
- Erythema, stridor, and cyanosis (late signs of obstruction)
- Changes in mental status
- Double tongue appearance



28

Ludwig Angina



Treatment:

- Nasotracheal intubation
**may need fiberoptic tube*
- IV antibiotics, i.e. penicillin or clindamycin
- Referral to surgeon for I & D

Clinical

- Pain, drooling, dysphonia
- Brawny neck edema
- Bilateral submandibular swelling
- Tongue protrusion or elevation

Management

- Emergent ENT/Oral surgery consultation
- Broad spectrum ABX and airway management

29

Otitis Externa



Description:

- Infection of the external ear canal, either bacterial or mycotic. Bacteria, pseudomonas, staph, fungi, aspergillus or candida may cause. Chlorine in pools kill normal flora. Fungal inf may be seen in immune disorders, diabetes and steroid use.

Symptoms:

- Pain, swelling and exudate
- Red pustular lesions
- Itching (pronounced with fungal inf)
- Black spots over tympanic membrane with fungus

30

Otitis Externa



Diagnosis:

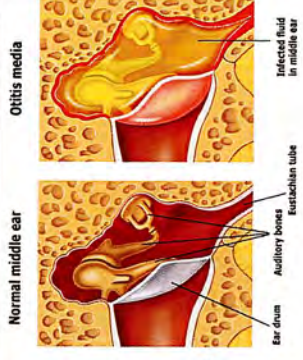
- Tenderness when touched on tragus or when auricle is pulled
- Erythema
- History

Treatment:

- Irrigate with Burrow's sol or NS to clean and remove debris or FBOs
- Bacteria:** ABX ear gtt's i.e. ciprofloxacin and ofloxacin.
- If impetigo, flush with peroxide 1:1 sol and apply mupirocin BID for 5-7D
- Lance pointed furuncles
- Fungus:** Solution of boric acid 5% in ethanol; clotrimazole-miconazole sol with/without steroid for 5-7D
- Analgesics as needed

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Otitis Media



Description:

- Inflammation of the middle ear, usually follows URI or allergic rhinitis. Eustachian tube swells and prevent passage of air. Fluid pools in the middle ear causing infection. Pathogens include *Strep Hflu*, and *Moraxella catarrhalis*. Trisomy 21, cleft palate increase risk due to eustachian tube abnormalities

Forms:

- Acute:** 1-3 weeks with swelling, redness & poss rupture of tympanic membrane, fever pain and hearing loss
- Recurrent:** 3 episodes in 6 mos or in 4-6 in 12 mos
- Bullous:** acute inf with ear popping pressure in middle ear, pain hearing loss and bullae between layers of drum causing bulging
- Chronic:** persists > 3 mos with thick retracted drum, hearing loss and drainage.

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Otitis Media

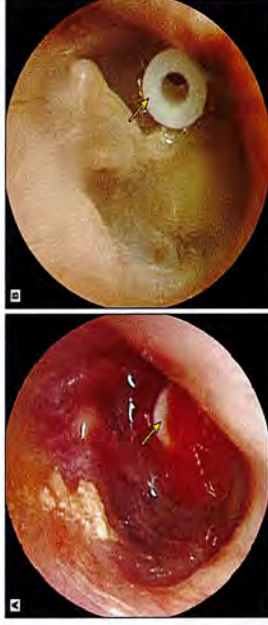
Diagnosis:

- Examine for bulging or perforated drum, signs of inflammation or purulent fluid

Treatment:

- 75-90% resolve spontaneously so abx withheld for 2-3 D. Amoxicillin for 7-10D. Referral for tympanostomy and tubes for severe chronic or recurrent infections.

To review otitis media go to: www.mometrix.com/academy code 328778



33

Mastoiditis

Description:

- Results from extension of acute otitis media.
- Mucus membranes of middle ear are continuous with mastoid air cells in the temporal bone.
- Can result in formation of benign cholesteatoma.

Symptoms:

- Persistent fever
- Pain in or behind the ear (*esp at night*)
- Hearing loss

Diagnosis:

- Based on symptoms, CBC, audiometry, tympanometry, myringotomy with C&S. CT scan is definitive

Treatment:

- Treat acute with 3rd gen cephalosporin or until C&S return
- If spreading empyema or osteitis is present surgery is required



34

Sinusitis

Description:

- Inflammation of nasal sinuses of which there are 2 maxillary, 2 frontal and 1 sphenoidal as ethmoidal air cells. Inflammation causes obstruction of drainage with discomfort.

Symptoms:

- Frontal and maxillary presents with pain over sinuses
- Ethmoidal present with dull aching behind eye
- Tenderness to palpation and percussion of sinuses
- Mucosa of nasal cavity edematous and erythematous
- Purulent exudate



Diagnosis:

- Transillumination of sinus (diminished with inflammation)
- CT for those who are immunocompromised or if diagnosis is not clear
- Careful examination to rule out spreading infection, especially with fever, altered mentum or unstable VS

Treatment:

- Analgesics
- Topical decongestants and nasal irrigation
- Antimicrobial tx if symptoms persist > 7D or are severe (avoid routine use); Amoxicillin or TMP/SMX (co-trimoxazole)



35

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Meniere's Disease

Description:

- Blockage in the endolymphatic duct of the inner ear causing dilation of the endolymphatic space and abnormal fluid balance which causes pressure or rupture of the inner ear membrane.

Symptoms:

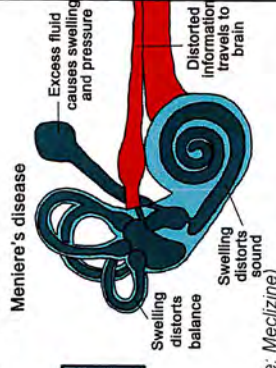
- Progressive fluctuating sensorineural hearing loss
- Tinnitus
- Pressure in the ear
- Severe vertigo that lasts minutes to hours
- Diaphoresis
- Poor balance
- N/V

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Diagnosis:

- Physical exam including CN evaluation
- Tuning fork sounds may lateralize to unaffected ear
- Assessment of hearing loss

Meniere's Disease



Treatment:

- Low sodium diet
- Vestibular suppressant (*antihistamine: Meclizine*)
- Benzodiazepine or SSRI for anxiety
- Antiemetics, such as promethazine suppositories
- Diuretics, such as HCTZ
- Referral for surgical repair for persistent vertigo, but this will not correct other symptoms

38

Labyrinthitis

Description: A viral or bacterial inflammation of the inner ear. May occur secondary to bacterial otitis media, mumps, rubella, rubeola, flu etc.

- Includes vestibular system and may cause balance disorders
- Lasts 1-6 weeks with acute symptoms the first week then decreasing

Symptoms:

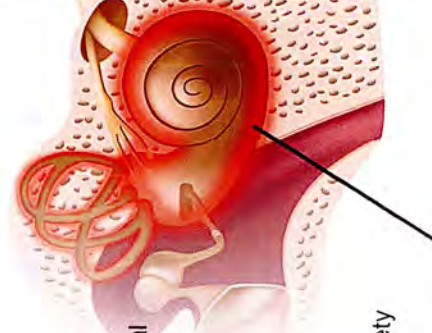
- Sudden onset of severe vertigo
- Hearing loss and sometimes tinnitus
- N/V
- Panic attacks from severe anxiety r/t sx

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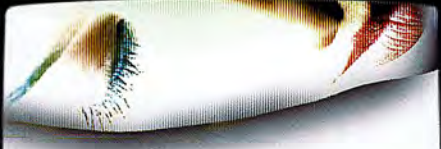
Labyrinthitis

Treatment:

- Bacterial:** IV abx
- Viral:** Symptomatic as for bacterial (except for abx)
- Volume replacement**
- Antiemetics** i.e. promethazine suppositories
- Vestibular suppressant** (antihistamine – Meclizine)
- Benzodiazepine** or SSRI for anxiety
- Referral to surgeon for I&D if necessary



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TMD

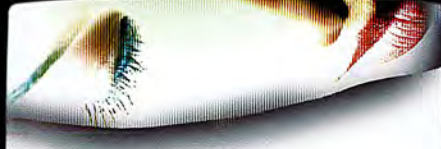
Description:

- Temporomandibular disorder is jaw pain caused by dysfunction of the temporomandibular joint (TMJ) and the supporting muscles and ligaments. It may be precipitated by injury, such as whiplash, or grinding of the teeth, stress or arthritis

Symptoms:

- Clicking or popping noises on jaw movement
- Limited jaw movement or "locked" jaw
- Acute pain on chewing or moving jaw
- Headaches and dizziness
- Toothaches

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TMD

Diagnosis:

- Complete dental exam with x-rays to r/o other d/o
- MRI or CT

Treatment:

- Ice pack to jaw for 10 min followed by jaw stretching exercise and warm compress for 5 min 3-4 x/D
- Avoidance of heavy chewing
 - Avoid hard food such as carrots/nuts
 - Eat soft foods
- NSAIDS to relieve pain and inflammation
- Night mouthguard
- Referral for dental tx to improve bite as needed

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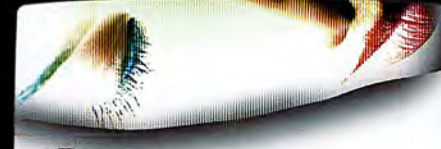


101

Which of the following is effective in the management of posterior epistaxis?

- Pinching the nose to stop the blood flow
- Topical vasoconstrictors such as phenylephrine
- Silver nitrate or electric cautery
- Insert a Merocel nasal sponge or Nasostat epistaxis nasal balloon

43



102

A 2 y/o presents to the ED with mild fever, persistent restlessness, crying and pulling his left ear. He has had a cold for 1 week. Exam reveals a distorted light reflex and slight bulging of the tympanic membrane. What is the proper diagnosis and treatment?

- Otitis externa and antibiotics
- Otitis media and antibiotics
- Otitis media and myringotomy
- Acute labyrinthitis and antivertigo drug

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103

a 45 y/o M presents with severe pain after being struck in the face during an auto accident while he was driving. He also reports some numbness of the upper lip. His face is bruised and somewhat distorted and edematous with nasal and periorbital swelling and subconjunctival hemorrhages. A CT scan of the facial structures is obtained. What is the likely diagnosis?

- A. Orbital blowout fracture
- B. Zygomatic fracture
- C. Mandibular fracture
- D. Middle third maxillary fracture (LeFort II)



45

a 65 y/o Asian M presents c/o headache and severe pain in his right eye and nausea for several hours. The pupil is slightly dilated and fixed to light and the globe is very hard. He also notes halos of light and a diminished peripheral vision. Left eye exam is normal. What is the likely diagnosis?

- A. Open-angle glaucoma
- B. Acute angle-closure glaucoma
- C. Occlusion of the central retinal artery
- D. Retinal detachment



47

Orbital blowout fracture – cause a rise in orbital pressure blowing out the weak orbital floor and prolapsing contents into the maxillary sinus. Periorbital edema, subluxation of the lens, dysconjugate gaze and enophthalmos are signs often cause by baseball or golfball impact

Zygomatic fracture – Pain in lateral cheek and an inability to close mouth. There is swelling and crepitus over the zygomatic arch.

Mandibular fracture – May cause airway obstruction by forcing the tongue posteriorly. Malocclusion is a typical finding. Paresthesias of the lower lip, broken teeth and sublingual hematoma are seen.

Middle third maxillary fracture (LeFort II) – involves central maxillary, nasal and ethmoid bones and nasal rhinorrhea suggests skull fracture with CSF leak



46

Open-angle glaucoma – blockage of the anterior chamber near the iris root. More common in Asian and inuits. Results in elevated IO pressures and when > 60 mmHg, damage to structures and impaired circulation to the retina occur. Treatment includes topical miotics and beta-blockers (LOLs), carbonic anhydrase inhibitors (acetazolamide) and drainage of the aqueous humor

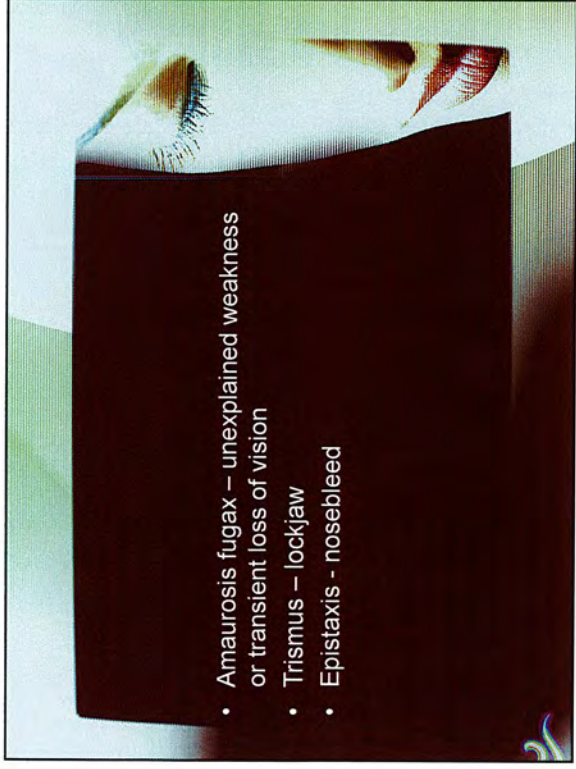
Acute angle-closure glaucoma – second leading cause of blindness. Impaired drainage of humor from the anterior chamber with rise in IO pressure although the angle drainage at Schlemm remains open

Occlusion of the central retinal artery – Painless blindness. Often has a history of transient attacks of amaurosis in the affected eye.

Retinal detachment – Occurs when the retina tears and humor separates the retina and choroid. Usually c/p flashing lights, floaters or a curtain effect.



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- Amaurosis fugax – unexplained weakness or transient loss of vision
- Trismus – lockjaw
- Epistaxis - nosebleed

Orthopedics – CEN Review

Traci Motes, MNsc, APRN, AGACNP-BC, CCRN
UAMS Orthopaedic/Infectious Disease



1

Triage

- Conditions requiring immediate treatment
 - Pulseless extremity
 - Hemorrhage
 - Open fracture
 - Compartment syndrome
- Subjective data collection
 - HPI/CC
- Description of events
 - History of past ortho problems
- Objective data collection
 - Obvious deformity
 - Assess the 5 P's
- Provide first aid



2

Pain

- Subjective
 - OLD CARTS
- Objective
 - General appearance
 - Pain rating
 - Inspection
 - Auscultation
 - Palpation
- Analysis/Assessment
 - Acute
 - Chronic
- Plan



Wong-Baker FACES® Pain Rating Scale

0	2	4	6	8	10
No Hurt	Hurts Little Bit	Hurts Little More	Hurts Even More	Hurts Whole Lot	Hurts Worst

3

Contusions/Hematomas

- Closed wound with ruptured blood vessels
- Causes
 - Blunt trauma
 - Exertional stress
- Symptoms
 - Edema
 - Discoloration
 - Tenderness to palpation
- Assessment needs to include:
 - Labs
- If contusion doesn't match mechanism of injury
- If contusion quickly expands post-injury
- If PMH or medications require
- X-rays if indicated
- Ice/elevate/splint



4

Strains and Sprains



- Sprain is a ligament
- Strain is a musculotendon
- Symptoms
 - Pain worse with movement/weight bearing
 - Edema
 - Inability to bear weight
- Rare in small children with open epiphyseal plates
- Common in
 - Athletes
 - obese persons resuming physical fitness
 - Rheumatoid arthritis
 - Steroid injections
- Radiography – Ottawa rules
- Pain control and RICE
- Weight bearing limitations x 24-48 hrs then slow resumption with crutches

5

Fractures



- ABCDs first
- Fractures are assessed in secondary survey
 - Splint it the way it is found
 - Pain control
 - Ice and elevation
- Open fractures
 - Irrigate with NS ONLY
 - Cover with sterile NS gauze

7

Dislocations

- Emergent condition due to danger of adjacent nerve or blood vessel damage
- Dislocation
 - When the bones forming a joint loose contact
 - Adults shoulder most common
 - Anterior 96-98%
 - Posterior 2-4%
 - Seizure disorder? High force injury
 - Pediatrics
 - Nursemaid's elbow (radial head dislocation)
 - X-ray positioning can sometimes fix
- Subluxation
 - When partial contact between joint bones



6

Fractures

- Femur fractures
 - Require stabilization due to ability for great amount of blood loss
 - Use of traction splint if not accompanied by hip, knee or ankle fractures
 - Manually stabilize and hold traction
 - Apply splint above and below fracture
 - Adjust mechanical traction until greater than manual
 - Assess distal peripheral vascular
 - Circulatory
 - Motor
 - sensory



8

Amputation

- Assess ABCDs first unless there is exsanguination then move Circulation up first
- Complete vs partial
- Ischemia time
 - Cooled**
 - 12 hours for digits
 - 6 hours all other parts
 - Not cooled**
 - 24 hour digits
 - 12 hours all other parts
- Possible reattachment considerations
 - Children** – possibly better success than adults
 - > 50 years old have issues with PAD/PVD
 - Post-reattachment functionality
 - Ability to withstand lengthy hospital/rehabilitation

9

Amputation

- Control bleeding
 - Direct pressure
 - Tourniquet use is **ONLY** for uncontrolled bleeding
 - Can use blood pressure cuff at 30 mm Hg higher than SBP
- 2 large bore IVs
- Splint and elevate
- Wrap stump in NS or LR gauze
- Wrap amputated part in sterile gauze, then seal securely in plastic bag then place sealed bag in ice
- Pain control
- Antibiotics, tetanus
- Replantation center

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Amputation

Indications

- Multiple digits
- Thumb
- Wrist and forearm
- Sharp amputation
- Pediatric amputations
- Within ischemia time frames

Contraindications

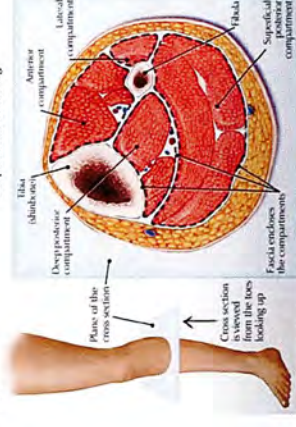
- Hemodynamic instability
- Multiple level amputations
- Self-inflicted amputations
- Severe PAD, PVD, complicated DM, CHF
- Extremes in age



10

Compartment Syndrome

- Compartmental pressures increased by either internal edema or external pressure causing vascular neurological structures to become compromised.
 - Lymph, vein, artery
- Most common in lower arm/hand or lower leg/foot



12

Compartment Syndrome

- Diagnosis with Compartment Pressure Needle
 - Diagnosed at ≥ 20 mm Hg
 - Emergency fasciotomy usually at 30-40 mm HG or higher



- Avoid excessive elevation; may impede arterial flow

13

Inflammatory Conditions: Costochondritis

- Inflammatory chest wall pain at the rib and sternal junction
- RULE OUT AMI, PE AND PNEUMONIA
- Causes can be exertion or strain
- Sharp pleuritic pain
- Pain control including NSAIDs
- Encourage deep breathing and avoid exertional activities



14

Inflammatory Conditions: Bursitis

- Inflammation of the bursal sac
- Acute or chronic
- Must rule out septic arthritis
- Most common: elbow, then shoulder and knee



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Inflammatory Conditions: Bursitis

- Edema, erythema, warm and tender to touch
- Do not aspirate first
- Labs: CBC with differential, ESR, CRP and BMP
- Radiological imaging
- Pain control including use of NSAIDs
- RICE with possible splinting



16

Inflammatory Conditions: Tendonitis

- Lateral ligament that connects the radial head to the distal humerus (tennis elbow) most common
- Wrist rotation exacerbates pain
- Can also occur in shoulder, elbow, knee, heel
- Point tenderness at tendon line
- Edema, erythema and warmth to touch
- May need to rule out septic arthritis as well
- Compressive dressing or support brace
- Possible pain control with NSAIDs



17

Inflammatory Conditions: Gout/Pseudogout



- Rule out gout vs infection
- Common triggers
 - Dehydration (diuretics)
 - Purine foods (organ meats, sardines, dark aged wines, aged cheeses, etc.)
 - Male : Female = 9,1
- Edema, erythema, acute pain generally single joint
- Great toe most common
 - Other common sites - Ankle, wrist and knee
- Uric acid build up -> Crystals trapped in joint

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Joint Effusion

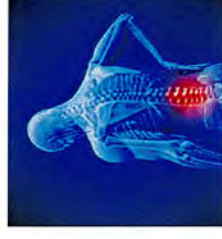
- Fluid collection
 - Inflammatory process
 - Previous surgery
 - Trauma
 - Infection
- Most commonly in the knee joints – usually single joint
- Edema and pain with or without erythema
- Diagnostics
 - Aspiration
 - ESR, CRP
 - STI labs: NG, RPR, Chlamydia
 - Radiographs
- Pain control, steroids, possible surgery



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Low Back Pain

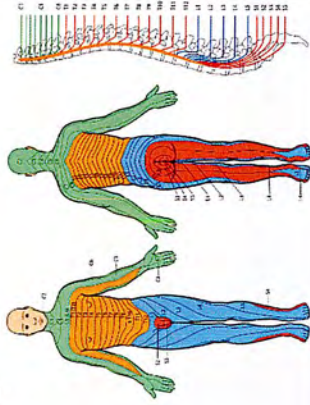
- Usually benign, affects ~ 60-80% of everyone
- Average onset is 30-40 years old
- Most common causes
 - Intervertebral disk disease
 - Disk herniation
- Risk factors
 - Obesity
 - Poor body mechanics
 - Heavy lifting
 - Prolonged sitting
 - Poor office furniture
 - Walking on hard floor surfaces
- Remember –
 - lumbar spinal column provides weight bearing, spinal cord protection and trunk movement



20

Low Back Pain

- Usually benign, affects ~ 60-80% of everyone
- Subjective
 - OLD CARTS
 - Acute < 7 days
 - Subacute 7 days to 7 weeks
 - Chronic > 7 weeks
- Objective
- Analysis/assessment
- Plan



21

Low Back Pain

- Look deeper if
 - < 20 or > 60
 - Hx of cancer, HIV or long term steroid use
 - Recent onset of fatigue and malaise
 - Unintentional weight loss
 - Bilateral lower extremity symptomatology
 - Structural abnormalities
 - Saddle anesthesia and/or bowel dysfunction



22

Foreign Bodies

- Reactive objects vs lower risk of reactivity
 - Metal, glass
 - Vegetative objects
- Radiographic imaging
 - Plain x-rays
 - CT, U/S, Fluoroscopy
- Removal?
- Pain control, wound care and possible antibiotics



23

Osteomyelitis

- Infectious in the bone
- Causes
 - Edema, erythema, pain, warmth, may have drainage
- Organisms: Staph Aureus most common
 - CoNS – Staph Lugdunensis
- Surgery
- Cultures
 - Aspiration
 - OR
 - Blood cultures
- Antibiotics



24

Trauma: Achilles tendon rupture

- Achilles tendon rupture
 - “Hit with baseball bat in the back of leg” then just sore
 - Palpate a knot or ball in the back of calf area
 - Causes: activity, systemic disease or medications
 - Diagnosed with U/S or MRI
 - Non-op vs surgery



25

Trauma: Blast injuries

- Primary injury
 - Caused by blast wave – damage to air filled organs from pressure
- Secondary injury
 - Caused by flying debris – shrapnel wounds
- Tertiary injury
 - Caused by blast wind – being thrown
- Quaternary injury
 - Caused by heat, flames and smoke
- Quinary injury
 - Caused by exposure to biological, chemical or radiation materials

26

References

- Armstrong, A., & Hubbard, M. C. (2022). *AAOS Essentials of Musculoskeletal Care*. Jones & Bartlett Learning.
- Boswell, M. (2020, July 2). *Boswell CEN Review: Ortho- Trauma Emergencies* [Video]. YouTube. Retrieved July 28, 2023, from https://www.youtube.com/watch?v=hFpe_XTGONIM
- Emergency Nurses Association. (2017). *Emergency nursing core curriculum*. Elsevier Health Sciences.

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Abdominal Emergencies

LYNNETTE FLYNN

CCRN CMC/CSC

REFERENCED SHEEHY'S MANUAL OF
EMERGENCY CARE, 8TH EDITION

PAGES 235-245

1

Introduction

Pain - Categorized as visceral, parietal or referred

- Visceral receptors located throughout abd
- Parietal located in peritoneum
 - Somatic
 - Localized, sharper pain
 - Signals surgical intervention

Assess location and radiation, change in position, D/T of last BM, surgical Hx

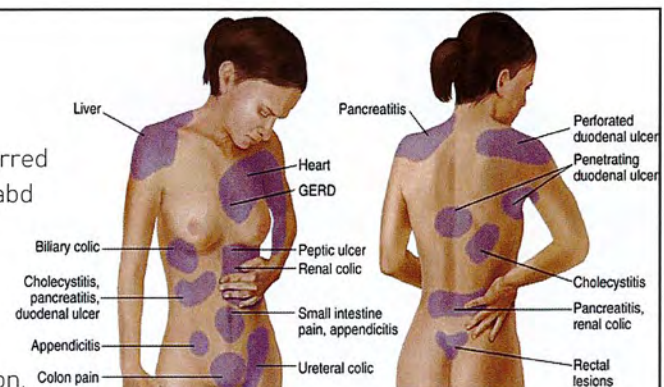
Pain preceding vomiting, severe pain > 6 hours → surgical condition

Anorexia N/V are directly proportional to extent of peritoneal irritation

Colic increases peaks and subsided → hollow viscera

r/o hypovolemia if tachycardic

Fetal position → peritonitis



2

PAIN CATEGORIES

*** ACUTE**
- SUDDEN ONSET
- RESOLVES within 3 MONTHS

*** NOCICEPTIVE**
- SOMATIC
- VISCERAL

*** NEUROPATHIC**
- DAMAGE or DYSFUNCTION of SOMATOSENSORY NERVOUS SYSTEM

*** ISCHEMIC**
- INSUFFICIENT OXYGEN SUPPLY

*** REFERRED**
- PAIN FELT in DIFFERENT LOCATION

*** CHRONIC**
- GRADUAL ONSET
- LASTS > 6 MONTHS

Pain patterns

• Diffuse pain

- Gastroenteritis
- Sickle cell crisis
- DKA
- Peritonitis
- IBS
- Intestinal obstruction
- Constipation

• Epigastric pain

- Acute gastroenteritis
- PUC
- GERD
- AAA
- Early perforated viscus
- Acute pancreatitis
- AMI

Upper Quadrants

- Lower lobe pneumonias
- Pylonephritis
- Herpes zoster
- Assess with ultrasound

Right sided

- Liver
 - Hepatitis
 - Hepatomegaly
 - Herpes zoster

Left sided

- Spleen
 - Infarct or rupture
 - Splenomegaly of leukemia or mono

• Lower Quadrants

- Ovarian torsion or cyst rupture or metterschmerz
- Ruptured ectopic
- PID or salpingitis
- Inguinal hernia
- Assess with CT

Left

- Diverticulitis

Right

- Acute appendix

3

Abdominal Pain

Provider Practice Essentials

	Upper	Diffuse/Flank	Lower
Upper	Pneumonia	ACS/GERD	Pneumonia
Diffuse/Flank	Cholecystitis Cholelithiasis Cholangitis Fitz-Hugh-Curtis	PUD Pancreatitis	Gastric Ulcer Splenic Disorder
Lower	Pyelonephritis/ kidney stone	SBO, DKA, AAA, Ischemia, Gastroenteritis, Perforation, Unknown	Pyelonephritis/ kidney stone
	Constipation, colitis		Constipation, diverticulitis, colitis
	Appendicitis	Ectopic Menstrual/ Fibroid UTI	GYN - PID, Torsion, Cyst, Mittelschmerz
	GYN - PID, Torsion, Cyst, Mittelschmerz	Testicular Torsion, Epididymitis, Orchitis	

4

Peritonitis

• Primary

- Spontaneous peritonitis occurs when blood borne organisms enter the peritoneal cavity as a complication of liver or kidney disease

• Secondary

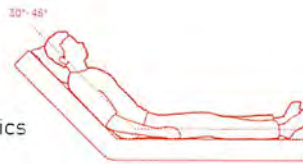
- More common, occurs when abd. organs perforate as in appendicitis, pancreatitis, diverticulitis, PUD and perforated small bowel or penetrating injury

• Symptoms

- Pain diffuse, severe and worsens with movement
- Hypovolemic shock, abd tenderness, guarding and rigid abdomen, rebound tenderness, N/V, Diarrhea or constipation, bloating

• Interventions

- NPO, NGT monitor I&O
- Semi-fowler's position
- IV fluids and electrolytes
- Analgesics, antiemetics, antibiotics
- Anticipate surgical intervention



5

Acute Gastroenteritis

Bacterial, viral or chemical origin

Symptoms

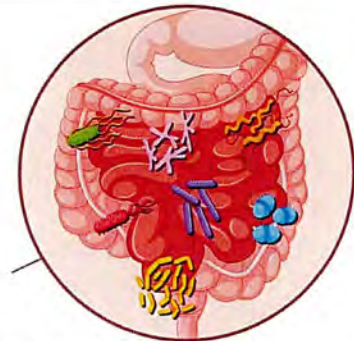
- Diarrhea with nausea and vomiting
- Pain is diffuse, crampy and lower abdominal
- Fever
- Dehydration with tachycardia and warm dry skin
- When splenomegaly present, bacterial origin
- Assess similar symptoms in others – food poisoning or recent travel – intestinal parasite

Procedures

- Ova and parasite stool testing
- r/o appendicitis
- r/o gastritis (*LUQ or epigastric pain of gastric mucosa irritation from smoking, ETOH, meds*)

Interventions

- IV fluids and electrolytes
- Antiemetics
- Pain control
- Keep NPO till vomiting passes then po fluids with glucose and lytes (Pedialyte)



6

Appendicitis

Obstruction of appendiceal lumen → ↓ blood supply → necrosis, perforation and peritonitis

Presentation

- mild fever, dull steady periumbilical pain, anorexia nausea
- vomiting that does not precede abd pain
- Over 12-48 hrs, pain moves to RLQ 'McBurney's point' with positive psoas sign
- Rebound tenderness with abd rigidity
- CT over US, with contrast for atypical presentations

Interventions

- NPO
- IV fluid
- Analgesics, antiemetics and antibiotics
- Prepare for surgical intervention

Psoas Sign



7

GERD and Esophagitis

Gastroesophageal Reflux Disease – stomach acid erodes esophagus

Esophagitis – results from GERD, infections, radiation, caustic ingestions

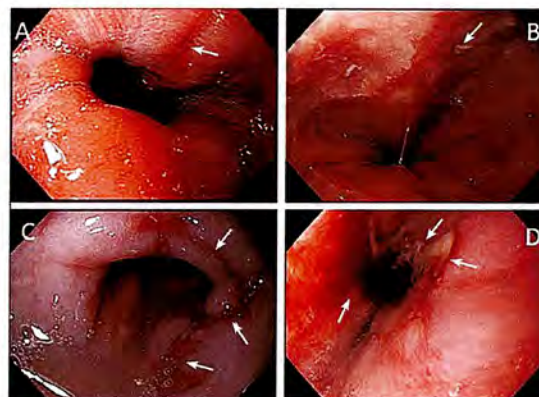
Symptoms

- Substernal pain, positional, worsens when supine, increases with swallowing
- Occasional vomiting
- Weight loss
- Sore throat with raspy voice
- GI bleeding episodes reported

Intervention

- Weight loss recommendation
- Avoid foods that relax lower esophageal sphincter, coffee, alcohol, chocolate fatty foods and smoking
- Elevate HOB, avoid food/drink before HS
- GI cocktail, PPI, H2 blockers

- acid pH<3, coagulative necrosis, eschar keeps more superficial
- alkali > 11, liquefactive & more extensive damage
- TAR is titratable acid or alkali reserve and predicts amt of acid or alkali required to bring substance pH to 8



8

Upper GI Bleeding

Causes

- Esophageal varices, gastric ulcers and erosions, Mallory Weiss syndrome and esophagitis

Symptoms

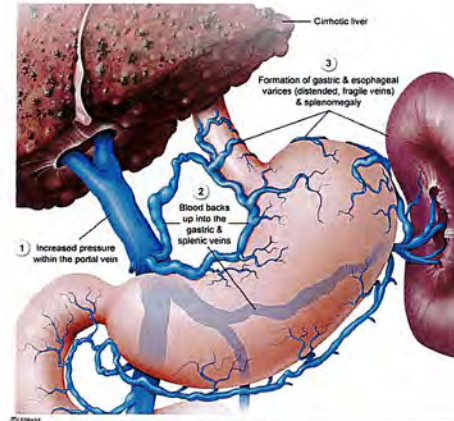
- Weakness, dizziness, syncope, & postural hypotension of hypovolemic shock
- Hematemesis or melena
- Coffee ground emesis specific for UGI bleed

Procedures

- Basic labs + coags, type & cross
- CT or GI bleeding scan
- Endoscopy to ID site

Interventions

- Intubation if actively bleeding
- IV fluids and PRBC transfusion
- NGT
- Anticipate endoscopy



9

Lower GI bleeding

Bleeding distal to the ligament of Treitz

Causes

- Inflammatory bowel disease, bleeding polyps or ulcers, cancer, hemorrhoids, perirectal abscess or diverticulosis

Symptoms

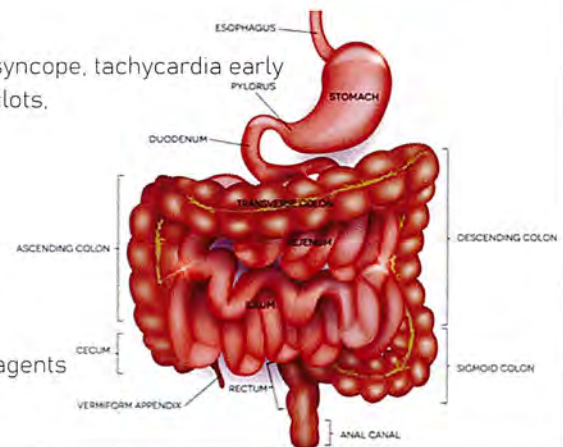
- Hypovolemia signs of pallor fatigue, postural changes, syncope, tachycardia early
- Modest, painless, bright red bleeding that may contain clots.
- Hypotension is a late sign

Procedures

- Labs, stool guaiac, colonoscopy

Intervention

- IV fluids and transfusion
- Reverse any coagulopathy
- Thermal coagulation or vasoconstrictors or sclerosing agents



10

Peptic Ulcer Disease

Disruption of the protective mucosal barriers and increased acid secretion

Contributing factors: NSAIDs or infection with *helicobacter pylori*

Three types:

• Duodenal

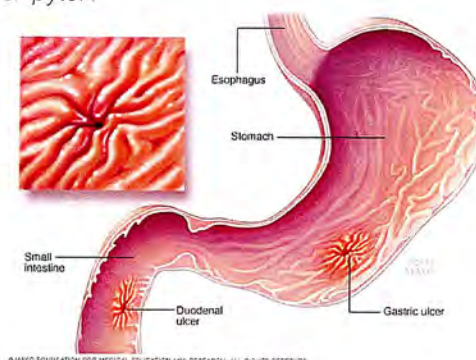
- Increased acid and gastrin
- Rapid emptying time
- Pain when stomach is empty, relieved with food or antacids
- Heal spontaneously and recur often

• Gastric

- In the antrum and tend to become chronic
- c/o pain after eating, may have weight loss
- Higher risk for gastric cancer

• Stress

- Develop after long period of physical stress such as illness, trauma or neural injury
- Stress shunts splanchnic circulation causing ischemia and mucosal damage
- Often seen in ICU



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Peptic Ulcer Disease

Symptoms

- Episodic gnawing or burning pain, relieved or exacerbated by food
- Pain accompanied by fullness or bloating
- Pain may waken during the night
- Hx of frequent NSAID or ASA use
- May present initially with UGIB

Procedures

- Fecal antigen

Interventions

- Acid inhibiting meds (H2 blockers or PPIs)
- Antibiotics (clarithromycin and amoxicillin for *H. pylori*)
- Discontinue NSAIDs

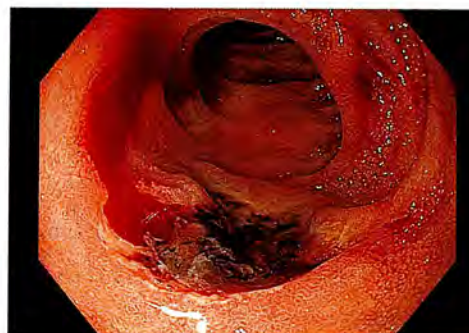


Figure 1. Peptic ulcer in duodenum. Image courtesy of Dr. Nipun Reddy.

12

Mallory - Weiss Syndrome

- Results from violent vomiting asynchronous with gastric regurgitation causing a longitudinal mucosal tear at the gastroesophageal junction
- Similar to Boerhaave syndrome which differs in that the treatment is surgical due to multiple transmural lacerations to the distal esophagus

Symptoms

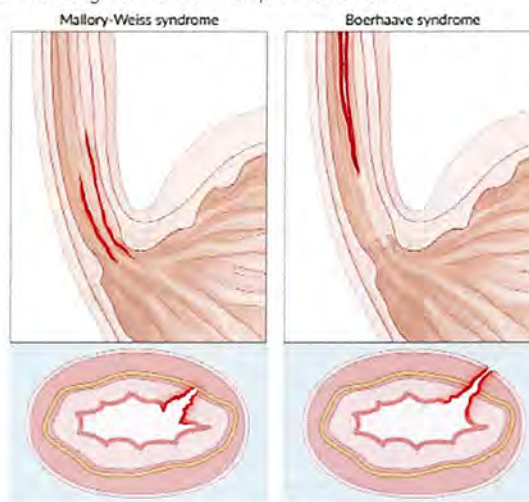
- Hx of vomiting followed by hematemesis
- Hx of ETOH, ASA, heavy lifting, coughing, bulimia or pregnancy
- Red or coffee ground emesis
- Hematochezia (maroon colored stool)
- With or w/o melena (black tarry stool with strong odor)

Procedures

- NGT to assess for occult blood
- UGI
- Labs

Interventions

- IV
- Antiemetics
- Prepare for endoscopy
- Avoid balloon tamponade if possible



13

Bleeding Esophageal Varices

Portal HTN from liver disease causes collateral vessels to form in the lower esophagus which can rupture.

Symptoms

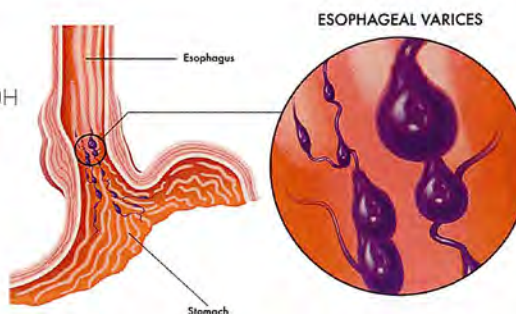
- UGI bleeding with Hypovolemic shock & hx. Of chronic ETOH

Procedures

- Labs – coags, hepatic function studies
- UGI endoscopy
- Abdominal US or CT

Interventions

- NGT high risk on insertion
- Rx. Somatostatin or octreotide to decrease portal HTN or IV vasopressin and SL/Transdermal TNG
- Endoscopic injection sclerotherapy
- Balloon tamponade (Blakemore, Minnesota, Linton-Nachlas tubes)
- TIPS (transjugular intrahepatic portosystemic shunt) with esophageal US for coil embolization and glue injection (99% success)



14

Cholecystitis

Acute or chronic inflammation of the gallbladder, usually from a stone

Symptoms

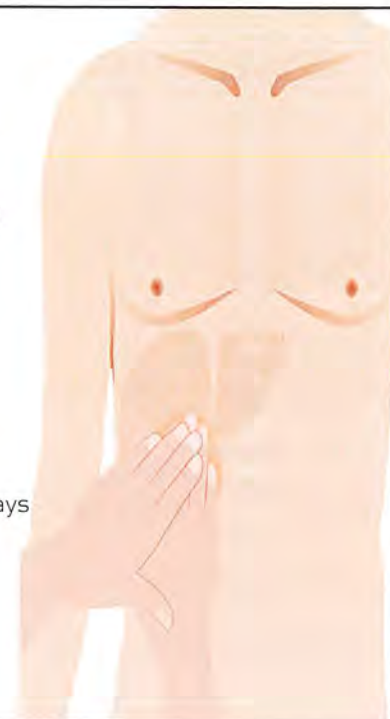
- RUQ pain radiates to back, Rt shoulder or scapula after a high fat meal
- Pain – may be colicky initially but becomes constant
- + Murphy sign – gasp with palpation below Rt costal arch
- Low grade fever and tachycardia from infection
- Jaundice if significant obstruction
- GI upset N/V, anorexia, flatulence or fat intolerance

Procedures

- Labs show elevated WBC, Bili and ALT/AST
- US, HIDA scan (hepatobiliary iminodiacetic acid)
- Abd CT scan, cholangiogram, cholecystogram, ERCP, flat & upright x-rays

Interventions

- NGT for vomiting
- IV fluids and electrolyte replacement
- Antiemetics and analgesics
- Broad spectrum antibiotics
- Anticipate endoscopy



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Pancreatitis

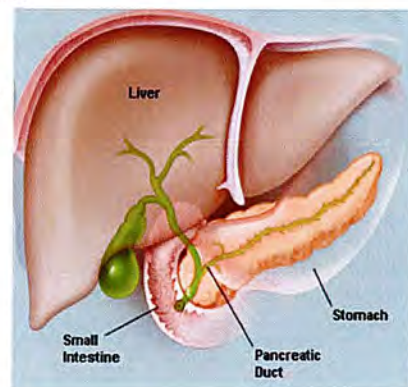
Results of release of digestive enzymes into the tissue of the pancreas – auto digestion, inflammation, tissue destruction, injury to adjacent organs

Causes

- ETOH, gallstone, recent surgery or ERCP, viral illness, trauma, hypertriglyceridemia
- Can resolve spontaneously or progress to life-threatening condition
- Chronic from long term ETOH, results in inability to digest fats, proteins & carbs properly, reduced insulin = hyperglycemia
- Hemorrhagic pancreatitis is emergent condition where enzymes erode through a major abdominal vessel

Symptoms

- Sudden dull and steady pain in the LUQ or epigastrium
- Onset that increases in severity.
- Abdominal tenderness and guarding with NV anorexia
- Fever, tachycardia and hypovolemia may ensue



16

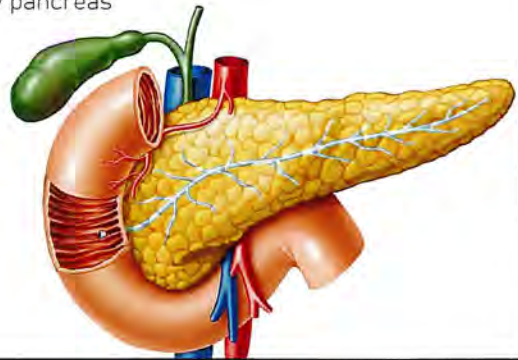
Pancreatitis

Procedures

- Serum amylase rises quickly but returns to normal 24-72 hrs.
- Urine amylase is elevated up to 2 weeks
- Serum lipase rises slowly for up to 2 weeks (specific to pancreatitis)
- **Diagnosis:** 2 of 3 criteria: abdominal pain, elevated serum lipase or amylase, abdominal imaging findings consistent with acute pancreatitis
- Lytes, CBC, hepatic profile, glucose
- Ultrasound can view biliary tract but is often unable to view pancreas
- Contrast CT abd
- Abd x-ray to check for free air of perforation

Interventions

- IV fluids and meds
- MSO4 can cause spasms in sphincter of Oddi so don't use
- Antiemetics
- Replace serum calcium with IV infusion
- Frequent reassessment
- IV antibiotics if septic



17

Intestinal Obstruction

Physical obstructions: fecal impaction, hernia, tumor, intussusceptions, volvulus, postop adhesions.

Nervous system disorders: paralytic ileus

Inflammatory conditions: abscess, pancreatitis causing an ileus, inflammatory bowel disease

Following intestinal obstruction, GI secretion accumulation and swallowed air cause intestinal distention, increased intraluminal pressure and massive third spacing of fluid.

Symptoms

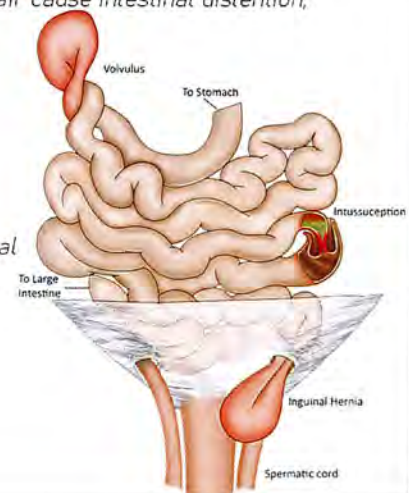
- Hx of previous abdominal surgery esp. appendectomy
- N/V of stomach contents, then bile then feces.
- Colic pain that may be wavelike. Pain improved after vomiting
- Abd distension and tenderness
- Tachycardia and hypotension
- No flatus or stool passage
- Bowel sounds *high-pitched, hyperactive proximal, hypoactive/absent distal*

Procedures

- Chem, BUN, CBC, abd x-ray, CT abd

Intervention

- Treat hypovolemia from third spacing
- NGT for bowel decompression
- Analgesics, antiemetics, IV abx as indicated
- Surgical consultation



18

Incarcerated Hernia

When a protrusion of a bowel loop through the abdominal musculature but not through the skin. Commonly inguinal, femoral, umbilical regions. When blood supply compromised, it is incarcerated and emergent.

Symptoms

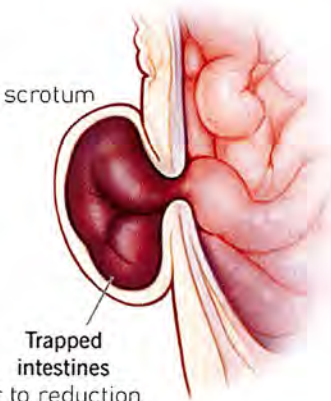
- Pain/swelling
- Inguinal hernias are firm, tender masses in the inguinal canal and scrotum
- Nausea and vomiting
- May develop signs of obstruction

Procedures – diagnosis based on physical exam

- Abd x-rays to r/o obstruction
- Ultrasound to detect strangulation

Interventions

- Anticipate manual reduction of hernia
- Provide sedation
- Ice packs to hernia and Trendelenburg positioning 20–30 min prior to reduction
- Surgical consult may be needed



Cleveland
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19

Irritable Bowel Syndrome

IBS is characterized by abdominal pain and altered bowel function without structural or biochemical abnormalities. Diagnosis is one of exclusion.

IBS has three components:

- Altered GI motility
- Visceral hyperalgesia
- Psychopathology

Symptoms

- Abd pain with constipation, diarrhea or both
 - Pain usually in lower abdomen
 - Described as crampy or generalized ache with periods of cramping
 - May be relieved with a bowel movement
- Anxiety and stress may be a factor
- May have recent weight loss with diarrhea

Procedures

- CBC for anemia, ESR and CMP
- Stool for blood O&P, C.Diff
- Abd CT to r/o obstruction
- Colonoscopy

Intervention

- Analgesics, antidiarrheals, anticholinergics, prokinetics and antidepressants
- Psych referral
- Dietary modifications
 - More fiber
 - Avoid fluids with meals
 - Limit lactose, fructose, gluten
 - Increase fluid intake for constipation



20

Inflammatory Bowel Disease

Intestines inflamed, usually due to auto-immune reaction

Two types

- Ulcerative colitis – involves large colon
- Chron's disease – can affect any part of the GI tract from mouth to anus

Procedures

- Routine labs
- Albumin to assess nutrition
- Diagnosis by endoscopy
- Abd x-rays can see colonic dilation, evidence of perforation or obstruction

Intervention

- Bowel rest with IV rehydration

Symptom	Ulcerative colitis	Crohn's disease
Pain	Cramps	Crampy or steady
Abdominal	LUQ tenderness Abd distention	Periumbilical RLQ Abd pain
Stool	Bloody Severe diarrhea	Signs of obstruction
Weight	Loss	Loss
Other	Fever and tachycardia	Intermittent fever Associated with anal fissures, perianal fistulae or abscesses



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Diverticulitis

Small outpouchings anywhere in the GI tract, most common in the sigmoid colon

Diverticulosis – uninflamed diverticula, associated with a low-fiber diet, constipation and obesity

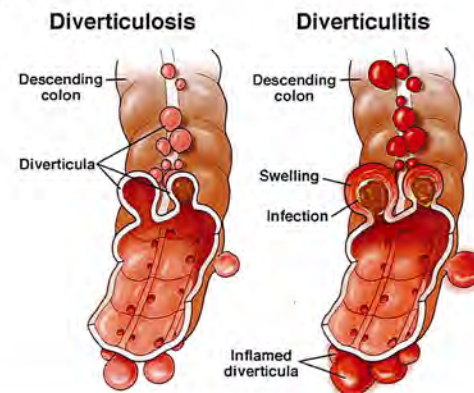
Diverticulitis is the inflammation of one or more diverticula resulting in focal necrosis and perforation due to obstruction of diverticula by fecal material or food.

Symptoms

- LLQ pain and tenderness (left appendicitis)
- Anorexia, N/V, Constipation, Diarrhea
- Fever and peritonitis if perforated

Procedures

- Usual labs, CBC for WBC evidence of infection, BMP for electrolyte imbalances
- CT scan or abdominal x-rays



22

Esophageal Obstruction

Causes: Children: ingested foreign body
Adults: food bolus or bone

Symptoms

- Hx of foreign body ingestion may not be present
- Difficulty swallowing
- Drooling
- SQ emphysema of the neck when esophagus perforated

Procedures

- Chest / neck x-rays

Interventions

- IV admin of glucagon to relax
- Upright position
- Esophagoscopy to remove

NOTE: if no sharp edges and ca



ut difficulty

23

• John has been diagnosed with GERD. It's crucial to educate him about his condition. What would be an essential piece of advice to include in his discharge instructions?

- Encourage John to increase his intake of spicy and greasy foods
- Advise John to start a heavy weightlifting regimen immediately
- Suggest John increase his consumption of alcoholic beverages
- Avoid reclining or lying down for three hours post-meal

24

-
- **John has been diagnosed with inflammatory bowel disease. What distinguishes the two types of this condition in terms of areas affected in his system?**
 - A. "Chron's disease can impact any segment of the GI system while ulcerative colitis is limited to the large colon.
 - B. Both Chron's and UC affect the entire GI system equally
 - C. Chron's affects only the large intestine, and UC affects the small intestine
 - D. Chron's primarily affects the stomach and small intestine, while UC affects the large intestine and rectum.

25

-
- **What type of discomfort would Mr. Smith likely experience if he was suffering from pancreatitis?**
 - A. Epigastric pain that radiates to the back
 - B. Severe chest pain that mimics a heart attack
 - C. Continuous pain in the lower left abdomen
 - D. Sudden sharp pain in the lower right abdomen

26

• **John is rushed to the ED due to esophageal varices. Can you identify the most severe complication that could arise from his condition?**

- A. Pulmonary embolism
- B. Hypovolemic shock
- C. Arrhythmia
- D. Stroke

27

• **John has developed small pouches known as diverticula in his GI tract. When they become inflamed it is referred to as diverticulitis. What is the most typical area of the intestines where these tend to form?**

- A. Sigmoid colon
- B. Jejunum
- C. Ileum
- D. Duodenum

28

• **What is a late sign of intussusception?**

- A. Colicky pain
- B. Ribbon-like stools
- C. Left lower quadrant tenderness
- D. Currant jelly-like stools

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Reference

- Referenced Sheehy's Manual of Emergency Care, 8th edition, Pages 235-245
- Septic Peritonitis, Brown et al, NIH StatPearls, September 2022
<https://www.ncbi.nlm.nih.gov/books/NBK526129/#~:text=Concerning%20signs%20present%20in%20a%20high%20percentage spontaneous%20bacterial%20peritonitis%20are%20asymptomatic%20on%20presentation>
- Caustic Ingestions, Bielecki et al, StatPearls, Jan 2024 <https://www.ncbi.nlm.nih.gov/books/NBK557442/>
- CEN exam study guide, Judy Stevenson, 2023

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