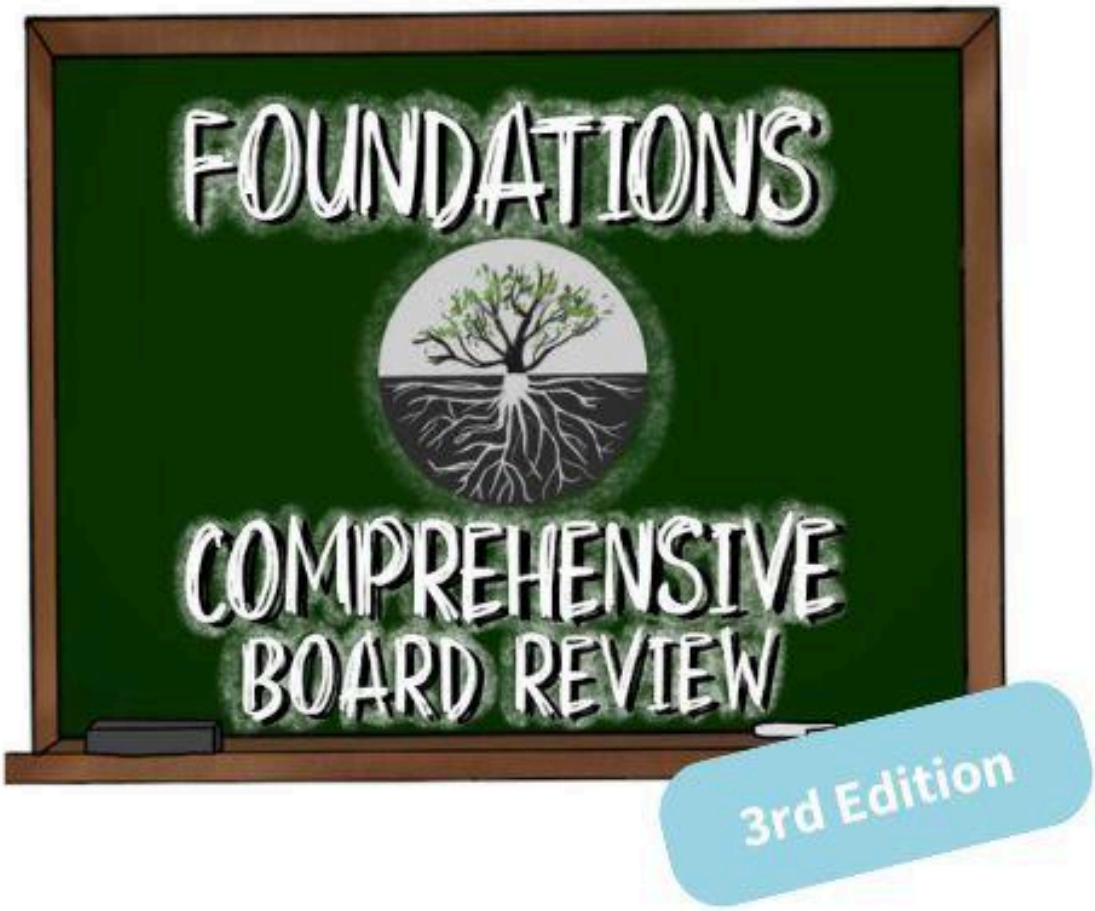
Foundations of Emergency Medicine



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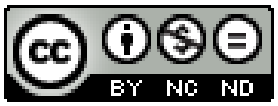

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FOUNDATIONS

Comprehensive Board Review

Third Edition, 2024

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DEDICATION

To the free open access medical education
(FOAMed) pioneers.

You know who you are.

ABOUT THIS BOOK

The Foundations Comprehensive Board Review resource is intended to provide a high-yield, systems-based approach to studying for the Emergency Medicine In-Training Exam (ITE) and American Board of Emergency Medicine Written Board Exam. The first version, created in 2016, was developed as a comprehensive reservoir of test relevant information based on a multitude of board review references. Each year, content has been edited by a recent emergency medicine resident while they study for the written board exam. This review is divided by system, with the highest yield (highest % on the test) first and the lower yield content topics towards the end. This is meant to be a low cost resource that learners of emergency medicine can use for independent study. For a more interactive approach, consider following instructions for flashcard review noted below.

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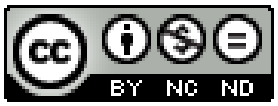

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TABLE OF CONTENTS

Cardiology

Bizz	Buzz
What underlying **pathologic process** distinguishes **myocardial infarction** from angina/unstable angina?	Common pathway: Atherosclerotic plaque rupture → exposed endothelium → clot attaches → reduced blood flow; If cell death occurs → positive troponin and MI; If no cell death occurs → negative troponin and angina/unstable angina.
What is the difference between **transmural** and **nontransmural** infarction?	**Transmural:** usually STEMI, large vessel affected, benefit from thrombolytics/PCI; **Non-Transmural:** usually NSTEMI, smaller subendocardial artery, may benefit from PCI but no thrombolytics
What defines **unstable angina**?	Stable Angina + pain at rest, new pain, increasing pain severity/frequency, pain with less exertion, hemodynamic changes with pain; No troponin elevation
Diagnosis: Acute chest pain at night, ECG with STEMI, all symptoms and ECG changes resolve with nitro.	**Prinzmetal's Angina -** coronary vasospasm; Many do not have CAD. Treat with diltiazem. Smoking is major risk factor.
What are early to late **ECG changes** with ACS?	Hyperacute T's and Giant R (very early and transient) → ST Elevations with reciprocal ST Depression → T wave inversions → Q waves (1 square wide, 1/3 height QRS)
Diagnosis: Crushing central chest pain with diaphoresis, and nausea. Resolved on arrival. Initial ECG without STEMI criteria but has biphasic T-wave in V2/V3.	**Wellens Syndrome:** biphasic (type A) or deeply inverted, symmetric (type B) T wave in septal leads; Can have resolution of pain; Signifies early proximal **LAD** lesion
Treatment for patient with chest pain and ECG concerning for **Wellen's Syndrome**?	Cardiology consult and urgent LHC; Signifies early proximal **LAD** lesion
Chest Pain with STE V1-V4 with STD II, III, aVL. What **region** is affected and where is the most likely **culprit lesion**?	**Anterior MI** 2/2 **LAD** occlusion; May affect large territory of LV, septum and conduction system (at risk for high grade blocks, wide complex bradycardias), commonly have shock, possible septal or papillary ruptures
Chest Pain with STE I, aVL, V5, V6 with STD V1. What **region** is affected and where is the most likely **culprit lesion**?	**Lateral MI** 2/2 **LAD vs left circumflex** occlusion; May affect LV
Chest Pain with STE II, III, aVF with STD V1-V4. What **region** is affected and where is the most likely **culprit lesion**?	**Inferior MI** 2/2 occlusion of **RCA >> LCx;** May affect AV node (usually transient narrow complex bradycardias), may cause papillary muscle rupture
Chest Pain with STE III > II and V1 > V2. What **region** is affected and where is the most likely **culprit lesion**?	**Right Ventricular MI** 2/2 occlusion of **proximal RCA;** Associated with Inferior MI; Should get R-sided leads (STE in V4R, V5R)
Chest Pain with STD V1-3 with upright T waves. What **region** is affected and where is the most likely **culprit lesion**?	**Posterior MI** 2/2 occlusion of **PDA (RCA > L circ)** Get posterior leads to dx (requires only 0.5 mm elevation for STEMI dx).

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What are the **J-point elevation criteria** for STEMI? How does this differ in leads **V2-V3**?	**V2-V3:** ≥2.5mm in MEN < 40yrs, ≥ 2mm in MEN ≥ 40yrs, or ≥ 1.5mm in WOMEN; **All other leads:** STE at the J-point of ≥ 1 mm in two contiguous lead
What distinguishes **Type I-Type V MI**?	**Type I:** MI caused by acute atherothrombotic CAD (plaque rupture); **Type II:** MI 2/2 mismatch of oxygen supply and demand (sepsis, extreme tachycardia); **Type III:** typical MI presentation but death before biomarkers obtained; **Type IV:** MI 2/2 PCI; **Type V:** MI 2/2 CABG
How can you detect MI in patients with **paced rhythm** or **old LBBB?**	**Sgarbossa Criteria**: a) STE >1mm with concordant (same direction) QRS, b) concordant ST depression >1mm V1-V3, c) STE >5mm with discordant (opposite direction) QRS **Modified Sgarbossa** changes this last rule to discordant STE >25% preceding S wave.
Diagnosis, Treatment: Chest pain with upsloping ST depressions and tall symmetrical T waves in the precordial leads.	**Dx: DeWinter T waves** = STEMI equivalent; **Tx:** Cards consult → Cath lab
What is unique about the management of **inferior MIs**?	1. Always consider concurrent RV involvement and get **right-sided ECG leads**. 2. Patient is **preload dependent**, **no nitroglycerin** or other preload reducing interventions.
What is unique about the management of MI with **right-ventricular involvement**?	They are **preload dependent** and will become very hypotensive with nitroglycerin - avoid this, give IVF for hypotension.
What are potential **early complications** (< 24 hours) of MI?	**Arrhythmia** (most common), shock 2/2 pump failure or valve dysfunction (valve rupture).
What are potential **late complications** (> 24 hours) of MI?	Thromboembolism, myocardial rupture, valve rupture, CHF, pericarditis, LV anurysm
Diagnosis, Treatment: Pleuritic chest pain 4 weeks after MI	**Dx: Dressler's syndrome**: autoimmune pericarditis, typically occurs 2-6 weeks s/p MI. **Tx:** NSAIDs
What artery typically supplies the **SA node** and **AV node**?	**SA node**- RCA 60%, LCx 40%; **AV node**- RCA 90%, LCx 10%; Concern for bradycardias if inferior MI
What is the most common **cause** of **cardiac tamponade after MI**? When will this occur?	Myocardial wall rupture Bimodal distribution: first few days and 1-2 weeks
ECG finding: cardiac tamponade	Electrical alternans
Cause, Treatment: New murmur and shock after MI	**Papillary muscle rupture** leading to **mitral regurgitation**; **Tx:** reduce afterload and dispo to OR; Same treatment if septal wall rupture
What potential **treatments for acute MI** have been shown to **reduce mortality**?	**Defibrillation** for VF/VT (30% mortality reduction), **Aspirin** (25% mortality reduction)
What is the only **contraindication to aspirin** in ACS?	True aspirin allergy (anaphylaxis)

What is the **preferred treatment for STEMI**?	**Percutaneous coronary intervention** (PCI) is preferred for STEMI. Thrombolytics should only be considered if PCI is not available at center within 90 min, or after transfer within 120 min.
What are the AHA recommended **"door to balloon" times** for STEMI at a PCI center and non-PCI center?	PCI center - **90 minutes**; Non-PCI center must transfer - **120 minutes**
What is the AHA recommended **time to administration of thrombolytics** for STEMI at a non-PCI center if you cannot transfer for PCI within 2 hours?	If cannot transfer for PCI within 120 min from a non-PCI center, give thrombolytics (to those eligible) within **30 minutes** of arrival.
What **ECG changes** are included under **indications for thrombolysis**?	**STEMI** (STE > 2 mm for men, > 1.5 mm for women in V2-3, STE > 1 mm in 2+ other leads), **STD V1-3** (posterior MI), **old LBBB + Sgarbossa**. ACC/AHA Updated in 2023 to include **deWinter T waves** and posterior MI.
What are **absolute contraindications** for thrombolysis?	**Absolute contraindications:** prior brain bleed or mass, ischemic stroke or sig closed head trauma < 3 mo, brain or spine surgery < 2 mo, possible dissection, active bleeding, bleeding disorder, INR > 1.7, platelets < 100k, DOAC use, and HTN > 185/110 (despite IV therapy).
What are concerning **complications of thrombolysis** and how often do they occur?	**Intracranial hemorrhage** (1/70 to 1/100, > 50% mortality), **major bleeding** (e.g., GI bleed) in 5%
What **ECG changes** may occur with **reperfusion**?	**Accelerated idioventricular rhythm** (wide complex, no p waves, rate 40-50's), **non-sustained VT**, **PVCs**; These should be transient, are overall benign and do not require additional treatment
Treatment: ST elevation after cocaine use	First treat with **benzodiazepines**, **aspirin**, and **nitrates**. Use thrombolysis only if ST does not return to baseline after these treatments.
Treatment: HTN after cocaine use	**Tx:** Benzodiazepines, calcium channel blockers, alpha blockers (e.g., phentolamine)
What medications are **contraindicated** in **cocaine-induced chest pain**?	**Beta blockers** (may theoretically lead to unopposed alpha stimulation and worsened HTN)
What are key **risk factors** for **infective endocarditis**?	Diseased valves, artificial valves, IV drug use, dental extractions
What **heart valve** and what **organism** is most common in **infective endocarditis**?	**General Population:** - Left sided > right sided - Most common valves are **mitral** > aortic > tricuspid > pulmonary **- Staph aureus** is most common pathogen but viridans strep if s/p tooth extraction; If **IV drug use**: Tricuspid valve infected by staph aureus

Describe the classic **physical exam** findings in **infective endocarditis**?	**Osler nodes** (painful nodules on fingertips), **Janeway lesions** (nontender hemorrhagic lesions on palms/soles), **Roth spots** (retinal hemorrhages), **splinter hemorrhages** (linear on nails), **petechiae, new murmur;** While the above are classically tested, fever and new murmur are the most common exam findings.
What are the **two major Duke Criteria** for infective endocarditis?	1. Positive blood culture 2. Valvular vegetation on echo; All other classical exam findings are minor criteria.
What is the appropriate **management** and **treatment** of a patient with suspected **infective endocarditis**?	**Blood cultures x 3** (different locations), **Echo** (transesophageal preferred), **broad spectrum antibiotics** to cover staph/strep/gram negatives (vancomycin + penicillin + gentamicin)
When should a patient receive **antibiotic prophylaxis** for **infective endocarditis** prior to a procedure?	<u>High-risk procedures</u>: **Dental** or **invasive respiratory (i.e., bronchoscopy)**; GI/GU procedures don't need abx. <u>High risk patients</u>: **Artificial or damaged valves**, ANY **congenital heart disease history,** previous endocarditis diagnosis; Rx: Amoxicillin (dental procedures)
What **left sided murmurs** are **systolic**?	Aortic stenosis and mitral regurgitation
What **left sided murmurs** are **diastolic**?	Aortic regurgitation and mitral stenosis
What **valve disease** do you consider in patient with **syncope + systolic murmur** radiating to neck?	**Aortic Stenosis;** Syncope is poor prognostic sign, typically causes angina and dyspnea → syncope → heart failure
What is the **vasopressor** of choice in a patient with cardiogenic shock from **critical aortic stenosis**?	**Phenylephrine;** Left ventricular afterload is fixed at the level of the stenotic valve. Alpha agonism increases diastolic BP beyond the valve and helps perfuse the ventricle.
Diagnosis: chest pain and new diastolic murmur	Aortic dissection causing aortic insufficiency
Patient presents with a **new diastolic murmur**, **widened pulse pressure**, and **head bobbing**. What **valve** is most likely affected?	Aortic insufficiency
What **valve disease** do you think of in **pregnant women** with sudden cardiovascular collapse during labor?	**Mitral Stenosis** High output during labor causes LA enlargement, AFib, and arrhythmia.
Treatment: Decompensating patient with diastolic murmur and opening snap	**Tx:** Cardioversion Suspect mitral stenosis and unstable Afib from atrial dilation.
Diagnosis, Treatment: valve pathology in new MI followed by hypotension and new murmur	**Dx: Mitral Regurgitation** 2/2 ruptured chordae tendineae/papillary muscle **Tx:** decrease afterload and cardiac surgery

Causes and **signs/symptoms:** Right Heart Failure	**Causes:** 2/2 L-sided failure, lung disease (chronic: COPD, sleep apnea, asthma) → pulmonary hypertension, PE (acute) **Symptoms:** JVD, peripheral edema, hepatic congestion
Causes and **signs/symptoms:** Left Heart Failure	**Causes:** 2/2 ischemia, valvular dysfunction, longstanding HTN **Symptoms:** SOB, orthopnea, PND, potential R-sided failure
What distinguishes **systolic** vs **diastolic** heart failure?	**Systolic:** failed forward flow **Diastolic:** failed filling
What is the general approach to **treatment** of **decompensated** heart failure?	**Decrease LV preload** to improve SV and cardiac output (Starling curve); Reduce preload with nitroglycerin and diuretics (Lasix; caution if diastolic failure), BiPAP (improves ventilation and preload); consider afterload reduction (nitroglycerin); give inotropes for shock
What are the classic **causes** of **high output** cardiac failure?	Hyperthyroidism, Beriberi, AV fistula, Paget's disease, severe anemia, pregnancy
What are classic **CXR** findings with **heart failure**?	Enlarged cardiac silhouette, bilateral fluffy infiltrates, Kerley B lines, blunted costovertebral angle (effusion).
What does **BiPAP** help patients with **heart failure**?	Decreases work of breathing, **decreases preload** (positive pressure increases intrathoracic pressure and decreases venous return).
What is the most common cause of **acute** Right Heart Failure (Cor Pulmonale)?	Pulmonary Embolism; (left heart failure is most common chronic cause)
Etiology, Diagnosis, and Treatment: Dilated Cardiomyopathy	**Etiology:** H/o HTN or ischemia; **Dx:** cardiomegaly on CXR, low EF on echo; **Tx:** underlying cause/CHF/dysrhythmias, anticoagulate if mural thrombus, transplant if severe
Etiology, Diagnosis, and Treatment: Restrictive Cardiomyopathy	**Etiology:** fibrosis, radiation, TB causing stiffness; **Dx:** normal heart on CXR, poor filling on echo; **Tx:** underlying cause/CHF/dysrhythmias
Diagnosis and Treatment: Hypertrophic Cardiomyopathy	**Dx:** severe symptoms/syncope with exercise. septal hypertrophy on echo, ECG with LVH (tall QRS, needle-like Q waves); **Tx:** avoid exertion, beta blockers (slow rate and ↑ ventricular filling), AICD for ventricular arrhythmias, surgical ablation
Describe the typical **murmur** of Hypertrophic Obstructive Cardiomyopathy (**HOCM**)	Harsh, **systolic** crescendo-decrescendo murmur; ↑ **with Valsalva**, standing up (↓ LV blood volume and worsening obstruction); ↓ **squatting**, trendelenburg (↑ LV blood volume and decreased obstruction). Note: this is the same pattern as mitral valve prolapse
What is the typical **time frame** for developing **peripartum cardiomyopathy**?	Third trimester to 5 months postpartum

What are the classic **clinical clues** for diagnosis of **Pericarditis**?	Triad: fever + dyspnea + chest pain (pleuritic chest pain radiating to neck, **worse with laying flat**), recent viral syndrome. Exam: intermittent **friction rub**, **clear lungs**; May have evidence of pericardial effusion/tamponade; unlikely to have trop leak (unless concurrent myocarditis)
ECG changes: Pericarditis	**PR depression** (most specific), PR segment elevation (aVR), **diffuse STE**, TW flattening followed by TW inversion
Treatment: Pericarditis	**Tx:** NSAIDS, ± colchicine (↓ recurrent pericarditis). **Pearl:** Must get Echo to r/o pericardial effusion
What are the classic **clinical clues** for diagnosis of **Myocarditis**?	**Dyspnea** (most common symptom), chest pain, **viral prodrome**, **CHF** (wet lungs, edema), **arrhythmias**, *unresolving sinus tachycardia*; usually (+) troponin; Echo usually with global hypokinesis and dilated chambers
ECG changes: Myocarditis	Sinus tachycardia, non-specific STE; can be similar to pericarditis
Treatment: Myocarditis	Supportive care, avoid early NSAIDs or steroids, ICU admit if severe/CHF
Causes: Myocarditis	**Idiopathic** (most common overall), **Parvovirus** (most common viral cause), **Chagas** disease (most common worldwide)
What are the collective signs of **JVD, decreased heart sounds, and hypotension** called and what does it represent?	Beck's Triad of Pericardial Tamponade
What are the clinical **features** of **hypertensive emergency**?	**CNS**: dizziness, n/v, confusion, weakness, encephalopathy, ICH, SAH, CVA **Eyes**: ocular hemorrhage, papilledema, vision loss **Heart**: ACS, aortic dissection, shock **Kidneys**: hematuria, proteinuria, acute renal failure
What are the differences between Asymptomatic HTN, HTN Urgency and HTN Emergency?	**Asymptomatic HTN:** BP >140/90 without apparent symptoms **HTN Urgency**: BP >180/110 but *WITHOUT* signs of end organ dysfunction **HTN Emergency:** BP >180/110 *WITH* signs of end organ dysfunction
What is appropriate ED **management** of Asymptomatic HTN, HTN Urgency, and HTN Emergency?	**Asymptomatic:** no workup needed (Cr = only screening test shown to change management for ITE), no treatment needed, restart home meds (if any), refer to PCP. **HTN Urgency:** rule out end organ dysfunction (based on sx), gradually lower BP over 1-2 days with PO meds (restart home or HCTZ, BB/CCB). **HTN Emergency:** if end organ dysfunction, then goal 20-30% BP reduction (Nicardipine, Esmolol, Labetalol, Nitroglycerin, etc. based on sx).

What are the JNC 8 recommendations for **BP meds** in **asymptomatic HTN**?	NOT a requirement to start in ED, but recommended (esp. for boards). Non-African-American: Thiazide, CCB, ACEI, ARB African-American: Thiazide, CCB CKD: ACEI or ARB
What **medications** are best to lower BP in patients with **severe HTN** and the following: **Encephalopathy, Aortic Dissection, Cocaine use, pregnancy, ACS/CHF**?	**Encephalopathy:** Nicardipine **Aortic Dissection:** Beta blockers FIRST (Esmolol or labetalol to reduce rate & shear stress), ± Nitroprusside AFTER rate reduction) **Cocaine use:** benzos and phentolamine (no beta blockers) **Pregnancy:** IV Mg, Hydralazine, Labetalol (preeclampsia), nifedipine **ACS/CHF:** Nitroglycerin
How should HTN be managed for **Ischemic and Hemorrhagic** Strokes?	**Ischemic Strokes: permissive** HTN (up to 220/120) to protect penumbra if no thrombolytics BUT reduce to **<185/110 if considering tPA. Hemorrhagic Strokes:** varied guidelines for BP control (good goal SBP 140 or MAP < 130), use CCBs to prevent vasospasm (PO Nimodipine = classic for boards)
What are potential **non-cardiac causes** of **syncope**?	**Aortic** (Aortic dissection, ruptured AAA), **neurologic** (CVA, SAH, seizure), **bleeds** (RP bleed, ruptured ectopic or AAA, GI bleed), **orthostatic** (meds), **reflex** (vasovagal)
What is the **differential** for potential life-threatening **cardiac causes of syncope**?	**Dysrhythmias** (VT), **structural** abnormalities (HOCM, critical aortic stenosis), **electrical** abnormalities (Brugada, WPW, Prolonged QT, arrhythmogenic right ventricular dysplasia), **others** (PE, MI). Screen all ECGs for these findings
What minimum **workup** should be completed on **young female patients with syncope**?	Pregnancy test (ruptured ectopic may only present with syncope), ECG
How is near syncope treated differently than syncope?	They aren't. They have the same causes and should be worked up the same way
What is the overall **most common cause** of **syncope**?	Idiopathic (40-50%) > Vasovagal (~20%)
What **factors** make someone with **syncope** "high risk" **requiring admission** and significant workup?	San Francisco Syncope Rule: Admit patients with **CHESS**, as they are high risk for serious outcomes. **C**HF, **H**ct < 30, **E**CG that is abnormal, **S**hortness of Breath, **S**ystolic BP < 90. Other high risk features: family history of sudden death, syncope with exertion, structural heart disease.
ECG changes: Wolff-Parkinson-White	Slurred upstroke of QRS (**delta wave**), wide QRS (QRS > 120ms), **short PR interval** (most common, PR < 120ms)
ECG changes and **Treatment:** Brugada Syndrome	**ECG:** Pseudo-RBBB, STE V1-3 (types: coved/downsloping STE followed by TWI, or "saddle-back" STE) **Tx:** AICD
ECG changes: Long QT	End of T wave > 1/2 R to R interval

ECG changes: Arrhythmogenic Right Ventricular Dysplasia	Epsilon wave (positive notch at end of QRS)
Underlying **pathology** and **Treatment:** Arrhythmogenic Right Ventricular Dysplasia	**Pathology: Genetic** abnormality, autosomal dominant, causes **fibro-fatty infiltrate in RV** (best seen on Cardiac MRI) that causes arrhythmogenic focus in RV (30% with epsilon wave) and predisposes for fatal arrhythmias. **Tx:** antiarrhythmics, AICD
ECG changes: Hypertrophic Obstructive Cardiomyopathy (HOCM	LVH, **LARGE voltages** (tall QRS), **deep/narrow Q waves** ("dagger-like") in lateral (I, aVL, V5-6) and inferior (II, III, aVF) leads
What are some **risk factors** for **Aortic Dissection**?	**Prolonged HTN** (#1 most common), **connective tissue disease** (e.g. Marfan syndrome); also pregnancy, congenital heart disease, trauma
What are the classic **clinical clues** for diagnosis of **Aortic Dissection**?	Acute onset severe pain **chest pain, radiating** in direction of propagation (neck/arms vs back/abdomen); **chest pain + something else** = thoracic dissection; **HTN** = most common risk factor AND exam finding. Can be associated with any sx linked to **sequelae of dissection** including: new murmur, MI, CHF, renal insufficiency, mesenteric ischemia, new neuro deficits (dissecting carotid). **Note: BP can be high, low, or normal.**
What is the most common **CXR finding** in acute **aortic dissection**?	Mediastinal widening
Management and Treatment: suspected Aortic Dissection	**HR (<60) and SBP (<120)** control to decrease shear stress (**Esmolol/labetalol** followed by **Nitroprusside**, or Labetalol), control pain, **T&C** x 10-15 units. If unstable, **consult cards/thoracic** surgery with dispo to OR, consider bedside echo. If stable, get **CTA aortogram**; **NEVER send unstable patient to CT**
What is the difference between **Type A** and **Type B** aortic dissections?	**Type A:** Ascending Aorta, managed surgically **Type B:** Descending Aorta, usually managed medically
What patients are **higher risk** for **Ruptured AAA**?	Disease of **arteriosclerosis** (all the same risk factors): age > 60, males, family history, HTN, HL, smoking, CAD, connective tissue disease
Most common **presentation** for **UNruptured AAA**?	Asymptomatic
What are the classic **clinical clues** for diagnosis of **Ruptured AAA**?	Cooper's triad: **sudden abdominal/flank pain** + **pulsatile abdominal mass** + **hypotension.** Others: peripheral ischemia, syncope, sudden death
What **size AAA** is higher risk for **rupture**?	**> 3 cm** is pathological, **> 5 cm** is high risk and requires surgery
Management, Treatment: suspected Ruptured AAA	**Bedside US** to eval for AAA, possible free fluid (though bleeding may be retroperitoneal), **T&C** x 10-15, emergent **vascular surgery consult** with dispo to OR ASAP. **DO NOT send unstable patient to CT scan**

Diagnosis: history of repaired AAA with massive GI bleed	Aortoenteric fistula
Diagnosis, Treatment: Acute Arterial Occlusion	Look for medical problems related to **thromboemboli** (Afib = most common embolic cause, MI, or endocarditis) **6 P's:** pain (out of proportion to exam), pallor, pulselessness, poikilothermia, paresthesias, or paralysis **Dx:** CT angio vs duplex US; emergent vascular surgery consultation. **Tx**: heparin vs thrombolysis vs embolectomy (vascular surgery consult)
What is **Homan's sign** and how sensitive is it for DVT?	Homan's sign is **pain in the calf on dorsiflexion of ankle** while the knee is fully extended. 50% sensitivity for DVT.
What are **risk factors** for **DVT**?	Classic triad (Virchow's): **stasis + hypercoagulability + endothelial damage** Acquired (persistent): age, active cancer, hx DVT/PE, antiphospholipid Ab; Acquired (transient): recent surgery or major trauma, pregnancy, OCPs/HRT, paralysis/immobilized (3 days within last 4 weeks); Inherited: ATIII deficiency, Protein C/S deficiency, Factor V Leiden; exam- tender vein or distended superficial veins, unilateral calf swelling > 3 cm, unilateral pitting edema
What is the appropropriate **workup** for patients with clinical symptoms and **low versus high risk** of DVT?	**Low risk**: D-dimer **Moderate-high risk**: D-dimer and **duplex US** (alternative is CT venography); if high risk, may require serial dopplers and whole leg US
Management: isolated calf DVT	Anticoagulation not required unless **within 5 cm of popliteal vein** (ASA otherwise); **repeat ultrasound** (in 2-5 days) to rule out propagation. This is only true for low risk pts with transient risk factors (such as recent travel).
What are considered **distal veins** in the evaluation of a DVT? How are clots in these veins **managed**?	**Anything in the calf** - infrapopliteal veins: posterior tibial, peroneal, anterior tibial. If a pt is **low risk** (e.g. NOT obese or prothormobic for any reason) and has a **transient risk factor** (e.g. recent travel, prolonged immobilization, etc.) distal DVTs can be monitored with **repeat US** and no anticoagulation.
ECG findings: 1st vs. 2nd (type I and II) vs. 3rd degree AV Block	**1st Degree:** PR >200 and otherwise normal **2nd Degree**: Mobitz Type I (Wenckebach) - increasing PR interval then dropped beat Mobitz Type II - stable long PR, then sudden, non-conducted PR → dropped beat **3rd Degree:** P waves entirely dissociated from QRS
What types of **heart block** typically require **pacemaker** placement?	2nd degree (Mobitz Type II) and 3rd degree

Treatment: unstable bradycardia	Temporizing measures: **Atropine** (may help if narrow QRS); Others: Dopamine, Epinephrine, Isoproterenol Unstable: **transcutaneous pacing** (± transvenous pacing) Definitive treatment is a **permanent pacemaker**
Explain the steps for **transcutaneous pacing**.	Sedate/pain control if able, place pacer pads, turn on pacing function, set rate 70-80, increase voltage until capture noted (this is painful, so start low!)
Explain the steps of transvenous pacing.	Place IJ or SC introducer. introduce catheter into right IJ or left subclavian, advance wire into vein and inflate balloon, advance to ~20 cm, set pacer at 80 bpm and output to 20 mA, advance catheter to RV (will show STEMI pattern on monitor, LBBB pattern on ECG), confirm mechanical capture (pulse or pulse ox correlate with pacer spikes), deflate balloon, secure and decrease output to x1.5 lowest current setting with continued capture.
Treatment: arrhythmia and unstable patient	**Electricity**. Cardioversion (synchronized) if they have a pulse, Defibrillation (unsynchronized) if no pulse.
What is most common **side effect** of **amiodarone IV**?	**Hypotension** (due to solvent medication is in). Other side effects to monitor in chronic use: LFTs, thyroid function tests, pulmonary fibrosis, blue-gray discoloration of nose.
Differential, Treatment: Narrow complex tachyarrhythmia WITHOUT P waves	**DDx:** Atrial fibrillation, SVT, AVNRT, orthodromic AVRT **Tx:** Adenosine or AV nodal blockers; electricity if unstable!
Differential, Treatment: Wide complex tachyarrhythmia WITHOUT P waves	**DDx:** VT (Vfib possible but likely unstable), SVT with BBB, Antidromic AVRT (e.g. WPW); **Tx:** Procainamide or Amiodarone (AVOID AV nodal blockers); electricity if unstable!
Diagnosis: chaotic P waves, irregularly irregular rhythm	Atrial Fibrillation
Diagnosis: "sawtooth" symmetrical P waves, regularly irregular rhythm	Atrial Flutter
Diagnosis, Cause: multiple types of P waves, irregularly irregular rhythm	**Dx:** Multifocal Atrial Tachycardia **Cause:** 2/2 pulmonary disease (COPD = most common cause)
Diagnosis, Treatment: regular tachycardia and narrow QRS	**Dx:** AV nodal reentrant tachycardia (AVNRT) or Orthodromic Atrioventricular Reentrant Tachycardia (AVRT). **Tx:** Adenosine (first line), consider BB or CCB, electricity if unstable!
Diagnosis, Treatment: regular tachycardia and wide QRS	**Dx:** Antidromic Atrioventricular Reentrant Tachycardia (AVRT) OR Ventricular Tachycardia **Tx:** Procainamide vs Amiodarone, consider Mag, electricity if unstable! (Avoid AV nodal blockers in these patients)

What is the **difference** between **Orthodromic and Antidromic** Atrioventricular Reentrant Tachycardia (AVRT)?	Reentry circuit with accessory pathway (WPW- Bundle of Kent). **Orthodromic** travels anterograde **down AV node** and back up accessory pathway resulting in **regular and narrow QRS** complex (looks like SVT). **Antidromic** travels anterograde **down accessory pathway** and back up AV node (retrograde) resulting in **regular and wide QRS** complex (looks like VT).
Treatment: tachydysrhythmia and suspected Wolff-Parkinson-White	**Procainamide or Amiodarone** if stable**; Shock** if unstable; (AVOID AV nodal blockers). If any signs of WPW (delta wave, short PR) or borderline wide QRS, presume WPW and avoid AV nodal blocker
Diagnosis, Treatment: multiple chaotic ventricular foci that are wide and irregular	**Dx:** Ventricular Fibrillation **Tx:** defibrillation
What **BP measurements** define Stage I and Stage II HTN?	**Stage I HTN:** systolic 140-159 mmHg or diastolic 90-99 mmHg **Stage II HTN:** systolic >160 mmHg or diastolic >100 mmHg
ECG findings: Ventricular Aneurysm	Persistent **STE > 2 weeks after known MI** (and lack of reciprocal changes), most often in precordial leads (V3-5). Others: Q or QS waves, T waves small relative to QRS, reciprocal changes absent
Diagnosis, Treatment: "Holiday Heart Syndrome"	**Dx:** typically atrial arrhythmia (Afib) after excessive alcohol intake **Tx:** observation (if stable), typically self-resolves within 48 hours
ECG findings: Ventricular Tachycardia	AV dissociation, QRS > 120, HR > 100, fusion beats & capture beats (both help distinguish from SVT with BBB)
What are some common **mimics** of **Ventricular Tachycardia** on ECG?	**Hyperkalemia**, **Sodium Channel Blockade** (TCA's, Benadryl, etc.), **accelerated idioventricular rhythm**. Suspect these mimics when the QRS is too wide, HR is < 130, or the rate is variable.
What is the most common **cause** of **Cor Pulmonale**?	Cor Pulmonale = right heart failure 2/2 respiratory disease Most common CHRONIC cause: **COPD** Most common ACUTE cause: **PE** Others: pulmonary fibrosis, ILD, pulmonary HTN, sleep apnea
What are **contraindications** for **Coumadin** with known AFib?	Alcoholism, recent trauma or surgery, respiratory bleeding, active GI bleeding, GU bleeding, ICH, or significant risk of falls. Use the HAS-BLED score.
Review **CHA2DS2 VASc** scoring to determine need for anticoagulation with AFib.	CHF (1), HTN (1), Age ≥75 (2), DM (1), Stroke history (2), Female (1). Tx: Low risk (0)- ASA or none; intermediate risk (1)- consider AC; high risk (≥ 2)- start AC
How are **vitals** assessed on a patient with an **LVAD**?	Blood pumped by machine from LV to aorta, **no pulse will be present**. Inflate BP cuff and listen for flow in brachial artery with doppler as you deflate. This is the MAP (goal 70-80). No systolic/diastolic measurement.

Diagnosis: Pt with an LVAD and elevated LDH	**Pump thrombosis**. Thrombosis leads to hemolysis which then leads to elevated LDH. LDH levels are typically **> 1000.**
What is the most **common site for infection** in a **LVAD**?	**Drive line** (Wire connecting external controller and the internal pump), followed by pump pocket
What **radiating characteristic** of chest pain is most consistent with a **cardiac cause**?	Radiation of pain down **Right arm** > radiating down both arms > radiation down Left arm
What is the **path of electrical conduction** during a normal cardiac cycle?	SA node → R atrium → AV node → Bundle of His → Bundle branches → Purkinje fibers
What are the most appropriate **locations** for **central line** placement prior to **transvenous pacing**?	Right IJ (preferred), L Subclavian (these offer the most direct routes to the heart)
What happens when a **magnet** is placed over an **AICD**?	It **disables defibrillation** and switches to factory rate pacing mode; should be done if the patient is receiving **inappropriate shocks**. Note all AICDs are also pacemakers (on XR AICDs have a thicker wire in the distal lead)
Definition, presentation, treatment: oversensing in a pacemaker	**Definition:** pacemaker interprets external noise/interference as native heart beats and does not generate a paced beat when indicated. **Presentation**: individual with a pacemaker that is bradycardic and symptomatic and withOUT appropriate pacer spikes on the ECG. **Tx**: place magnet over the pacemaker to switch it back to pacer mode at a factory set rate (60-80).
Management: patient with an AICD with unstable VT	Immediate electrical cardioversion for AICD/pacemaker malfunction
What **medication** decreases mortality after an MI?	Aspirin
With cardiac arrest, what drugs can be given to adult and pediatric patients by **ET tube**?	NAVEL (adults): Narcan, Atropine, Vasopressin, Epinephrine, Lidocaine. LANE (peds): all of the above except vasopressin
What **medications** should be used in **stable ventricular tachycardia**?	Amiodarone, procainamide, or lidocaine
What **medication** can cause a bidirectional ventricular tachycardia or slow atrial fibrillation?	Digoxin
At what **heart score** should a patient be admitted for further risk stratification?	Heart score of **4-6 is moderate risk** (12-16.6% risk of major adverse cardiac event). Score > 7 has 50-65% risk of major adverse cardiac event, warranting cardiology consult in addition to admission.
What **medication** should be administered for patients in **asystole or pulseless electrical activity**?	Epinephrine 1mg IV every 3 to 5 minutes (these are **not** shockable rhythms. No amiodarone)
What class of **antiarrhythmics** categories has a similar **mechanism of action** as **Tricyclic Antidepressants** (TCA)?	**Class 1A drugs** (quinidine, procainamide, disopyramide) work by inhibiting fast sodium channels similar to TCA (will have prolonged QRS duration, prolonged action potential, lengthening of QT interval).

ECG finding: hypothermia	**Bradycardia** and J waves or **Osborne waves** (upward deflection at the terminal portion of the QRS complex).
What **physical exam** findings associated with **aortic stenosis**?	Crescendo-decrescendo **systolic murmur** that radiates to the **carotids**, S4 gallop, paradoxically split s2. Murmur decreases with valsalva.
What **medication** if given to patients with **pericarditis** has risk of **causing recurrence**?	Prednisone (steroids)
Definition, Causes, Signs and Symptoms, and Treatment: Constrictive Pericarditis	**Definition**: Scarring and loss of elasticity of pericardial sac **Causes**: idiopathic, infectious, post radiation, post cardiac surgery **SSx**: fluid overload, diminished CO, Kussmaul sign **Tx:** pericardiectomy
Signs and Symptoms, Diagnostic Test, Treatment: Atrial Myxoma	**SSx:** right heart or left heart failure, embolic phenomena, constitutional symptoms **Diagnostic test:** Echocardiogram **Tx:** Surgical removal by sternotomy. (Most common primary cardiac tumor!)
Diagnosis, ECG findings, Treatment: complication occurring **two weeks after STEMI** that **increases risk for thrombus** formation	**Dx:** Left ventricular aneurysm **ECG findings:** persistent ST segment elevation **Tx:** ACE inhibitors, anticoagulation if mural thrombus present, and aneurysmectomy if refractory to medical therapy

Trauma

Bizz	Buzz
Difference between **tension pneumothorax** and **pericardial tamponade**	**Tension pneumothorax:** tracheal deviation, decreased breath sounds, subQ air **Pericardial tamponade:** decreased heart sounds **BOTH**: JVD, hypotension, tachycardia
How to determine **GCS**	E4 V5 M6 = Max 15 **Eyes:** 4- Spontaneous, 3- Voice, 2- Pain, 1- None **Voice:** 5- Normal, 4- Confused, 3- Words, 2- Sounds, 1- None **Motor:** 6- Follows commands, 5- Localizes pain, 4- Withdraws to pain, 3- DeCORticate (arms to CORE; flexed), 2- Decerebrate (extended) posturing, 1- None **GCS < 8 intubate**
How to determine **ACS Class of Hemorrhagic Shock**	**I**: Normal vitals (<15% loss, 750cc) **II**: Tachy, but normal BP with ↓ PP (15-30% loss, 750-1.5L) **III**: Hypotension (30-40% loss, 1.5-2L) **IV**: AMS-confused/lethargic (>40%, >2L)
What is **Cushing's Reflex**?	Cushing's reflex is due to increased ICP and impending herniation Triad: hypertension (widened pulse pressure), bradycardia, irregular respirations
Compare **subfalcine**, **uncal** and **tonsillar herniation**	**Subfalcine:** most common, frontal lobe under falx, ssx abnormal gait **Uncal:** temporal lobe under cerebellar tentorium, ssx CN3 palsy (blown pupil, down and out), ipsilateral hemiparesis, coma **Tonsillar:** rare, brainstem herniation, coma and death
Traumatic injuries **CT** can commonly **miss**	Diaphragmatic injury, pancreas injury, basilar skull fracture, hollow viscus injuries
Next step for a patient with **high suspicion of diaphragmatic injury and a negative CT**?	OR for diagnostic lap and direct visualization of the diaphragm (gold standard)
Classification of **LeFort fractures**	Midface fx resulting in detachment of maxilla from skull, all the fractures involve pterygoid plate; Dx with CT **LeFort I:** palate mobile (fx below nose) **LeFort II:** palate + nose mobile (inferior orbits) **LeFort III:** entire midface is mobile (zygoma bone), ± CSF rhinorrhea. **LeFort IV:** a III that involves the frontal bone
Signs & Symptoms, Diagnosis, Treatment: mandibular fractures	**SSx:** malocclusion, trismus, lower lip paresthesias; BODY = most common **Dx:** CT or panorex **Tx:** manage non-condylar fx as open fx with empiric unasyn, ENT/OMFS consult

Signs & Symptoms, Diagnosis, Treatment: orbital fractures	**SSx:** diplopia, proptosis, limited EOM, ↓ visual acuity; check for infraorbital paresthesia, **inhibited upward gaze** (sign of inferior rectus entrapment), globe injury **Dx:** CT orbit **Tx:** consult ophtho/ENT, decongestants, abx (Augmentin) for sinus involvement
Which **facial bone fx** has the **lowest rate of infection**?	Zygomatic
Diagnosis, Treatment: Nasal septal hematomas	**Dx:** dark red mass/hematoma associated with nasal fx/trauma **Tx:** MUST incise & pack (NO needle) to prevent saddle nose deformity/pressure necrosis. Pack with gauze bilaterally (keeps septum midline). Antibiotics while packing in place
Classification of **neck zones**	**Zone I:** sternum/clavicles to cricoid cartilage **Zone II:** cricoid to angle of mandible, (MC site of injury) **Zone III:** angle of mandible to base of skull. (think of it like an elevator. Zone I is the ground floor)
Discuss the **evaluation of penetrating neck injury** and how it is managed	Intubate early, straight to OR if unstable vitals or **HARD signs** of vascular injury "HARD BRUIT": **H**ypotension (shock), **A**rterial bleeding, **R**apidly expanding hematoma, **D**eficit [pulse/neuro], **Bruit**/thrill), airway obstruction **Soft signs:** CT angio, possible scope/exploration if stable
Possible **complications** of **blunt neck injury**	Pseudoaneurysm, carotid artery dissection, tracheal injury **Dx:** CT angio, if unstable, intubate/ENT consult
Diagnosis: Car Accident + neck pain + ipsilateral facial and arm weakness	**Carotid artery dissection** until proven otherwise. This goes for any new neurologic deficits.
Signs & Symptoms, Diagnosis, Treatment: Traumatic aortic dissection	**SSx:** high speed deceleration, chest pain/back pain, new murmur, pulse deficits **Dx:** stable- CXR (look for mediastinal widening but 1/3 are normal, obscured aortic knob, L apical pleural cap, R tracheal deviation, ↓ L bronchus/↑ R bronchus, loss of AP window, R displaced NGT), VERY stable- get CTA; **Tx:** OR on beta blocker for BP control **Most common location:** aortic isthmus
Diagnosis, Treatment: Flail chest	**Dx:** ≥3 adjacent rib fractures at 2 different points; leads to paradoxical chest motion with respirations; often associated with pulmonary contusion **Tx:** early intubation, ± chest tube
Appropriate **imaging** to evalulation for **sternal fracture**	Must get lateral CXR; consider CT if high suspicion and XR (-)
Identify **high risk rib fractures**	**1-2:** associated with vascular and bronchial injuries **9-11:** associated with liver and spleen lacerations **4-9:** most common location **multiple ribs:** associated with underlying lung contusion
Indications for OR **thoracotomy** with **hemothorax**	Unstable vitals, **initial chest tube output >1.5L (20cc/kg)** OR **>200/hr over 3-4hr (3cc/kg)**, persistent bleeding >7cc/kg/hr, persistent air leak

Management of **traumatic pneumothorax**	**Small:** O2, repeat CXR **Large**: chest tube **Pearl: if intubating with ptx, do **chest tube first** to prevent tension ptx**
Indications for **ED thoracotomy**	**Penetrating trauma**: field arrest <15 min with initial vitals, ED arrest, SBP <50 after IVF **Blunt trauma:** Field arrest <10 min with initial vitals, ED arrest **Other:** suspected air embolism
General approach to **traumatic abdominal injury**	**OR (penetrating):** unstable vitals, peritonitis, evisceration, or transabdominal GSW If none of the above and stable, get CT DO NOT send unstable patient to CT **Tx:** blood for shock even if initial H/H is normal
Most common **injury sites** for abdominal GSW, abdominal stab wound, blunt trauma	**GSW:** small bowel **Stab wound:** Liver **Blunt trauma**: spleen > liver
Signs & Symptoms, Diagnosis, Treatment: Diaphragmatic injuries	Both sides are injured equally, but historically L>R for blunt (more common) & penetrating; consider with any injury nipple to navel; frequently missed/delayed dx **SSx:** SOB, chest/abd pain, n/v, Kehr sign (referred L shoulder pain) **Dx:** CXR with coiled NGT in chest = pathognomonic, blurred hemidiaphragm, air/fluid level in chest **CXR & CT miss 50%** **Definitive Dx and Tx**: laparoscopy/otomy in OR
Abdominal pain secondary to **bike handlebar injury**	Duodenal/pancreas hematoma/injury
Abdominal pain after **lap belt injury**	**Small bowel injury** Part of the “seat belt syndrome” which includes: 1. Transverse abdominal wall contusion 2. Chance fracture 3. Abdominal visceral trauma (e.g. small bowel injury)
What **volume** of fluid/bleeding is required for **positive FAST**?	250 ml
Where is the m**ost common location for intraperitoneal fluid** to appear on the eFAST exam?	RUQ/Morrison's pouch
What traumatic injuries would **NOT be identified on FAST**?	Poor sensitivity for solid-organ injury, hollow viscus injury, and retroperitoneal injury
When is **diagnostic peitoneal lavage** considered **positive**?	Use if unstable + no US or equivocal FAST **(+) DPL** if (**Rule of 10's):** 10 mL initial gross blood/bile/feces If no gross contents, infuse **1000cc** and then aspirate: (+)DPL if **>10,000** RBCs (penetrating) or **>100,000** RBCs (blunt)
How to diagnose **retroperitoneal injuries**	**CT with IV contrast**, FAST will be negative

Signs & Symptoms, Diagnosis, Treatment: Scrotal/testicular injuries	**SSx:** straddle injury, hematuria, scrotal ecchymosis/hematoma, tenderness to palpation **Dx:** doppler US, CT AP **Tx:** urology consult
Time limit to **reimplant amputated penis**	8-12 hr max
Signs & Symptoms, Diagnosis, Treatment: Bladder/urethral Injuries	**SSx:** pelvic fx, gross hematuria, blood at meatus, urinary retention, high prostate, perineal bruising, females may have vaginal bleeding **Dx:** NO FOLEY (before imaging), **RUG** first to evaluate for **urethral** injury, **CT cystogram** for **bladder** injury **Tx:** urology consult, partial urethral lacs typically treated with Foley, complete urethral lacs require surgery
Interpretation of **RUG for possible urethral injuries**	**Anterior Urethral Injury:** distal to UG diaphragm, usually external signs of trauma, RUG: small extravasation with bladder filling **Posterior Urethral Injury:** proximal to UG diaphragm, usually normal external exam, RUG: large extravasation into pelvis
Signs & Symptoms, Diagnosis, Treatment: Bladder rupture	**SSx:** pelvic fx, **gross hematuria** (most common) **Dx:** retrograde cystogram **Tx:** Intraperitoneal (contrast posterior to bladder) → OR (non-emergent), Extraperitoneal (flame pattern) → Foley (no OR)
Signs & Symptoms, Diagnosis, Treatment: Renal injuries	**SSx:** blunt trauma causes 90% renal injuries, gross hematuria (microscopic hematuria is rare for significant injury) **Dx:** CT with IV contrast **Tx:** all ureteral injuries go to OR, most blunt renal injuries are nonoperative; Renal injury is rarely in isolation - look for other injuries
Management of **severe head trauma**	Intubate with GCS ≤ 8; remove c-collar + hold in-line cervical stabilization for intubation; HOB elevated; hyperventilation (temporary measure) → cerebral vasoconstriction → ↓ ICP; Hypertonic saline; consider AEDs; Reverse AC if bleeding
What are the **NEXUS Criteria** and what are they used for?	Used to clear c-spine; DOES NOT include "cervical PAIN": midline cervical ttp, distracting injury, AMS, intoxication, neuro deficits
How to read **C-spine XR**?	**Lateral:** Ant/Post spinal line & spinal laminar lines should be smooth; normal prevertebral space- 6mm at C2 & 22mm at C6; **Open mouth:** C1 and C2 lateral edges should align, look at odontoid for fx

Identify the **unstable C-spine injuries** and their associated mechanisms	"**J**efferson **B**it **O**ff **A** **H**angman's **T**humb" **Jefferson fx** (C1 burst fracture 2/2 axial load) **Bilateral facet joint dislocation** (2/2 hyperflexion) **Odontoid fx** (Type I - tip [stable fx]; Type II - neck [most common and unstable]; Type III - body [unstable]) **Atlantoaxial dislocation** (C1/C2 dislocation) **Hangman's fx** (bilateral C2 pedicle fracture 2/2 hyperextension) **Teardrop fx** (anterior & inferior vertebral body fx with interspinous ligament rupture, 2/2 flexion > extension) **Mechanisms are very important for boards**
Identify landmarks for anterior, middle and posterior spinal column (Denis model)	Classification for thoracolumbar fx **Anterior column:** anterior half of vertebral body **Middle column:** posterior half of vertebral body **Posterior column:** posterior to vertebral body **> 2 columns = unstable**
Most common location of spinal fractures	T11-L2 (50%). **Spinal fractures often occur in multiples**
Describe **wedge**, **burst** and **chance fractures**	**Wedge:** compression of anterior column **Burst:** crush with multiple fragments involving anterior & middle columns **Chance:** fracture through all columns, associated with lap belt injuries
Identify the spinal cord syndromes and their associated neurologic findings: **Central Cord, Anterior Cord, Brown-Séquard**	**Central cord:** 2/2 hyperextension, usually elderly person hitting chin, sensory (cape distribution) & motor deficit, **UE > LE** **Anterior cord:** 2/2 hyperflexion, bilateral motor paralysis, loss of pain/temp, intact vibration & proprioception, worst prognosis (ischemia/infarction) **Brown-Séquard:** penetrating trauma to 1/2 spinal cord, ipsilateral loss of motor, vibration & proprioception, contralateral loss of pain/temp, best prognosis
Identify landmarks for **dermatomes**: C6/7/8, T4, T10, L1, L4/L5/S1, S3-5	**C6:** 1st dorsal web space **C7:** middle finger **C8:** pinky finger **T4:** nipple **T10:** umbilicus **L1:** inguinal ligament **L4:** patella **L5:** big toe **S1:** 5th toe **S3-5:** anus
Clinical Features, Treatment: Neurogenic Shock	Loss of vasomotor & sympathetic tone **Classic features: hypotension** (vasodilation), **bradycardia** (unopposed vagal tone), **poikilothermia** (peripheral vasodilation, "warm shock") **Tx:** IVF, pressors, Atropine

What is **spinal shock**?	Not true shock, more of a spinal "stun" 2/2 no circulatory involvement **SSx:** areflexia & flaccid paralysis (all transient), relative bradycardia; first reflex to return is bulbocavernosus
Indication for **perimortem C-section**	gestation **≥ 24 weeks** + loss of maternal vital signs; **within 4 minutes** of arrest; does not worsen maternal outcome
Describe the steps of **perimortem c-section** (resuscitative hysterotomy)	Indication: > 24 weeks and less than 4 minutes from time of maternal arrest. Vertical incision from uterine fundus to pubic symphysis. Dissect down to the uterus. 2 cm horizontal incision at base of uterus. Insert fingers into incision, push away fetal parts, and extend incision with scissors. Deliver neonate and clamp cord. Deliver placenta. Pack uterus with gauze. Staple close abdominal incision.
What population is at **highest risk for intimate partner violence**?	Pregnant women
Leading non-OB causes of **death in pregnant women**	1. MVC 2. Intimate partner violence 3. Falls
Differential for serious complications in pregnant trauma?	Placental abruption, maternofetal hemorrhage, uterine rupture, preterm labor
Review blast injury Types I-IV	**1°**: blast shock wave (hollow viscus injury; TM rupture = most common blast injury, blast lung) **2°**: projectiles from explosion (penetrating trauma, amputations, lacs) **3°**: individual thrown by explosion (crush injuries, blunt trauma) **4°**: environmental contamination (burns, inhalation injury, smoke, radiation)
What are 2 common concerning **blast-related injuries**	**TM rupture:** most common injury, CXR if (+) to look for blast lung **Blast Lung:** pulmonary barotrauma, most common cause of death **Dx:** CXR (patchy opacities in butterfly pattern); **Others:** delayed intra abdominal injuries, compartment syndrome
Immediate and delayed possible complications with **myocardial contusion**	**Immediate:** arrhythmia (sinus tach most common) **Delayed:** pericardial effusion (most common complication 2 weeks out), MI/CHF, valvular injuries (aortic valve + AR most common), ventricular wall rupture (rare; most common cause of death in non-penetrating cardiac injuries); Sternal fx = most common associated fx. Screen with 1. ECG 2. troponin
What is the most common cause of in-hospital death following near-hanging?	Pulmonary edema (post-obstructive response)

What criteria require **transfer** of a patient to a **trauma center**?	Abnormal vitals, GCS < 14, penetrating trauma, severe blunt injuries (flail chest, multiple long bone fx), pelvic or skull fx, neurological deficits, high mechanism MVC or ped vs auto, elderly or kids, anticoagulant use, pregnant > 20wks
Potential complication of not repairing a **galeal laceration**?	**Loss of the frontalis muscle function** → asymmetric forehead
Diagnosis, Treatment: Patient presents 2 days after a femur fracture w/ AMS, hypotension, hypoxia and petechiae	**Dx:** Fat embolism to the lungs **Tx:** Supportive care. Intubate early because of the development of ARDS and AMS. High risk for DIC. There is no specific treatment.
What type of brain bleed is associated with **basilar skull fractures**?	**Epidural hematoma** Temporal bone is most fractured bone in the base of the skull. Middle meningeal artery runs along the temporal bone.
Diagnosis: Fat protruding through an eyelid laceration	**Globe injury** Eyelids do not have fat therefore the presence of fat is concerning for deeper injury.
When should **tourniquets** be applied **prehospital** per ACEP practice guidelines?	Tourniquets should be used in the setting of **significant extremity hemorrhage** if direct pressure is not sufficient or impractical
What **injury** should you expect in **pediatric trauma patient with paralysis on scene that resolves on arrival to ED**? Workup? Management?	**SCIWORA** - spinal cord injury without radiographic abnormalities **Dx**: MRI of spine **Tx**: Spine Immobilization for 12 weeks.
What **location** of a **dog bite** is a candidate for **primary closure**?	**Facial laceration** (close approximation is appropriate and does not lead to increased infection rates)
Signs & Symptoms, Treatment: Patella tendon rupture	**SSx:** inability to extend knee, superior patellar displacement, tenderness inferior to patella **Dx:** straight leg raise exam, patella alta on XR (high riding patella) **Tx:** knee immobilizer, crutches, referral to orthopedics outpatient
How do you manage a **high pressure injury** (paint gun into finger)?	Splinting, IV antibiotics, admission and immediate surgical consultation (most important as needs debridement)
What **medication** can be used to **reverse Dabigatran** in a patient with traumatic intracranial hemorrhage?	**Idarucizumab** (Praxbind)
What laboratory test, if positive, raises suspicion for **basilar skull fracture**?	**Beta-transferrin**, will help differentiate nasal secretions from CSF leak
Management: Avulsed tooth	Handle tooth by the **crown** (AVOID handling the root). Rinse (DON'T brush or debride) with normal saline. **Extraoral time <20 min:** gently rinse tooth and replace **Extraoral time >60 min:** soak in citric acid/fluoride and consult oral surgeon Do not reimplant primary teeth (6mo - 6yr)
What is the best **transport medium for avulsed tooth**?	**Hank's** balanced salt solution. Others: milk > saliva > saline

What are the general guidelines for administering **tetanus vaccination** for wounds?	**Fully vaccinated:** Clean wound → vax only if last dose >10 years ago; Dirty wound → vax only if last dose > 5 years ago **Un/Incompletely vaccinated:** Clean wound → vax; Dirty wound → vax and TIG
Diagnosis: Trauma patient receiving **massive transfusion** has t**etanic muscle contractions** and **prolonged QTc**	**Hypocalcemia** related to citrate in pRBC
What is the **most appropriate transfusion strategy for patients with severe hemorrhage** on the boards?	**1:1:1; pRBC:FFP:platelets**

Procedures & Skills

Bizz	Buzz
Describe **adequate CPR** prior to placement of a definitive airway	Minimize interruptions, adequate rate (100-120/min), adequate depth (5cm in adults, ⅓ the anterior-posterior (AP) chest diameter in children), allow full chest recoil (avoid leaning), avoid excessive ventilations (30 compressions: 2 BVM breaths), rhythm check every 2 min
What is the appropropriate **compression to ventilation ratio** in a **newborn**?	**Single** rescuers: **30:2** compression-to-ventilation ratio **2 person** rescuers: **15:2** compression-to-ventilation ratio
What level of **EtCO2 indicates adequate chest compressions** during resuscitation?	**10-20 mmHg**; maintaining level >15 is associated with better outcomes; <15 rarely with ROSC; waveform will abruptly increase with ROSC
What are possible **reversible causes of cardiac arrest**?	**H&Ts**: Hypoxia, Hydrogen Ion (Acidosis), Hyperkalemia, Hypothermia, Hypovolemia/hemorrhage, Tamponade, Tension Pneumothorax, Thrombosis (ACS or PE), Toxicologic, Trauma
What **medications** should be considered for **VFib/VTach arrest**?	Epinephrine 1mg q3m, Amiodarone 300mg x1, Lidocaine 1-1.5mg/kg (repeat 0.5mg/kg), Magnesium 2g IV push (esp if torsades), Calcium chloride 1 amp (esp if possible hyperkalemia), Bicarbonate (esp if prolonged arrest)
Are pads or paddles better for **defibrillation**?	**Pads** because better skin contact and safety
What **rhythms** during cardiac arrest should be **defibrillated** and at what dose?	**VFib or VTach**; 360J for monophasic, 150-200J for biphasic
What are general **criteria** for **Therapeutic Hypothermia after cardiac arrest**?	VFib/VTach arrest, ROSC > 60min, induction time < 6 hrs from ROSC, Comatose (or GCS < 9, doesn't follow commands), MAP > 80 mmHg. Consider if PEA with ROSC < 30min, no contraindications
What are **contraindications** to **Therapeutic Hypothermia**?	DNR order, sepsis, cancer with brain mets, active bleeding, advanced dementia
What is the **temperature** goal with **Therapeutic Hypothermia**?	**33-36°C**
Patients with what **ASA classes** are likely **inappropriate for procedural sedation** in the ED?	**Class III** (severe systemic disease) or worse
What **volume of pericardial fluid** can be identified on bedside **US**?	**15mL**
What are general **indications for endotracheal intubation**?	Failure of ventilation (hypercarbia) or oxygenation (hypoxia), failure of airway maintenance or protection, anticipated clinical course
What factors predict **difficulty with BVM ventilation**?	Obesity (or pregnancy), facial hair, elderly (>55), potential airway obstruction, edentulous
Review the **LEMON Rule** for predicted difficult intubation	**LEMON: L**ook externally, **E**valuate 3-3-2, **M**allampati Score (Class IV = strongest predictor of difficult intubation), **O**bstruction, **N**eck mobility

Review definitions of **Mallampati I-IV**	**I**: full view of uvula and tonsillar pillars **II**: full view of uvula **III**: partial view of uvula/base **IV**: only hard palate visible
Medications for **pretreatment prior to intubation** and the theoretical **benefits** of each	**Lidocaine:** blunt increased ICP, bronchospasm **Fentanyl:** thought to blunt sympathetic response to intubation **Atropine:** previously given in kids to prevent reflex bradycardia with intubation (only recemmended in specific situations now, per PALS)
What **complication** of **fentanyl cannot** be **reversed with Narcan**?	Chest wall rigidity or **"Wooden Chest Syndrome"** (rare complication)
Succinylcholine contraindicated for which patients	Hyperkalemia. Denervation injuries (stroke, spinal cord) > 5 days old until 6 months post-injury. Neuromuscular diseases indefinitely (e.g. MS: may not work, AML). Intra-abdominal sepsis > 5 days until resolution. Cholinergic toxidromes (e.g. organophosphates as it will cause prolonged paralysis).
What are the rules regarding **oral intake prior to procedural sedation**?	**No oral intake > 3 hr** (may accept small clear liquids). Note: dislocation reduction and other urgent/emergent procedures should not be delayed to allow time for fasting.
Define: Minimal, Moderate, Deep sedation, General Anesthesia	**Minimal:** anxiolysis, no affect on breathing or vitals **Moderate**: purposeful response to stimulation, none to minimal effects on breathing or vitals **Deep:** purposeful response only to repetitive or forceful stimulus, likely depressed breathing **General:** no response, requires support of breathing and vitals
Side Effects for Etomidate, Ketamine, Fentanyl/Midazolam	**Etomidate**: myoclonus, adrenal suppression, respiratory depression **Ketamine**: emergence reaction, laryngospasm, nystagmus, vomiting **Fentanyl/Midazolam**: respiratory depression, cardiac depression **Propofol**: hypotension, apnea
Contraindication to the use of Ketamine	**Schizophrenia** (may increase psychosis)
Benefits of ultrasound guided central lines	Increases rate of success on initial attempt, decreases number of attempt. However, similar complication rate to non-US guided
True or False: Ultrasound guidance can be used for subclavian central line placement	**True.** It can be used for the supraclavicular approach but not the traditional infraclavicular approach
What is the appropriate **depth** for placement of **right** and **left internal jugular** and **subclavian lines**?	R SC 14cm, R IJ 15cm L SC 17cm, L IJ 18cm All +/- 2cm **Remember that SC is shorter distance than IJ and R is shorter than L**
Equipment for needle cricothyroidotomy	Syringe (3 or 5 ml), ETT (3.0 mm), over-the-needle catheter (14G), BVM

What is the appropriate intervention for a **failed airwa**y in a pediatric patient **(< 8-10 year old)**?	**Surgical cricothyrotomy is contraindicated** in this age group due to small membrane. Perform **needle cric** with transtracheal ventilation. 3.5 mm ETT cap can be attached to the angiocatheter and BVM can be attached to cap for ventilation
Steps for emergent **cricothyroidotomy**	1) Prepare the skin with antiseptic solution 2) Locate cricothyroid membrane (below thyroid cartilage above cricoid cartilage) 3) Make a **vertical** incision in the midline through the skin and SQ tissues 4) Dilate the cricothyroid membrane 5) Place a tracheostomy tube and inflate OR bougie > 6.0 ETT
Block to anesthetize: ipsilateral forehead and scalp	**Supraorbital**
Block to anesthetize: area between lower eyelid and upper lip	**Infraorbital**
Block to anesthetize: ipsilateral lower lip and chin	**Mental**
Block to anesthetize: ipsilateral maxillary molars	**Posterior superior alveolar**
Block to anesthetize: ipsilateral mandibular teeth, lower lip, chin	**Inferior alveolar**
What are the **relative contraindications** to **arthrocentesis**?	Overlying skin infection, bleeding diathesis (lower risk), bacteremia
Location of arthrocentesis: ankle	Medial to the anterior tibial tendon and directed toward the anterior edge of the medial malleolus
Location of arthrocentesis: elbow	Directed medially in the groove between the lateral epicondyle, radial head, and olecranon
Location of arthrocentesis: knee	Midpoint or upper portion of patella and directed beneath the posterior surface of patella into joint
Location of arthrocentesis: shoulder	Inferior and lateral to the coracoid process and directed posteriorly toward the glenoid rim
Synovial fluid differences between **inflammatory** and **infectious arthritis**	**Inflammatory**: clear to opaque, low viscosity, WBC 2-50k, PMN ≥ 50%, negative culture, total protein 3-5, LDH high, glucose >25 (lower than serum) **Infectious**: opaque, variable viscosity, **WBC >50k**, PMN ≥ 75%, positive culture often, total protein 3-5, LDH variable, glucose <25 (MUCH lower than serum)
Location for **escharotomies**	**Neck**: incise from clavicle to mastoid process. **Chest wall**: incise along anterior axillary line from 2nd to 12th rib. **Extremities**: incise on medial and lateral aspects 1 cm proximal to 1 cm distal to burn

Differences between **amides** and **ester local anesthetics**	**Amides**: lidocaine, bupivacaine (2 Is). **Esters**: tetracaine, benzocaine (1 I), allergenic 2º to (PABA). Benzocaine: cardiotoxicity, methemoglobinemia Lidocaine: seizures, hypotension **Toxicity treatment:** lipid emulsion
Describe the location of a **lower leg saphenous vein cutdown**	1-2 cm anterior and superior to the medial malleolus. Horizontal incision through the outer skin layers followed by blunt dissection and identification of the vein then cannulation of the vein.
Contraindication for **tonometry**	Suspected or confirmed **globe rupture**
Steps for emergent **lateral canthotomy** & **cantholysis**	1) Anesthetize the lateral canthus with lidocaine 2) Crush lateral canthus with a straight Kelly clamp x1-2 min 3) Remove clamp and cut the canthus horizontally 4) cut the inferior crus of the lateral canthal tendon and recheck IOP. **Note: If unsuccessful, cut superior crus of the lateral canthus**
Clinical indicators of a **successful lateral canthotomy + cantholysis**	1) Improved visual acuity 2) Resolution of a previously detected APD 3) ↓ in IOP to < 40 mm Hg
Proper **lateral neck radiograph positioning**	Neck in extension, end-inspiration Both make the space **smaller**
Management to **epistaxis**	Apply external pressure to the nasal bridge while leaning forward (often ineffective) → topical vasoconstrictors/anesthetics (oxymetazoline) → packing (anterior packs left in for 2-5 days; includes ribbon gauze, nasal sponges, tampons & balloon catheters). Consider cautery (will not work on actively bleeding vessels, NEVER bilaterally), TXA. If none of these work → IR or ENT
Approach to **failed anterior nasal packing** for epistaxis	Consider posterior bleed! Remove anterior pack and replace with either double or posterior pack. Can use commercial device or Foley catheter.
Location for **intracavernosal aspiration/injection** for **priapism**	Performed at **2 or 10 o'clock position** on the proximal shaft at the dorsal surface This is the location of the corpus cavernosum
Treatment: Thrombosed hemorrhoid	Clot excision with **elliptical** incision **Do not do this if it has been present for >48 hours as they will heal spontaneously at this point and excision does not help**
When **draining a peritonsillar abscess**, what **structure is at risk** and how can it be avoided?	**Internal carotid artery** (2.5 cm posterolateral to tonsil), jugular vein. Keep the needle as **medial** as possible and cut the **needle cap** to make a needle guard. Ensure a maximum of 1 cm insertion depth.
What **portion** of a **peritonsillar abscess** is **drained first**?	First aspiration attempt at the **superior pole** (where most abscesses are located) before moving to the **middle** and finally the **inferior** pole Superior → Middle → Inferior

Maneuvers to diagnose **meningitis**	**B**rudzinski's: **b**end the **b**rain **K**ernig's: extend **k**nees, jolt accentuation
Contraindications for an **lumbar puncture**	Increased ICP, bleeding diathesis, cardiopulmonary instability, soft tissue infection at LP site, vertebral trauma (e.g. fractured vertebra)
Indications for a **CT brain PRIOR to an LP**	Altered mental status, immunocompromised state, focal neuro deficit, increased ICP, h/o CNS lesion, new onset sz in previous week, suspected SAH
Anatomic landmarks for **lumbar puncture** in an adult and infant	**Adult needle placement**: **L2-L3 to L5-S1** (spinal cord ends L1-L2 in adults); L3-L4 interspace is at the level of the iliac crest **Infant needle placement**: **L4-L5** or **L5-S1** (spinal cord ends at L3 in infants)
CSF finding that is pathognomonic for **Subarachnoid hemorrhage**	**Xanthochromia** (may have yellow tinge), can be found from a **few hours post bleed up to 4 weeks**
Signs & Symptoms, Treatment: Postdural puncture headache	Most common complication of LP. **SSx:** 24-48 hours after the procedure, bilateral frontal/occipital, worse when upright or improves/resolves when supine **Tx:** hydration, NSAIDs, caffeine, epidural blood patch (severe sx) **Prevention:** small caliber/blunt needle, replace stylet, bevel parallel to nerve fibers
Indications for a **perimortem C-Section**	**>24wks, loss of vitals in ED**, no worse outcome for mother, **should be done within 4min of loss of pulses**
Needle **location** for **paracentesis**	**RLQ/LLQ entry:** 4-5 cm superior and medial to ASIS **Infraumbilical:** midline 2 cm below the umbilicus Spinal needle in obese
Indications for **thoracentesis**	**Diagnostic**: suspected pleural space infection, new onset pleural effusion **Therapeutic**: relieve dyspnea
Needle **location** for **thoracentesis**	1-2 intercostal spaces below effusion, 5-10 cm lateral to spine DO NOT perform below level of 9th rib to avoid intra-abdominal injury
Steps for **resuscitative hysterotomy**	Midline vertical from the **uterine fundus to pubic symphysis**. Cut through skin and then open peritoneum with scissors. Make a small horizontal incision in the wall of the uterus with a scalpel. Lift the uterine wall off of the fetus with your fingers and extend the uterine incision with scissors. Deliver the infant, clamp the cord, and hand off to the neonatal team. Deliver placenta. Pack the uterus with sterile gauze. Close the abdomen with skin stapler.
Steps to **remove insect from the external auditory canal**	Lidocaine to sedate before extraction, extract with forceps or bulb syringe. With an uncooperative patient (child) consider mineral oil to suffocate bug; must examine canal and TM for injury after removal.

How **old** does a **G-tube** need to be for **safe replacement in the ED**?	G-tubes take **3 weeks** to make a mature tract. Before this, surgery needs to be consulted because of the risk of creating a false tract.
How **long** does it a take a **tracheostomy** to **mature**?	**Two weeks**
Steps for a **bleeding tracheostomy**	1) Attempt tamponade with cuff overinflation 2) Secure airway with endotracheal intubation and cuff overinflation 3) Remove trach tube >> digital compression of innominate artery.
Steps for **paronychia drainage**	I&D with **unilateral longitudinal incision** on ulnar aspect of digits II-IV or on radial aspect of digits I & V **Avoid the pincher surfaces (spares the sensate portion of the finger**
Treatment: Chronic paronychia	**Topical corticosteroids**
Telemetry/**ECG** findings with **successful placement of transvenous pacer in RV**	**Left bundle branch block with left axis deviation**
Location for **chest tube**	**4th or 5th ICS @ anterior or midaxillary line** *Level of the nipple or infra scapular line
Complications of **chest tube drainage system**	**Absence of respiratory fluctuation or a ↓ in drainage:** indicates system is blocked or that the lung is fully expanded **Air leak:** indicates continuous bronchial injury or problem with the mechanics of the chest tube system. To test for air leak, have patient cough and bubbles will form in water seal chamber.
Signs & Symptoms, Diagnosis, Treatment: Re-expansion pulmonary edema after chest tube	Rare complication of chest tube insertion Patients at risk: > 30% pneumothorax, pneumothorax present for > 3 days **SSx**: worsening dyspnea, hypoxia **Dx:** CXR with pulmonary edema **Tx:** supportive. Turn off suction and keep chest tube to water seal only. Treat like you would treat any non-cardiogenic pulmonary edema.
Describe **manual detorsion** of a **testicle**	**"Open Book"** technique. **Medial** to **lateral** rotation or "opening of a book" (at least 1.5 turns - 540 deg).
Describe the **RUSH protocol**	**Rapid ultrasound for shock and hypotension** Bedside US exam looks at cardiac function, IVC dynamics, pulmonary congestion, abdominal free fluid, and abdominal aortic aneurysm
How do **foreign bodies** in the **skin** appear on US? How sensitive is bedside US for **detecting soft tissue foreign bodies**?	Foreign bodies will usually appear as **hyperechoic** foci with **acoustic shadowing** extending distally **Sensitivity is 90%** for identifying foreign bodies such as wood, metal, plastic greater than 4-5 mm in length

Pediatrics

Bizz	Buzz
Etiology of **neonatal jaundice within first 24 hours of life**	BAD sign - ABO incompatibility, Rh incompatibility, TORCH infections, G6PD deficiency Next step: admit, hydrate, and order Coombs test
Etiology of **neonatal jaundice 24 hour - 72 hours**	Usually **physiologic** (if gaining weight, stooling, not anemic, and not direct hyperbili) Check bilirubin nomogram to determine need for phototherapy
Etiology of **neonatal jaundice > 72 hours**	**DDx:** Sepsis, breast milk jaundice, breastfeeding jaundice, Gilberts syndrome
What is the difference between **breastfeeding** and **breastmilk jaundice**?	**Breastfeeding jaundice**: suboptimal supply of breast milk, requires hydration and supplementation **Breast Milk jaundice**: when the baby's liver is not developed enough to handle breaking down the supply of breast milk from mom
Diagnosis, Treament: Baby age **1 month** with jaundice and **direct** hyperbili	**Dx: Biliary atresia** (disease of intra and extrahepatic bile ducts leading to obstructive jaundice, cirrhosis, and death) Typically diagnosed **before 2 months** **Tx:** surgery w/ Kasai procedure.
What are the most concerning (and unique) **causes of abdominal pain** in the following age groups: 0-3 month, 3 month - 2 year, school aged kids	**0-3 month:** Necrotizing Enterocolitis, Hirschsprung's/Toxic Megacolon, Volvulus, Pyloric Stenosis **3 month - 2 year:** Intussusception, Meckel's Diverticulum, Foreign Bodies **School age:** similar to adults appendicitis, pregnancy, ect.
Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Necrotizing Enterocolitis	**Pathophys:** Inflammation & necrosis of the bowel wall from translocation of gut bacteria; prematurity is greatest risk factor **SSx:** bilious emesis, bloody stools, abdominal wall erythema **Dx:** XR with pneumatosis intestinalis (pathognomonic), portal vein air (poor prognosis) **Tx:** IVF, broad spectrum antibiotics, NG tube (bowel rest), surgery consult, admit ICU
Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Hirschsprung Disease	**Pathophys:** Lack of ganglion cells in the rectosigmoid colon → lack of distal bowel motility **SSx**: Delayed passage of meconium (> 48 hours) → obstruction & bilious emesis (late finding) **Complications:** enterocolitis/toxic megacolon **Dx**: rectal suction biopsy (gold standard), contrast enema (shows transition zone) **Tx**: surgery, admit

Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Midgut Volvulus	**Pathophys:** 1st month of life; Congenital malrotation → volvulus → midgut ischemia **SSx**: bilious vomiting (always emergent), abd pain/distention, ± rectal bleeding/hematochezia (gut ischemia) **Dx**: XR "double bubble" can also be seen in duodenal atresia, upper GI series "corkscrew" sign (definitive) **Tx**: NGT, surgery consult. **Associated conditions:** congenital diaphragmatic hernia, congenital heart disease, omphalocele
Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Intussusception	**Pathophys:** 6 month - 3 year; telescoping of bowel (ileocecal most common); typically has a lead point - Tumor, Meckel's, post-viral, HSP **SSx:** colicky abd pain w/ lethargy + abd mass (sausage-shape in RUQ; RLQ usually empty) + "currant jelly" stools **Dx**: XR - obstruction, Dance's sign (pathognomonic); US with "target sign" **Tx**: OR (sick), air/contrast enema (not sick)
Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Meckel Diverticulum	**Pathophys:** Most common congenital GI malformation. Incomplete closure of vitelline duct → heterotopic gastric mucosa **SSx:** painless rectal bleeding 2/2 ulceration → obstruction (2/2 intussusception/volvulus/hernia) Rule of 2s: 2% of population, 2% symptomatic, 2 feet proximal to terminal ileum, 2x more often in males, 2 year old most common **Dx**: Meckel (technetium-99m) scan **Tx**: surgical consult
At what **anatomical levels** do **ingested foreign bodies** usually get **stuck**?	**Cricopharyngeus C6 (60-80%)**, GE junction T11 (10-20%), Aortic Arch T4 (5-20%) **Coin most common object swallowed
Describe the different appearance on **CXR** of a **coin in the esophagus versus the trachea**	If in the **esophagus**: coin will appear **flat** on the **AP view** If in the **trachea**: coin will appear **flat** on the **lateral view**
What are indications for **emergent endoscopy** for **ingested foreign body**?	High-grade obstruction, object in esophagus > 24 hours, object > 6 cm, sharp objects, multiple objects swallowed, **button battery in esophagus**, button battery in stomach > 48 hours or if symptomatic (earlier)
Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Pyloric Stenosis	**Pathophys:** Age 2-8 wks. Hypertrophied pylorus. Most common congenital GI disorder. Risk factors: first-born males, macrolide abx exposure **SSx: nonbilious** projectile vomiting, "hungry vomiter"; Exam: **palpable "olive-shaped" mass** **Dx:** Labs: **hypoCl**, **hypoK**, **metabolic alkalosis (2/2 vomiting)**, dehydration; US (target sign), upper GI series **"string sign"** **Tx**: fluids and correction of electrolytes FIRST, then surgery

What is the **most likely location of traumatic C-spine injury** in young children?	**Age < 8** more susceptible to **upper cervical spine injuries (C1-3)** given the proportional size of the head relative to the rest of the body
What are normal variants in **pediatric c-spine imaging**?	**Pseudosubluxation** (C2 on C3), growth plates can look like fractures, anterior wedging
What is **SCIWORA**?	**"Spinal cord injury without radiographic abnormalities"** May present with missed old injury leading to significant subsequent injury after relatively minor trauma. XR/CT without abnormalities, MRI will show problem area. Most commonly seen in children and the elderly.
Common causes and presentations of **anemia** in young children	**Physiologic nadir** (Hgb 9 at 6wks), **B12/folate deficiency** (high MCV, hypersegmented polys, seen in vegans), **Iron deficiency** (1-2yr, low MCV, associated with *pica*, breath holding, high milk intake (more than 28-32 ounces per day)), **Sickle Cell dz** (hemolysis, high retic count), **Lead Poisoning** (basophilic stippling, abd pain, AMS)
Approximate **weight** for newborn, 1yr, 5yr, 10yr	Newborn: 3.5 kg 1yr: 10 kg 5yr: 20 kg 10yr: 40 kg
How do you determine **ETT size**, **depth**, and **blade** size in young children?	Term Newborn: **3.5 ETT** Otherwise **ETT = Age/4 + 4 (minus 0.5 cm for cuffed)** Depth = **3x tube size** Blade = **1 for newborn up to 2 yr; 2 for 2-12 yr; 3 > 12 yr**
ETT size for **premature** neonates or small neonates?	< 1 kg: 2.5 uncuffed 1-2 kg: 3.0 uncuffed
What are the general cutoffs for **abnormal vitals** in a newborn/infant?	Patient is SICK if **SBP < 60**, **RR > 60**, **HR > 180**
What is the equation to determine the **lower limit of normal for a child's SBP**?	Normal SBP = (Age x 2) + 70
Signs & Symptoms, Treatment: Breath Holding Spells	**Dx:** 6 mo-6 yr; associated with pain/emotion, ± turn blue then pass out, but child returns to normal after this and is otherwise well **Tx**: reassurance. Rule out Fe deficiency anemia, otherwise patient will grow out of it
What characterizes **Tic/Movement Disorders**? What are some associated **red flags**?	More common in males, **suppressible but involuntary** movements/actions/verbalizations in otherwise normal child **Red flags**: head bobbing, neuro deficits, nystagmus, choreoathetoid movements
What is the approximate **blood volume in a child**?	**80cc/kg**
At what level of **blood volume loss** does a **child drop their BP**?	**30%**
Peds **trauma** + **hypotension**. What are **initial bolus doses for blood** and **IVF**?	pRBC: **10cc/kg** Crystalloid: **20cc/kg**

Characteristics of the following viral exanthems: Measles/Rubeola, Rubella, Erythema Infectiosum/5th Disease, Varicella, Roseola, Hand/Foot/Mouth, Herpangina	**Measles (Rubeola)**: Cough/Coryza/Conjunctivitis (3 C's), Koplik's spots, **rash: maculopapular, head → feet**; complications: AOM (most common), encephalitis **Rubella:** "3d Measles"; suboccipital/posterior auricular lymph nodes, petechiae on hard palate, **rash: maculopapular: face → trunk** **Erythema Infectiosum (Fifth Disease):** Parvovirus B19, URI sx (3-5 days) → rash: **"slapped cheek"** with circumoral pallor; aplastic crisis in sickle cell dz. **Varicella: vesicles (dew drop on rose petal)** in crops **at different stages**, **spares palms/soles**.Treat with Acyclovir for immunosuppressed/age > 12, encephalitis/pneumonitis **Roseola: HIGH fever** → rash (**blanching maculopapular**), HHV-6, associated with febrile sz, mimics sepsis/meningitis **Hand/Foot/Mouth:** Coxsackievirus, URI prodrome, **vesiculopapular lesions (hands/feet)**, anterior mouth ulcers (most common: tongue/buccal mucosa) **Herpangina: painful ulcers and vesicles in the posterior oropharynx** + fever
Characterize, Treatment for tinea infections based upon location	T. capitis: head T. corporis: body T. cruris: groin T. pedis: foot T. unguium: nail (aka onychomycosis) **Tx:** t**opical antifungals UNLESS in hair (PO griseofulvin or terbinafine)**
Diagnosis, Treatment: Kerion	Inflammatory head/hair fungal lesion on scalp **Tx**: PO griseofulvin or terbinafine Complication: scarring alopecia
Distinguish, Diagonse, and Treatment: staph/strep infections including Impetigo, Bullous Impetigo, Staph Scalded Skin Syndrome	**Impetigo:** age < 6, **honey-crusted lesions** on face, pruritic NOT painful; **Tx**: topical mupirocin; Complication: PSGN. **Bullous Impetigo**: bullae formation with honey crusts, **Tx**: topical mupirocin + PO Keflex **SSSS**: severe form of bullous impetigo (extensive bullae), infants/young children, rash: erythroderma (perioral is classic), NO mucosal involvement, (+) Nikolsky's, **Tx**: PCN (e.g. Dicloxacillin) ± MRSA coverage (e.g. Vancomycin), admit
Diagnosis, Treatment: Acute Rheumatic Fever	Child with **recent hx of strep throat** that has fever, migratory polyarthralgia, signs of pericarditis or myocarditis/CHF, subcutaneous nodules, sydenham's chorea (rare, but often tested). All parts of **JONES criteria**. **Tx:** Penicillin. ASA/NSAIDs for the arthritis.
Complication of **untreated rheumatic fever**	**Mitral stenosis** as an adult

Signs & Symptoms, Treatment: Scarlet Fever	Age 2-10. Group A Strep infxn **SSx:** pharyngitis, strawberry tongue, circumoral pallor, rash: sandpaper feel, groin/axilla → trunk/extermity, spares palms/soles, pastia lines (linear petechiae) **Tx:** PCN to reduce incidence of rheumatic fever (not glomerulonephritis)
Signs & Symptoms, Treatment: Erysipelas	Upper dermal infection with GAS **SSx:** erythematous plaque, **sharp border** (cellulitis is less discrete), ± ears **Tx**: Amoxicillin/Keflex (mild), Ceftriaxone (systemic dz)
Diagnosis, Treatment: Pityriasis Rosea	**SSx: Herald patch** → Christmas tree distribution of rash on back **Tx**: improved with sunlight, antihistamines (pruritus), otherwise self-resolves
Distinguish, Diagnosis, and Treatment: Scabies vs. Lice	**Scabies: linear burrows** (pathognomonic), pruritic rash (hand/feet/groin); **Tx**: **permethrin** (NOT lindane for peds/pregnant → seizures), Ivermectin **Lice:** nits (eggs attached to hairs) with extreme pruritus on head; **Tx: permethrin** (alt. malathion), scrape out nits, repeat treatment in 7-10 days
Diagnosis, Treatment: Bed bugs	Pain immediately after bite. Can develop papules, bullae, and wheals. **Lines of bites**. **Tx**: antihistamines for itching, consider topical steroids for inflammation, supportive care, hot water washing for bedding
Signs & Symptoms, Treatment, Complication: Kawasaki Disease	**SSx**: **fever >5 days** (most common sx) + 4/5 hallmarks- bilateral conjunctivitis, oral mucosal changes (lip cracking, "strawberry tongue"), ext. changes (hand/foot erythema), polymorphous rash, cervical LAD (at least 1 > 1.5cm) **Tx:** high-dose **ASA**, **IVIG**. Complication: coronary artery aneurysm
Pathophysiology, Signs & Symptoms, Diagnosis, Treatment, Complication: Henoch-Schönlein Purpura	**Pathophys:** Post-infectious vasculitis (IgA deposition); most common vasculitis in Peds. Age 6 mo-5 yrs **SSx:** (TRIAD): **palpable purpura + colicky abd pain + arthralgia** **Dx: hemolytic anemia**, normal/high platelet count, **AKI**, lethargy **Tx**: If no renal failure, supportive care with NSAIDs. NO ABX. Admit if renal failure/involvement **Complications: intussusception** (heme pos. stool), renal failure (micro. hematuria, proteinuria, elevated BUN/Cr)
What **type of intussusception** is typically seen in **Henoch-Schonlein Purpura**?	**ileo-ileo** **The most common type of intussusception outside of HSP is ileocecal
Bacterial cause, Signs & Symptoms, Treatment: Cat Scratch Disease	***Bartonella henselae*** **SSx:** cat scratch/bite 1-3 weeks prior, causes regional LAD (up arm and into axilla) **Tx**: Doxycycline (Azithromycin in pregnancy)

Febrile Seizures: Simple vs Complex	**Febrile sz criteria**: convulsions + fever, 6 mo-5 yr (NOT < 6mo), no CNS infxn/inflammation, no metabolic abnormalities, no h/o non-febrile sz **Simple:** 6 mo-5 yrs, single episode/24hr, <15 min, generalized (tonic/clonic); no neuro hx and normal exam; no special workup or tx needed **Complex:** anything else
What are the most common **midline** and **lateral congenital neck masses**?	**Midline:** thyroglossal duct cyst - moves up and down with tongue protrusion **Lateral:** branchial cleft cyst (vs. cystic hemangioma)
Most common objects, Signs & Symptoms, Diagnosis, Treatment: Peds Respiratory Foreign Body	**Objects: coins** (most common), peanuts, beans **SSx**: high suspicion if sudden choking or coughing ± wheezing, stridor. Often unsupervised child **Dx:** CXR: obstructive emphysema (FB obstructs bronchus on expiration, hypodense), CT if in doubt **Tx**: bronch (gold standard for Dx & Tx)
What is the PALS approach to **resuscitation** in a **choking child <1 yr**?	**5 back blows**, **5 chest compressions** (no abd compressions)
Signs & Symptoms, Diagnosis, Treatment: Croup	Age: 6 mo - 3 yr Pathogen: ***Parainfluenza*** virus **SSx:** URI sx with barky, seal-like cough, inspiratory stridor, low grade fever, non-toxic appearance **Dx**: mostly clinical diagnosis, XR: steeple sign **Tx:** dexamethasone (0.6mg/kg), racemic epinephrine for stridor at rest (before steroids if given, monitor for rebound x4hr); Dispo: admit if sick, hypoxic, or with persistent stridor. Consider bacterial superinfection
Signs & Symptoms, Diagnosis, Treatment: Epiglottitis	Age: 3 - 7 yr Pathogen: *H. influenzae* (less since vaccine, now more adults), ***Strep. spp.*** **(most common)**, *S. aureus* **SSx:** toxic appearance, **rapid** progression of high fever, dysphagia, leaning forward/"tripod" position, dysphonia, drooling, inspiratory stridor **Dx:** XR: **thumbprint sign** **Tx:** airway management (**OR for eval**, BVM ok, avoid RSI), IV abx (CTX)
Signs & Symptoms, Diagnosis, Treatment: Bacterial Tracheitis	Age 3 - 5 yr Pathogen: *S. aureus*, mixed flora **SSx**: URI prodrome similar to croup BUT intensifies to include high fever, **inspir. & exp. stridor**, mucopurulent sputum or cough. breathe better when they lay flat. ****Croup but TOXIC appearing** **Dx**: XR: **subglottic narrowing**, hazy tracheal lumen **Tx:** airway management, IV abx. They do not respond to racemic epi or steroids.

Signs & Symptoms, Diagnosis, Treatment: Retropharyngeal Abscess	Age: 6 m - 4 yr Pathogen: Staph/Strep/anaerobes Common after trauma (e.g. popsicle stick), URI **SSx:** fever, sore throat, dysphagia, drooling trismus, stridor; **TOXIC appearing**, limited neck extension, muffled voice **Dx:** XR: widened prevertebral space 7 mm at C2, CT neck w contrast (imaging study of choice) **Tx:** Amp+sulbactam, ENT/OR
Signs & Symptoms, Diagnosis, Treatment: Bronchiolitis	Age < 2 yrs Pathogen: RSV (most common) Lower airway inflammation **SSx:** URI prodrome → fever, tachypnea, wheeze, **apnea (< 1 mo)**, lasts 1-2 wks **Dx:** CXR: diffuse infiltrates **Tx:** mild → nasal suctioning, hydration; severe → trial of nebs (controversial), suctioning, humidified HFNC Dispo**:** admit if persistently hypoxemic or < 3 mo for apnea monitoring
Most common causes of **pneumonia** by age group: < 3 mo, 3 mo - 5 yr, > 5 yr. What are the treatments by age?	**0-3 wks: GBS**, *E. Coli*, *Listeria, Staph* **3 wk - 3 mo**: ***C. trachomatis***, RSV, pertussis **1 mo - 5 yrs**: **RSV**, numerous viruses, *S. Pneumo,* atypicals **> 5 yrs**: ***M. pneumoniae***, atypicals **Tx**: **Neonates**: septic w/u, Amp + Gent or Cefotax, admit, **3 wk - 3 mo**: Azithro ± Cefotax, **3 mo - 18 yrs**: Vanc + CTX ± Azithro (ICU), CTX (inpt), Amox or Azithro (outpt)
Workup, Treatment: Fever in kids < 4 wks, 4-8 wks	**< 4 wks:** (GBS, *E. coli*, Listeria) blood & urine cultures, XR, LP, admit; Tx: ampicillin + cefotaxime or gentamycine, add acyclovir & vancomycin depending on risk **4-8 wks:** use clinical decision rules (Philadelphia, Rochester, Boston - generally well appearing, full-term, WBC <15, bands <1.5, CSF wnl, UA WBC <10); LP, abx Dispo: home (low risk), admit (high risk). **Always send UA
Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Myocarditis vs. Pericarditis in kids	**Myocarditis:** Most common cause of HF in kids. Viral infxn (MC Parvovirus) **SSx**: poor feeding & sweating, increased RR/HR, hepatomegaly (most specific finding or HF) **Dx**: nonspecific ECG, +trop **Tx**: diuretics, inotropes, IVIG, admit, consider ECMO **Pericarditis:** viral infection (Coxsackievirus) **SSx**: fever + dyspnea + chest pain (worse lying flat) **Dx**: ECG diffuse STE or PR depression, trop (-), get TTE r/o effusion **Tx:** NSAIDs

Signs & Symptoms, Treatment: PDA vs. ASD vs. VSD in kids	**PDA:** L→R shunt (Ao→PA) **SSx**: continuous machine murmur, wide PP, **may be worse with O2** **Tx**: indomethacin, surgery **ASD:** L→R shunt & R heart failure **SSx**: asymptomatic unless large (often delayed dx), **fixed split S2** **VSD**: most common congenital heart dz; L→R shunt R heart failure **SSx**: **loud, harsh holosystolic murmur** at LLSB (smaller the defect, the louder the murmur), usually presents @ 6 wks **Tx**: heart failure tx, peds cards consult ± surgery
What are the 5 **cyanotic congenital heart lesions**?	All R→L shunt (eaRLy cyanosis) **Truncus Arteriosus, Transposition of Great Arteries, Tricuspid Atresia, Tetralogy of Fallot, Total Anomalous Pulmonary Venous Return**
Diagnosis, Treatment: Cyanosis in a 2-10 day old neonate with a murmur	**Dx:** Cyanotic congenital heart disease (ductal dependent). Rapid decompensation with cyanosis at day 2-10 (when ductus closes) Lesions: coarctation of aorta, critical aortic stenosis, hypoplastic left heart, tricuspid atresia, tetralogy, transposition **Tx:** PGE1 to reopen duct (side effects: hypotension, apnea, cardiac arrest), admit to PICU
What is the **hyperoxia test** and what is it used for?	Test used to differentiate sick infants/neonates with cyanotic congenital heart disease from those with pulmonary disease. Place the patient on 100% oxygen for 10 minutes and check an ABG from the R radial artery. If the PaO2 is <100-150 after 10 minutes, this is more consistent with cyanotic CHD with R>L shunting.
Definition, Signs & Symptoms, Diagnosis, Treatment: Tetralogy of Fallot	**Key features**: RVH, RVOT stenosis, VSD, overriding aorta **SSx:** cyanosis day 2-10 with duct closure, shock, little improvement with O2 **Dx:** XR boot-shaped heart, ECHO **Tx:** PGE1, bicarb, IVF, blood, sat to 70s is ok
Describe a **typical tet spell** and appropriate treatment	Hypercyanosis associated with feeding, straining, crying, or exertion **Tx:** increased SVR (knee to chest, squatting), O2, morphine (decreased PVR)
Describe the presentation of **Coarctation of the Aorta** based on age	**Neonate:** HF & shock @ day 2-10 2/2 ductus closure **Infant/child:** HTN UE>LE, UE pulse delay and HF sx **Adults:** HTN, delayed LE pulses XR: rib notching

What is the appropriate **administration of glucose** for hypoglycemia in neonates and kids?	"Rule of 50" or "5-2-1" < 1 yr: D10 (5cc/kg) 1-8 yrs: D25 (2cc/kg) >8 yrs: D50 (1cc/kg)
Signs & Symptoms, Diagnosis, Treatment: Congenital Adrenal Hyperplasia	**SSx:** Virilization ("girls look like boys, boys not much different") & salt wasting. 21-hydroxylase most common **Dx:** adrenal crisis (↓ Na, ↑↑ K) **Tx:** glucose, IVF, IV steroids (Hydrocortisone, not dexamethasone, which only has glucocorticoid activity)
Signs & Symptoms, Diagnosis, Treatment: (Generic) Inborn Error of Metabolism	Ammonia & acid production Present at day 3-5 **SSx:** tachypnea, vomiting, AMS, seizures, odd smell **Dx:** hypoglycemia, metabolic acidosis, hyperammonemia **Tx:** stop protein breakdown (NPO, IVF), glucose (D10, not D5), remove ammonia (NH3 scavenging meds)
Diagnosis: 3 - 5 yo patient with painless abdominal mass	**Wilms Tumor** (nephroblastoma)
Age, Risk Factors, Protective Factors for SUDI/SIDS	**Sudden Unexplained Death in Infancy; formerly SIDS** Unexpected death of infants without pathologic cause. Age < 2yr (peak 2-4 mo) **Risks:** maternal smoking/drug use, prone sleeping (campaign was "Back to Bed"), loose bedding, soft sleeping surface, male, prematurity, +FHx **Protective:** breast feeding, pacifier, supine sleeping
Criteria, Diagnosis, Treatment: BRUE	**Brief Resolved Unexplained Event; formerly ALTE** Associations: Pertussis, RSV. Idiopathic = most common cause **Criteria:** Peak age: 1 wk-2 mo (must be < 12 mo). Sudden, brief, now resolved episode including: cyanosis or pallor, irregular breathing, change in tone, ALOC with return to baseline **Dx**: workup per h&p and high vs low risk. Pertussis screen and ECG **Tx:** low threshold to admit for board exam. Only dc select very low risk episodes
Diagnosis, Treatment: infant with seizures, financial insecurity	**Hyponatremia from diluted feeds** **Tx**: hypertonic saline (2 ml/kg 3% NaCl)
Diagnosis: AMS, kid with ETOH ingestion, hx of DM	**Hypoglycemia** (replete per rule of 50)
Diagnosis, Treatment: kid at grandma's house with AMS, pinpoint pupils	**Clonidine ingestion** **Tx**: narcan
Diagnosis: kid with lethargy, intermittent crying and abdominal pain	**Intussusception**
Diagnosis: kid with bloody diarrhea, lethargy	E Coli O157:H7 & possibly HUS **NO abx → increases chance of HUS
Diagnosis: child crying, boyfriend babysits	Non-accidental trauma/abuse
Diagnosis: Recurrent RML pneumonia in a child	Aspirated foreign body / Ball valve effect and post-obstructive PNA

Diagnosis, Treatment: Phimosis vs. Paraphimosis	**Phimosis:** **unable to retract foreskin**, **NOT** an emergency if patient can urinate **Tx**: topical steroid cream, gentle retraction **Paraphimosis**: **inability to reduce foreskin back to anatomic position**, **emergency** ("call the paramedics") → causes ischemia **Tx:** manual reduction, Urology consult (dorsal slit procedure, circumcision)
Risks for UTI based on sex/age, criteria for sending urine culture, and dispo criteria for UTI in kids	**Males:** < 1 yr & uncircumcised < 2 yrs **Females:** ALL, esp < 2 yrs **Ucx analysis:** suprapubic aspiration (rare but gold standard), even if urine dip normal, >50K CFU+ Fever + UTI = Pyelonephritis requires admit for IV abx, otherwise home with abx
What is a common cause of **UTI** < 1 yr?	50% with **vesicoureteral reflux** or other structural abnormality
Diagnosis, Treatment: Reye's Syndrome	Kid takes **aspirin** for viral URI → AMS and fatty degeneration of the liver, **cerebral edema** **Tx:** supportive.
What is the most common cause for **meningitis** in a neonate?	Group B Strep, E. coli, or Listeria
Diagnosis: Rectal prolapse in a kid	**Cystic Fibrosis**
Common Pathogens, Treatment: neonatal conjunctivitis	Rule of 5's **N. gonorrhoeae** (d 0-5), lots of purulent discharge, **Tx: IV cefotaxime** **C. trachomatis** (5 d-5 wk), **Tx: oral macrolide** to prevent pneumonia **Strep or H. flu** (5 wk-5 yr) **Bonus: The eye is most common site of gonorrhea in newborns
Definition, Signs & Symptoms, Diagnosis, Treatment: Legg-Calve-Perthes disease	**Idiopathic avascular necrosis** of one/both femoral heads Male 4-10 yrs **SSx:** limp + unilateral hip/thigh/knee pain, **worse with activity**. **Limited hip abduction & internal rotation**, ± limb length discrepancies **Dx**: XR "**moth eaten**", "crescent sign" **Tx:** non-weight bearing, Ortho referral
Definition, Signs & Symptoms, Diagnosis, Treatment, Complications: Slipped Capital Femoral Epiphysis **(**SCFE)	Most common hip disorder in teens Obese males. Age 12-16 yrs **SSx**: limp (L>R), hip pain, ext. rotation deformity **Dx:** XR pelvis (**"ice cream falling off of cone"**) **Tx**: non-weight bearing, surgery, admit **Complication**: avascular necrosis

Definition, Signs & Symptoms, Diagnosis, Treatment: Transient Synovitis	Inflammation + hypertrophy of hip synovium. Most common cause of hip pain in 3-10 yrs **SSx:** URI hx, limp with decreased ROM. **Hip held in flexion, ABduction, and ext. rotation.** **Dx:** Normal labs. XR: normal, US: ± joint effusion. ±Arthrocentesis (normal). **Tx:** NSAIDs
Definition, Signs & Symptoms, Diagnosis, Treatment: Septic Arthritis	Infection of the joint space (most commonly **S. aureus**). Male < 4yrs Knee (most common joint) > hip **SSx:** fever, irritability, pain, refusal to bear weight or move joint; hip, held in flexion, ABduction and external rotation **Dx:** WBC > 12k, ESR > 40, fever, refusal to bear weight (Kocher criteria). Synovial fluid will show WBC > 50,000 with > 75% PMNs **Tx**: IV abx, OR for washout
Signs & Symptoms, Diagnosis, Treatment: Post-Streptococcal Glomerulonephritis	Follows a GAS infxn (pharyngitis > impetigo) **SSx:** HTN, hematuria, periorbital edema **Dx:** UA: proteinuria, RBC casts. Others: +ASO titer, low C3 level **Tx:** supportive. Water restriction and lasix. Abx do NOT prevent this dz.
What are the 3 most common disease associations with pediatric **biliary colic**?	1. **Hemolytic anemia** (e,.g. sickle cell dz) is most common. Hemolysis → pigmented stones 2. **Cystic fibrosis** 3. **Obesity** (less so)
What is an **apt test**?	A way to determine if GI bleeding in a neonate is from the baby or swallowed from the mom. Basically, the bloody stool is exposed to an alkali solution and if fetal blood it will stay pinkish, red. **Maternal blood will degrade.**
Diagnosis, Treatment: Infantile Spasms	Presents at 4-8 months of age **Dx**: triad of **clusters of myoclonic seizures on awakening** + **hypsarrhythmia** on EEG + **developmental delay** **Tx**: **ACTH**, prednisone and AEDs Association: **tuberous sclerosis** (10-20% of cases)
What **medication** is associated with development of **pyloric stenosis**?	**Macrolides**: Azithromycin, erythromycin
What **bilirubin concentration** puts neonate at risk of **kernicterus**?	Total Bilirubin **> 25** Requires **phototherapy**
What are **clinical features** of **kernicterus**?	Lethargy, hypotonia, poor feeding, eventually develop choreoathetoid cerebral palsy, hearing loss, gaze abnormalities MRI imaging will find signals in **globus pallidus**
What is **surgical airway** of choice in children **less than 10 years old**?	**Needle cricothyrotomy** (attach 3.0 mm endotracheal tube adapter directly to angiocatheter of 14 to 16 gauge and bag ventilate)

What are the **I:E ratios** used when using a **BVM** through a **needle cric**?	**Incomplete airway obstruction**: 1:5 or 1:6 (10-12 breaths per minute) **Complete airway obstruction**: 1:10 to 1:12 (5-6 breaths per minute) **Major difficulty will be exhalation and avoiding barotrauma

Gastrointestinal

Bizz	Buzz
What **pain medication** is best for **biliary colic**?	**NSAIDS**, it is prostaglandin-mediated pain
Diagnosis, Treatment: RUQ US with gallstones and dilated common bile duct	**Dx:** Choledocolithiasis, ± Jaundice **Tx:** ERCP
Gold standard **diagnostic test**: choledocolithiasis	**MRCP**. ERCP and endoscopic US are good as well but they are invasive. HIDA scan not helpful.
What is the **sensitivity** of **Murphy's sign** for Acute Cholecystitis?	65%
US findings: Acute Cholecystitis	Gallstones, gallbladder wall thickening (> 3 mm), pericholecystic fluid, sonographic Murphy's
What is **Acalculous Cholecystitis**? Who is at high risk?	**Inflamed gallbladder but NO stone**; typically in the **critically ill**, post-operative or elderly. higher rates of gangrene, higher mortality
Diagnosis, Treatment: Fever + RUQ pain + Jaundice	These symptoms are **Charcot's Triad**. For Reynold's Pentad, add AMS and hypotension. **Dx: Ascending Cholangitis** - biliary obstruction with ascending bacterial infection; HIGH Mortality. **Tx:** broad spectrum antibiotics, ERCP vs surgery
What **malignancy** is associated with chronic **RUQ** abdominal pain, **Jaundice**, **Weight Loss**?	Cholangiocarcinoma
What is the **risk of cancer** in patients with a **Porcelain Gallbladder**?	25%
What **arthropod** is associated with **pancreatitis**?	Scorpion
Diagnosis: abdominal pain with bruising around the flank and umbilicus	**Hemorrhagic Pancreatitis.** Ecchymosis of left flank (Grey-Turner sign), Peri-umbilical ecchymosis (Cullen sign)
Does **lipase level** correlate with **severity** of disease in Pancreatitis?	No, useful for diagnosis but not prognosis
What are the components of **Ranson's Criteria** in Acute Pancreatitis?	At admission/In ED: Age > 55, WBC > 16k, Glucose > 200, LDH > 350, AST > 250. Helps predict inpatient mortality
What are 2 potential long-term **consequences** of **Chronic Pancreatitis**?	Malabsorption when 90% affected, late-onset type I diabetes
What **malignancy** is associated with **painless jaundice** and **palpable gallbladder** (Courvoisier sign)?	**Pancreatic Cancer**; most common at head of pancreas, high mortality, high CA 19-9
What malignancy is associated with **migratory thrombophlebitis**?	Pancreatic Cancer; also called "Trousseau's sign"
What is the difference between **incarcerated** and **strangulated** hernias?	**Incarcerated**: not reducible **Strangulated**: not reducible and ischemic (requires surgery)
What are the structures that make up **Hesselbach's traingle**?	Inguinal ligament, inferior epigastric vessels, lateral border of rectus abdominis
What do you call an inguinal hernia medial to the inferior epigastric artery?	**Direct** inguinal hernia. Less likely to incarcerate. Do not typically descend into the scrotum.

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What do you call an inguinal hernia lateral to the inferior epigastric artery?	**Indirect** inguinal hernia. most common inguinal hernia in men and women. involves the internal inguinal ring. Often descends into the scrotum.
What type of **hernia** appears on the **medial thigh**? Who is at highest risk?	**Obturator** hernia. **Elderly women** are at highest risk.
Location and Treatment: femoral hernia	**Location:** anterior thigh below the inguinal ligament **Tx**: urgent surgery consult due to very high risk of strangulation
What is the underlying **pathology** in **Achalasia**?	**Impaired relaxation of the lower esophageal sphincter** (LES), absence of peristalsis; most common esophageal motility disorder. Patients will present with dysphagia and they will "raise their arms above their heads" or "straighten their backs" after eating to increase intraesophageal pressure
Diagnosis, Signs and Symptoms, Diagnostic Test, Treatment: ill-appearing patient with chest pain after vomiting	**Dx: Boerhaave's Syndrome** - full-thickness perforation of esophagus causing mediastinitis. **SSx:** Mackler's Triad: **SubQ emphysema** + chest pain + vomiting; "Hamman's Crunch" (crunching sound around heart). **Diagnostic Test**: esophagram (water soluble) or CT w/ contrast. **Tx**: antibiotics, surgical consult
On **what side** of the **esophagus** is rupture most common?	Left side (**distal posterolateral esophagus**).
What condition predisposes to **spontaneous esophageal rupture**? Treatment?	**Esophageal Candidiasis** (consider in HIV patient). **Tx:** oral **fluconazole**, IV fluconazole if septic or cannot tolerate PO.
Diagnosis: regurgitating food and recurrent aspiration pneumonia	Esophageal Diverticula (Zenker's is pharyngeal mucosa above UES)
Diagnosis: a kid with witnessed choking episode	Esophageal (or tracheal) foreign body. Do thorough workup so this is not missed.
What is the most common **location of obstruction** in esophageal **foreign body ingestion**?	Cricopharyngeus (C6) > Aortic Arch (T4) > GE junction (T11)
What foreign bodies in the **esophagus** require immediate/emergent **removal**?	**Button batteries**, sharp objects, multiple objects. OR has been present in the esophagus 24 hours or more, airway compromised, or evidence of perforation.
Management: esophageal food impaction	**EGD**. You can try Glucagon 1 mg IV (relaxes LES and causes vomiting) while you wait for GI; if glucagon works, patients must follow up for endoscopy after to r/o underlying structural abnormality
What is the most common **structural abnormality** found in patients with **food impaction**?	**Schatzki's Ring**: ring of mucosal or muscular tissue in the distal esophagus causing narrowing
Diagnosis: small volume of blood after frequent emesis	**Mallory-Weiss** Syndrome: longitudinal, **partial-thickness** esophageal tear in the distal esophagus and proximal stomach

Diagnosis: pediatric patient with respiratory distress with feeding and recurrent pneumonia	**Tracheoesophageal Fistula** Commonly presents on tests as a **NG tube that enters the lungs**
Diagnosis: pediatric patient who presents not being able to tolerate solid foods but can have liquids	**Esophageal web** Think of Plummer-Vinson syndrome and associated with iron deficiency anemia
Diagnosis, risk factors: malignancy with a history of smoking, chest pain, and dysphagia	**Dx: Esophageal Cancer** (most likely Squamous Cell). **Risk factors:** males, heavy alcohol use, smoking, chronic GERD/Barrett's esophagus.
Diagnosis, Treatment: HIV patient with chest pain and dysphagia	**Dx: Candida Esophagitis** (with risk of perforation). **Tx:** oral **fluconazole** or IV fluconazole if they cannot tolerate PO. (nystatin is only for oral disease)
What **medications** are more likely to cause **Pill Esophagitis** and what is the appropriate **management**?	Large pills or those coated with gelatin. Meds: **antibiotics** (tetracycline, doxycycline —think of patients getting treatment for acne, clinda), **anti-inflammatories** (NSAID/ASA), **bisphosphonates, iron, vitamin c, potassium chloride**. **Tx**: stop inciting medication; endoscopy if severe or persistent symptoms
What type of **caustic ingestion** is worse and why?	**Alkali ingestions** are worse (cause **liquefactive necrosis** and deeper burns) than Acid ingestions (cause coagulative necrosis and more superficial damage)
Management: caustic ingestion	Get **upright CXR** to r/o perforation, **consult GI for early endoscopy**, consult surgery as needed. Do NOT induce vomiting or attempt decontamination/neutralization.
What is the most common **cause** of **Cirrhosis** in the US and the rest of the world?	Alcohol in US; Hepatitis C outside the US
Most common **complication** of **cirrhosis**?	Ascites
Most common cause, Management: upper GI bleed in Cirrhosis	**Esophageal Varices** 2/2 portal HTN; **Tx**: airway protection, blood transfusion, **PPI, octreotide, ceftriaxone** (mortality benefit!), GI consult for endoscopy vs IR for TIPS
What medication **improves mortality** when given for **variceal bleeding**?	**Ceftriaxone**; likely prevents translocation of bacteria (causing SBP) during GI bleed in cirrhotics
What are options for **tamponade** of **massive GI bleeding**?	Sengstaken-Blakemore tube, Minnesota tube, Linton tube
Diagnosis, Pathophysiology, Treatment: cirrhosis and new renal dysfunction	**Dx: Hepatorenal syndrome** (acute renal failure without other reversible cause). **Pathophysiology:** Cirrhosis → splanchnic vasodilation → decreased renal blood flow → activation of RAAS and increased sympathetic tone → further decreased renal blood flow → renal failure. **Tx**: **Albumin** decreases mortality (as it prevents large fluid shifts after large-volume paracentesis).

Diagnosis, Triggers, Treatment: patient with cirrhosis presents with altered mental status	**Dx: Hepatic Encephalopathy** - accumulation of nitrogenous waste (e.g. ammonia). **Triggers:** infection (SBP is most common), GI bleed, meds, or constipation. **Tx:** lactulose/Rifaximin and find/treat the underlying cause.
What are the **symptoms** associated with the **4 stages** of **hepatic encephalopthy**?	**I:** mild confusion and agitation. **II:** drowsiness, disorientation, inappropriate behavior. **III:** Somnolent, confused, slurred speech. **IV:** Coma.
What is the usual **source of infection** for Spontaneous Bacterial Peritonitis (SBP)?	bacterial translocation from gut
What are the **diagnostic criteria** for Spontaneous Bacterial Peritonitis (SBP)?	Paracentesis with PMN (neutrophils) > 250, pH < 7.34, low glucose, (+) gram stain/culture
What are the diagnostic criteria for Spontaneous Bacterial Peritonitis (SBP) in patients on **peritoneal dialysis**?	Paracentesis with > 100 WBC and > 50% PMNs
What are the two main **types** of **Liver Abscess** and what is the correct **treatment**?	**Pyogenic:** (80% in US), sepsis/RUQ pain/**JAUNDICE**, mixed bacteria (staph/strep); **Tx**: broad spectrum antibiotics (Ceftriaxone, Ampicillin, metronidazole), surgical drainage. **Amoebic:** (10%) usually subacute presentation, 2/2 entamoeba histolytica, **no jaundice**. possible complication is amoebic dysentery; **Tx**: metronidazole, medical management. Note: BOTH may cause biliary obstruction.
What **lab abnormalities** are expected with **Acute Viral Hepatitis**?	**Elevated AST/ALT** (**to 1000s**), high conjugated and unconjugated bilirubin, high Alk Phos, Coagulopathy
Which is **more common**: Hep B or Hep C?	Hepatitis C - 85%. Hepatitis B - 15%
Which **hepatitis virus** is most likely to cause **chronic infection**?	Hepatitis C - 80% cause chronic infection, 20% of these progress to cirrhosis
What is the **risk of liver cancer** in patients with Alcoholic Cirrhosis vs Hep B/C?	Alcoholic - 80%. Hepatitis - 25%. The most common cause of hepatocellular carcinoma is still chronic Hep B/C virus
How do **LFTs** help distinguish acute viral hepatitis from alcoholic liver disease?	ALT > AST with acute viral hepatitis. AST > ALT with alcoholic liver disease (Mnemonic: **S**cotch & **T**onic, A**ST**).
What **antibody** is diagnostic for Acute **Hepatitis A** virus?	Anti-HAV **IgM in acute infection.** Anti-HAV **IgG in prior infection/vaccination**
Antibodies and Antigens for Hepatitis B Virus	HBsAg: active infection Anti-HBs: recovered or immunized Anti-HBc IgM: early marker of infection, (+) in window period Anti-HBc IgG: best marker for prior HBV HBeAg: high infectivity Anti-HBeAb: low infectivity

Diagnosis, Signs and Symptoms, Diagnostic Test, Treatment: Patient with a history of Afib presenting with severe abdominal pain	**Dx: Mesenteric Ischemia** - 2/2 embolism (50%). Most common location is jejunum via **SMA occlusion.** **SSx:** severe **pain out of proportion** to exam (nonfocal abd exam), **lactic acidosis** (late finding, high mortality). **Diagnostic Test:** Xray to rule out free air, **CTA abdomen** is gold standard. **Tx**: antibiotics, anticoagulation, surgery consult
What is the most commonly affected **vessel** in **Mesenteric Ischemia**?	Superior Mesenteric Artery
Describe Rovsing sign, Psoas sign, and Obturator sign associated with appendicitis	Rovsing: most sensitive, RLQ pain with palpation to LLQ Psoas: RLQ pain with passive extension of the hip Obturator: RLQ pain with internal rotation of the hip (very low sensitivity)
What are diagnostic criteria for diagnosis of acute a**ppendicitis on US**?	Non-compressible, tubular structure with a diameter **≥ 6 mm** must be visualized. Others: fluid, target sign, appendicolith
What is the most common type of **bezoar**?	**Phytobezoar** (food, fiber); Others: Trichobezoar (hair), Pharmacobezoar (antacids, aspirin)
What is the significance of an enlarged **left supraclavicular lymph node**?	Indicative of **GI malignancy**, "Virchow node"
What is a common contributing **cause** of **Gastric Adenocarcinoma**?	**H. pylori.** Most common cancer with H.pylori is Mucosa-associated lymphoid tissue lymphoma (**MALToma**)
What is the significance of an enlarged **periumbilical lymph node**?	Indicative of **metastatic spread** of malignancy to peritoneum, "Sister Mary Joseph node"
Describe the intestinal and extraintestinal manifestations of **Crohn's Disease.** Treatment?	**Intestinal:** terminal ileitis (classic) [remember yersinia can also have terminal ileitis], **full thickness** involvement, **"skip lesions"** of normal bowel between disease, can involve **ANY part of the GI tract**. Complications - abscess, **fistula,** stricture, toxic megacolon. **Extraintestinal:** arthritis (most common), uveitis, erythema nodosum **Tx:** steroids, immunosuppressive
Describe the intestinal and extraintestinal manifestations of **Ulcerative Colitis**. Treatment?	**Intestinal: continuous disease** (no skip lesions) of rectum and **colon ONLY**, **partial thickness** involvement. Complications - toxic megacolon, increased risk of cancer. **Extraintestinal:** arthritis, uveitis, erythema nodosum **Tx:** steroids, less often antibiotics
What are the 3 most common **causes** of **Small Bowel Obstruction**?	**Adhesions** (very common with prior surgery) > tumor/mass > hernia
Diagnosis, Signs and Symptoms, Treatment: History of AAA repair with massive GI bleed	**Dx: Aortoenteric fistula.** **SSx:** Triad - **GI bleed** ("herald bleed") + **abdominal pain** + **palpable mass**; rare but high mortality. **Tx**: blood, surgical consult Note: Duodenum is most commonly involved portion of the intestines.

Diagnosis, Diagnostic Test, Treatment: patient with diarrhea after recent antibiotic use	**Dx: C.difficile** (anaerobic gram positive bacillus) causing Pseudomembranous Colitis **Diagnostic Test**: stool antigen **Tx**: metronidazole or vancomycin PO vs stool transplant
What are two **signs/symptoms** that **EXCLUDE** a diagnosis of **Irritable Bowel Syndrome**?	Fever or blood in stool
Patient population, Diagnostic Test, Treatment: Sigmoid vs Cecal Volvulus	**Sigmoid:** most common, **elderly/nursing home**, immobilized, chronic constipation. **Triad**: abdominal pain + distension + constipation. **Diagnostic Test**: Xray with **inverted "U"**. **Tx**: **sigmoidoscopy** with rectal tube decompression (stable), surgery (definitive). **Cecal:** younger, **marathon runners**. **Diagnostic Test**: Xray with kidney-shaped/**coffee-bean** (massively dilated cecum in the LUQ), comma sign. **Tx**: **surgery**, antibiotics for perforation
Diagnosis, Patient population, Treatment: Sudden severe abdominal pain, abdominal distension and inability to pass NG tube	**Dx: Gastric Volvulus** - closed loop obstruction, ischemia and perforation. **Patient population:** elderly or infants w/ congenital diaphragmatic defect. **Tx**: try to pass a NG tube (on an adult). Call surgery.
Diagnosis, Treatment: Patient with a history of Roux-en-Y gastric bypass presenting with dizziness, tachycardia, and syncope soon after a meal.	**Dx: Dumping Syndrome** - rapid stomach emptying (pylorus removed) and rapid fluid shifts in small bowel. Typically a clinical diagnosis. **Tx**: fluids, electrolyte replacement, dietary modifications, smaller meals
Diagnosis, Treatment: Abscess above gluteal cleft near midline	**Dx: Pilonidal cyst/abscess** **Tx**: I&D in ED, surgical removal (definitive). recurrent disease is the most common complication
Causes, Signs and symptoms, Diagnostic Test, Treatment: Proctitis	**Causes:** Inflammation of the lining of the rectal mucosa caused by STDs (most common is gonorrhea), radiation, Crohn's. **SSx**: tenesmus, rectal discharge **Diagnostic Test**: sigmoidoscopy **Tx**: treat underlying cause - antibiotics, anti-inflammatories, biologics
What is the most common **location** for an **anal fissure**? What should be considered for anal fissures NOT at this location?	**Posterior midline (90%)**. If anal fissure is lateral, should consider systemic process: Crohn's, HIV, leukemia, tuberculosis or syphilis
Treatment: thrombosed hemorrhoid	Excision of clot with elliptical incision (only if present <72 hours), sitz baths, topical lidocaine
What are the **classifications** of **internal hemorrhoid** severity I-IV?	**I**: don't protrude through anus **II**: prolapse but spontaneously reduce **III**: prolapse but require manual reduction **IV**: prolapse and cannot be reduced (± strangulation)

Patient population, Signs and Symptoms, Treatment: Rectal Prolapse	**Patient population:** Seen in young and elderly (related to constipation), also with anal intercourse; Consider cystic fibrosis in Peds. **SSx**: red mass protruding from anus **Tx**: manual reduction (can use granulated sugar), surgery consultation prn (ischemia)
Diagnosis, Patient population,Treatment: patient with large bowel obstruction without identified obstructing lesion on CT	**Dx: Ogilvie's Syndrome**: colonic pseudo-obstruction, massive dilatation of the colon (>10cm), absence of mechanical obstruction. **Patient population:** elderly/bedridden patients with comorbidities **Tx**: colonic decompression and neostigmine
What is the most common cause of **surgical** and **non-surgical abdominal pain** in the **elderly**?	**Surgical:** Acute Cholecystitis (**present with milder symptoms); **Non-surgical**: Pancreatitis
What is the most common **cause** of acute **pancreatitis**?	Gallstones (45%) > Alcohol (35%). Rationally, there are more people with gallstones than alcoholics in the world.
Treatment: epiploic appendagitis	**NSAIDs**, supportive, likely discharge with outpatient follow up. Presents similarly to appendicitis.
Treatment: intussusception in children and adults	**Children:** barium or air enema to reduce if uncomplicated **Adults:** surgery as most are associated with a mechanical cause (most often tumor)
Most common **lab findings** in **ischemic hepatitis**?	AST and ALT **>10,000**. Much higher than with viral hepatitis
What **lab findings** are seen in **Gilbert Syndrome**?	Elevated **indirect (unconjugated)** bilirubin
When is a **G tube** tract considered **mature**?	**After 2-3 weeks.** Before then, call a surgeon, consider antibiotics and imaging and DO NOT replace it as you could cause a false tract.
What is hallmark **symptom** of **Irritable Bowel Syndrome**?	Pain improved with defecation

Respiratory

Bizz	Buzz
Diagnosis, Cause, Signs and Symptoms: most common infectious airway obstruction in children	**Dx: Croup,** i.e. "laryngotracheobronchitis" **Cause:** *Parainfluenza* **SSx**: barky, **seal-like cough** worse at night, inspiratory stridor
What is the characteristic **CXR finding** in **Croup**?	"**Steeple sign"** (tapering of the upper airway on AP view)
Management: Croup	**Dexamethasone for all.** Mild**:** home tx, antipyretics, fluids, mist. Moderate-Severe (stridor at rest)**: Racemic Epi** —> if stridor goes away, observe for 3 hours and then okay to discharge home if stridor does not persist/return or if child is well appearing. Admit if needs 2nd treatment. Things that support admission for croup: age <6 months, stridor at rest, respiratory distress, hypoxemia, lack of good follow up.
Diagnosis, Cause: Sore throat, normal posterior oropharynx, ill-appearing, in **tripod** position	**Dx: Epiglottitis**. **Cause:** *H.flu* (unvaccinated), *Staph/Strep* (vaccinated). More common in adults now thanks to the HiB vaccine
What is the characteristic **CXR finding** in **Epiglottitis**?	"**Thumbprint sign**" (enlarged epiglottis on lateral view)
Treatment: Epiglottitis	**Emergent airway management,** antibiotics, steroids with ENT consult. **Unstable/ill-appearing:** go to the OR with ENT for direct visualization/scope. **Respiratory arrest = BVM.** No RSI! **Well-appearing/stable:** consider CXR.
Diagnosis, Signs and Symptoms, Diagnostic Test: Inspiratory whoop between violent coughing spells.	**Dx: Pertussis.** *Bordetella pertussis* **SSx:** (3 phases) Catarrhal (1-2 weeks): URI ****HIGHLY CONTAGIOUS** during this time** Paroxysmal (2-3 months): violent "**whooping" cough**, inspiratory stridor Convalescent (1-2 weeks): gradual reduction in symptoms **Diagnostic Test**: nasopharyngeal culture, PCR Notes: most common cause of death = pneumonia. Associations: seizures. Infants can present ONLY with apnea. One third of adults do not have the "whooping" either.
Treatment: Pertussis	**Azithromycin** = first line. No Clarithro/Erythro for infants < 1 month (increased risk of pyloric stenosis). Alternative: TMP-SMX. **Make sure to treat close contacts!**

Diagnosis, Signs and Symptoms, Treatment: Bleeding from trach site weeks after placement	**Dx: Tracheo-innominate fistula** **SSx:** often smaller sentinel bleed weeks after placement followed by massive hemorrhage. **Tx**: hyperinflate trach cuff, intubate to compress bleeding through trach site, compress with finger. **ENT to OR STAT**. Extremely high mortality.
Diagnosis: Child alone in room starts coughing	**Inhaled foreign body.** Can have hyperinflation of the ipsilateral lung on CXR due to ball-valve effect
Treatment: suspected hereditary angioedema	**Fresh frozen plasma or Icatibant** (bradykinin antagonist); epi and H1/H2 blockers don't work
Causes, Antibiotic options: community acquired pnuemonia (CAP) as an **outpatient**	**Outpatient CAP** **Cause:** *S. Pneumo or atypicals* **Tx:** healthy patients - Amoxicillin, Doxycycline or Azithromycin; Patients with comorbidities - respiratory tract fluoroquinolone (RTF) or Augmentin + Macrolide/Doxycycline
Antibiotic options: Pneumonia as an inpatient (Floor and ICU)?	**Floor**: add Gram negative coverage. Combo tx of **ceftriaxone + azithromycin** vs **fluoroquinolone** monotherapy **ICU**: antipneumococcal ß-lactam (CTX or cefotaxime) + either azithromycin or an RTF ± MRSA coverage (Vancomycin or Linezolid)
Most Common Cause, Signs and Symptoms: community acquired pneumonia	**Cause: *Strep pneumoniae***, Gram positive lancet-shaped encapsulated diplococcus Key features: rusty sputum, lobar pneumonia **SSx**: acute onset + rigors, follows URI or influenza
Diagnosis, Signs and Symptoms, Diagnostic Test, Treatment: Pneumonia + history of **Cystic Fibrosis**	**Dx: *Pseudomonas***, Gram negative rod **SSx**: green sputum, cough, fevers **Diagnostic Test**: CXR with multilobar pneumonia **Tx**: antipseudomonal antibiotics (e.g. cefepime)
Most Common Cause: pneumonia in young children with cystic fibrosis	**Staph aureus, Haemophilus influenzae**. By the time they are 18 yo, 80% of pts with CF will be colonized by pseudomonas though.
Diagnosis, Diagnostic Test, Treatment: Pneumonia + **alcoholic** + currant jelly sputum	**Dx: *Klebsiella***, encapsulated Gram negative bacilli in pairs Key features: higher risk in alcoholics, diabetics, nursing homes. **Diagnostic Test**: CXR with **RUL** infiltrate + "bulging" fissure, air-fluid level **Tx**: cephalosporin (e.g. CTX) + Gentamicin/Amikacin
Diagnosis, Diagnostic Test: Pneumonia after Influenza	**Dx: *Staph aureus,*** Gram positive cocci in clusters Associations: IVDU, hospitalization. Appear sick. **Diagnostic Test**: CXR with patchy/multilobar/cavitary/abscess
Diagnosis: Intermittent cough and episodic diaphoresis, CXR with **lung mass**	**Pulmonary carcinoid**

What are **risk factors** for Health Care Associated Pneumonia?	**Nursing homes**, **hospitalization in the last 90 days**, **Dialysis**, home IV antibiotics. More likely to have drug-resistant bugs and thus require broad coverage including *Pseudomonas* and MRSA. ***Note***: HCAP is now defunct, replaced by Hospital Acquired Pneumonia. Know HCAP criteria (test lags behind practice a few years)
Diagnosis, Diagnostic Test, Treatment: Immunocompromised with marked dyspnea and hypoxemia	**Dx: PCP pneumonia**. (HIV with **CD4 < 200**.) **Diagnostic Test**: ↑ **LDH**, BAL specimen, CXR with "batwing" sign. **Tx**: **TMP-SMX** (first line), Alterntive: IV Pentamidine (± hypoglycemia, hypotension), PO Dapsone (± methemoglobinemia). **Add steroids if PaO2 < 70 (~SaO2 <93%) or A-a gradient >35**
Diagnosis, Signs and Symptoms, Diagnostic Test, Treatment: Mild pneumonia symptoms and ear pain	**Dx: *Mycoplasma pneumoniae*** **SSx***:* Atypical "walking" pneumonia. Young adults, **bullous myringitis**, Faget sign (fever + relative bradycardia) **Dx**: CXR shows **diffuse interstitial pattern**, +cold agglutinin test. **Tx**: **Azithromycin** Note: bullous myringitis is most commonly caused by *S. Pneumo*, but the test often associated with Mycoplasma
What **extrapulmonary** complications are associated with ***Mycoplasma* pneumonia**?	Aseptic meningitis, hemolytic anemia, Guillain-Barré, erythema multiforme, bullous myringitis
Diagnosis, Signs and Symptoms, Diagnostic Test, Treatment: Pneumonia + Gram Positive Rods + **Widened mediastinum** on XR + occupation working with **sheep/alpaca**	**Dx: Pulmonary anthrax** **SSx:** viral prodrome, transient improvement, rapid decline with hypoxia, respiratory distress, shock, mediastinitis **Diagnostic Test:** CXR with **widened mediastinum** (typically because of hemorrhage) **Tx: Ciprofloxacin** OR Doxycycline and Clindamycin. Post-exposure prophylaxis for exposed contacts. **Note:** Cutaneous manifestations are often described as "**eschar**." Consider bio-terrorism. Also called "wool sorters disease" - think about **sheep**, **alpacas**, and other wooly animals
Diagnosis: Infant with **staccato** cough	***Chlamydia* pneumonia**
Diagnosis, Treatment: Pneumonia and headache in a **bird owner**	**Dx: Psittacosis,** *Chlamydia psittaci.* **Tx:** Doxycycline (or Azithromycin)
Most Common Cause: viral pneumonia in adults	**Influenza**
Diagnosis, Treatment: Cough and respiratory failure after exposure to **rodents**	**Dx: Hantavirus** **Tx:** supportive care only Note: commonly progresses to ARDS

Diagnosis, Signs and Symptoms, Diagnostic Test, Treatment: Pneumonia + diarrhea + hyponatremia	**Dx: Legionnaires Disease** (*Legionella pneumophila,* a Gram negative rod). Associated with **aerosolized water** (e.g. nursing homes, hospitals) or air travel. **SSx**: high fever, relative bradycardia, GI symptoms (n/v/d), neurologic symptoms (confusion, seizure). **Diagnostic Test**: **hyponatremia**, CXR shows patchy alveolar infiltrates, **urinary antigen testing**. **Tx**: **Azithromycin** or fluoroquinolone (severe disease)
Diagnosis, Cause, Diagnostic Test, Treatment: Pneumonia + sheep	**Dx:** Q fever **Cause: C*oxiella burnetii*,** obligate intracellular Gram negative bacterium **Diagnostic Test**: LFT abnormalities + proteinuria **Tx**: **tetracycline**
Diagnosis, Cause, Treatment: Pneumonia + high temp + hunter/butcher. **Rabit exposure**.	**Dx: Tularemia** **Cause:** *Francisella tularensis*, a Gram negative coccobacillus **Tx**: **Streptomycin** Note: commonly referred to as a bioterrorism agent
Diagnosis, Diagnostic Test, Treatment: Pneumonia in alcoholic who passed out/vomiting	**Dx: Aspiration pneumonia** **Diagnostic Test**: CXR with RLL or RUL infiltrate. **Tx**: broad spectrum antibiotics (need Gram negative, anaerobes coverage)
What pathogen is associated with **bullous myringitis** accompanying **pneumonia**?	Classically ***Mycoplasma pneumoniae***; newer studies suggest it is actually caused by ***Strep pneumoniae***.
What is the underlying pathologic process in **emphysema**?	Irreversible **destruction of alveolar septae**. Airways collapse on exhalation, trapping air. Associated with smoking, certain jobs (e.g. ship-building), cystic fibrosis, *alpha*-1-antitrypsin
CXR findings: COPD	Hyperinflation, flat diaphragms, blebs/bullae
What is required for a **diagnosis** of **chronic bronchitis**?	A cough most days of the month, for 3 months each year, for at least 2 consecutive years
Differential: acute decompensation in COPD patient	Pneumothorax (high risk due to blebs), mucous plug, PE, MAT/arrhythmia, pneumonia
Review the approach to **mechanical ventilation** of a **COPD** patient	Goal is to avoid barotrauma. Minimize auto-PEEP by using **lower RR** (8-10/min) to **lower I:E ratio**, lower TV (5cc/kg), prolong expiration time, and tolerate respiratory acidosis/permissive hypercapnia
Review the approach to **supplemental O2** in a **COPD** patient	They are **chronically hypercapneic**, so respiratory drive relies on hypoxemia. Tolerate sats to low 90s, limit supplemental O2 and target SpO2 to 88-92% unless you've made the decision to intubate and are pre oxygenating
What are the typical **pulmonary function test** abnormalities in **Asthma** and **COPD** patients?	↓ FEV1, ↓**FEV1/FVC**, ↓ PEFR (peak expiratory flow rate). Means they can't exhale effectively.

Review the approach to **treatment** of **COPD** patients	Supplemental O2 prn for target SpO2 88-92%, antibiotics for change in sputum or obvious infection, steroids, albuterol/ipratropium, BiPAP, epinephrine, terbutaline, intubate if all else fails.
What are the most likely **causes/triggers** for **COPD** and **asthma**?	**COPD**: infection (virus) = most common cause of exacerbation. Always get CXR. **Asthma:** more likely 2/2 meds, exercise, allergens.
What is the underlying **pathologic process** in **asthma**?	Triad of lower airway **inflammation** + **bronchoconstriction** due to hyperreactivity + reversible airflow obstruction
Diagnosis: Persistent cough in patient with atopic history	**Cough-variant asthma**
Management: exercise-induced asthma	Albuterol treatment before, during, and after exercise
What **pulmonary function test** can be used to monitor **asthma severity**/treatment response?	**Peak expiratory flow rate (PEFR)**. PEFR > 70% predicted has high likelihood of successful discharge. PEFR < 40% should be admitted.
Review the approach to **treatment** of **asthma** patient	Albuterol/ipratropium, steroids, supplemental O2 (if hypoxic), Magnesium if sick, Epi if sick, Terbutaline, BiPAP, intubate if all else fails
What is the **mechanism of albuterol** in treatment of asthma?	**Beta-2 agonist.** Causes **bronchodilation** by increasing **cAMP** → smooth muscle relaxation, affects smaller peripheral airways
What is the **mechanism of ipratropium** in treatment of asthma?	**Anticholinergic.** Causes **bronchodilation** by decreasing **cGMP** → inhibiting vagally-mediated bronchoconstriction in larger airways
What is the **mechanism of systemic steroids** in treatment of asthma?	Limits recruitment and activation of inflammatory cells, and decreases leukotriene and prostaglandin production. Note: these effects are **delayed** (onset 1-2 hours, peak 24 hours). No real immediate effect in ED.
Review the approach to **intubation** and **mechanical ventilation** of an **asthma** patient	**Intubation indications**: cardiac or respiratory arrest, physical exhaustion, AMS. **Intubation:** IVF before (PPV decreases preload and may cause hypotension). RSI: **consider Ketamine.** **Ventilation:** Goal is to avoid barotrauma. Minimize auto-PEEP by using **lower RR** (8-10/min) to **lower I:E** ratio, lower TV (5cc/kg), prolong expiration time, and tolerate respiratory acidosis/permissive hypercapnia
What is meant by **delayed sequence intubation**?	**Procedural sedation** (typically with ketamine to preserve airway reflexes and respiratory drive) to help facilitate pre-oxygenation before RSI
What is the best measurement of **airway compliance** in a patient **on a ventilator**?	**Plateau pressure** (i.e. alveolar pressure). Calculated via **inspiratory hold**. High plateau = poor compliance, **Low plateau = good compliance.** Keep plateau pressure **< 30** in asthma/COPD. Peak pressure measures flow resistance in larger airways.
Diagnosis, Treatment: PEA arrest after intubation of asthma patient	**Dx:** Tension pneumothorax **Tx:** disconnect from vent, squeeze chest, place bilateral chest tubes, give IVF.

Definition, Signs and Symptoms, Diagnostic Test, Treatment: Bronchiectasis	**Definition:** Permanent destruction and dilatation of bronchi 2/2 recurrent infections, cystic fibrosis. **SSx:** chronic foul-smelling sputum, hemoptysis, recurrent PNA. **Dx:** CXR ± honeycombing, "tram-track" markings; CT with dilated, tortuous airways. **Tx**: antibiotics (cover *Pseudomonas*), albuterol.
Child or teenager with **pancreatitis** should raise suspicion for what condition?	Suspect cystic fibrosis (GI variant)
What is the **pathophysiology** of **cystic fibrosis**?	**Autosomal recessive**. Leads to mutations affecting **Na/Cl exchange channel**. Results in abnormally **viscous mucous secretions**. Multiple organ systems affected: recurrent pulmonary infxns (Pseudomonas), meconium ileus & intussusception, pancreatic insufficiency & pancreatitis
Diagnostic Test: cystic fibrosis	Elevated quantitative **sweat chloride test** or DNA testing
What is the **infectious complication** associated with **esophageal rupture**?	Mediastinitis (2/2 Boerhaave syndrome)
Most Common Cause: pleural effusion in elderly patients	Transudative causes
Pathophysiology, Management: exudative vs. transudative effusions	**Exudative**: **Pathophysiology: damaged** capillaries leak **thick** fluid usually 2/2 **inflammation** **Management:** effusion must be removed **Transudative:** **Pathophysiology: intact** capillaries leak thin **fluid** 2/2 increased hydrostatic or decreased oncotic **pressure** **Management:** treat the underlying cause
Common causes: exudative vs. transudative pleural effusions	**Exudative:** pulmonary **infections** (pneumonia) > **malignancy** (most common cause of massive effusions), **PE** (most common cause of isolated, unexplained effusion). **Transudative: CHF** (most common cause in US), **renal failure, liver failure**.
Review **Light's Criteria** to distinguish exudative from transudative pleural effusion	**Exudative** if: 1) fluid protein : serum protein > 0.5 2) fluid LDH : serum LDH > 0.6 3) fluid LDH > 2/3 upper limit of normal for serum LDH. In other words, **exudative if high protein and high LDH.**
Diagnosis: PCP/PJP pneumonia with sudden worsening shortness of breath	Pneumothorax (strong association PCP/PJP and PTX)
What is the **most sensitive bedside test** for possible pneumothorax? What indicates a positive test?	Bedside **ultrasound** (better than CXR). Normal lung will show "seashore sign" on M mode, "comet tails" with lung sliding on 2D. PTX will show **"barcode sign"** on M mode, and the **absence of "comet tails"** indicates no lung sliding.

What are possible **CXR findings** in a **supine** patient with **pneumothorax**?	**"Deep sulcus" sign**. Air rises anteriorly and tracks along the anterior diaphragm
Treatment: tension pneumothorax	Immediate **needle decompression** (2nd intercostal space at midclavicular line) followed by chest tube. Do NOT take the time to get CXR.
Diagnostic Test, Treatment: Empyema	Empyema = pus in pleural space. **Dx**: CXR with effusion +/- loculations, thoracentesis (pH < 7.20, WBC > 50k, glucose< 60, pus). **Tx**: ultimately requires fluid drainage (thoracentesis vs. tube thoracostomy vs. thoracotomy), long-term antibiotics
What is the most common **cause** of **hemoptysis** in the US and abroad?	US: **bronchitis** Worldwide: **TB**
What defines **massive** hemoptysis?	≥ 50 mL single expectorant or ≥ 500 mL / 24-hr
What is the most common **cause of death** in massive hemoptysis?	**Hypoxia/asphyxiation** (not blood loss); early airway management is key
Treatment: unstable patient with massive hemoptysis	**Early intubation**, **mainstem to ventilate good side** if possible, and position patient with **bleeding side down** so the blood follows gravity and stays in the impaired lung. After initial stabilization, the patient will need bronch or angio to identify source of bleeding.
Diagnosis, Treatment: Young person, massive hemoptysis, **bilateral white out on CXR**	**Dx: Diffuse Alveolar Hemorrhage.** Cause is usually inflammatory or autoimmune. **Tx**: high dose steroids, airway management, supportive care
Diagnosis, Risk Factors, Treatment: altered mental status + vomiting + patchy dependent consolidation	**Dx: Aspiration pneumonitis**, chemical pulmonary inflammation. **Risk factors:** alcoholism, seizure, neuromuscular disorder, dysphagia. **Tx**: supportive, monitor for development of aspiration pneumonia, no antibiotics unless true PNA.
Diagnosis, Most Common Cause, Treatment: Alcoholic with foul breath, cough and **CXR with air fluid level**	**Dx: Lung abscess.** **Cause: Polymicrobial. Anaerobes** are most common cause (e.g. Peptostreptococcus), *Staph* (post-influenza). **CXR:** consolidation + cavity/air-fluid level; aerobes/TB (upper lobe), anaerobes (lower lobe). **Tx**: antibiotics (ampicillin+sulbactam, zosyn, carbapenem), surgery if severe.
CXR findings: primary, reactivation and miliary TB	**Primary**: lower lobes, looks like pneumonia. Children: pronounced hilar adenopathy. Elderly: isolated pleural effusion. **Reactivation**: upper lobe granuloma ± **cavitation**. **Miliary:** scattered nodules (**millet seeds**) throughout lung fields

How is TB diagnosed?	Sputum stain (for AFB, suggestive, **faster**) Sputum culture (**gold standard**, confirmatory test, takes weeks). Quantiferon Gold (possible alternative, expensive). Tuberculin skin testing (i.e. PPD, used to **screen**, but positive tests require follow up with CXR, Quant Gold, etc.).
What defines a **positive** TB **skin test**?	Assessed for **induration (not erythema)**. **≥ 5 mm:** HIV, immunosuppressed (e.g. organ transplant), close contact with active TB, abnormal CXR. **≥ 10 mm:** h/o IVDU, exposure to high risk setting (immigrant from TB-endemic area, jail, healthcare worker), children < 4 years old. **≥ 15 mm:** everyone else
Treatment: latent and active TB	**Latent:** Isoniazid (+ B6) for 6-9 months. **Active:** Rifampin, Isoniazid, Pyrazinamide, Ethambutol (alternative: Streptomycin) for 9-12 months
What are potential **side effects** of the different drugs in **RIPE** therapy?	**Rifampin:** orange body fluids, hepatitis, low platelets. **Isoniazid:** neuropathy (B6 deficiency), seizures (B6 for refractory cases), hepatitis (most common), drug-induced lupus. **Pyrazinamide:** hepatitis, high uric acid → gout, teratogenic. **Ethambutol:** optic neuritis, red-green blindness. **Streptomycin**: vestibular nerve damage, renal injury (contraindicated in pregnancy → congenital deafness)
ECG changes: pulmonary embolism	**Sinus tachycardia (most common),** nonspecific ST-T changes, precordial T wave inversions. R heart strain (e.g. RAD, new RBBB, p-pulmonale, **S1Q3T3** = classic but rare).
What are some **echocardiographic** signs of **right heart strain**?	**RV dilation**, RV hypokinesis, **septal shift** to the LEFT, tricuspid regurgitation, elevated pulmonary artery pressure, decreased LV filling (due to septal bowing), and impediment of LV output.
What is **McConnell's Sign** on echo? What does it represent?	**Akinesis of the RV free wall that spares the apex**. It indicates right heart strain and is **highly specific for acute pulmonary embolism**.
Signs and Symptoms: pulmonary embolism	**Dyspnea (73%)** and tachypnea (54%). Other "classic" symptoms are less common, such as calf pain/swelling (44%), pleuritic pain (44%), cough (37%), tachycardia (24%), hemoptysis (15%).
CXR findings: pulmonary embolism	**CXR:** nonspecific abnormalities, Hampton's hump (pleural-based wedge infarct), Westermark's sign (vascular cut-off sign)
What is the appropriate **workup** for patients with clinical symptoms and **multiple risk factors** for DVT and PE?	**DVT:** need negative D-dimer and Doppler US (repeat Doppler US if high risk and initial study negative) to exclude. **PE:** need negative imaging (CTA or VQ scan) to exclude

When should **thrombolytics** be given and when should they be considered a patient with **PE**?	**Indication for Thrombolytics:** hypotension/shock (sustained x 15 minutes), cardiac arrest. **Indication to consider thrombolytics in PE:** RV enlargement or dysfunction (ECG, TTE, or CT proven), extensive clot burden, severe hypoxemia, RA/RV thrombus, PFO
Diagnosis: IVDU + multiple infiltrates on CXR	**Septic pulmonary emboli** (raising concern for endocarditis)
Signs and Symptoms, Diagnostic Test, Treatment: pulmonary arterial hypertension	**SSx**: SOB (most common), chest pain, hypoxia, lower extremity and abdominal swelling. **Diagnostic Test:** TTE, cath, CT, CXR with enlarged pulmonary arteries, ECG with R heart strain. **Tx:** vasodilators (prostacyclins like Remodulin), optimizing fluid balance, pressors, NO NITRATES (preload dependent).
Causes: acute decompensation in patients with pulmonary hypertension	PE or Vasodilator IV pump failure
Causes: acute decompensation in patients with pulmonary fibrosis	Progression of disease vs. acute pneumonia
Diagnosis, Treatment: Non-caseating granulomas in lungs with bilateral hilar adenopathy	**Dx: Sarcoidosis (**associated with erythema nodosum) **Tx**: steroids
Definition, Signs and Symptoms, Diagnostic Test: Pneumoconiosis	**Definition:** lung disease caused by inhalation of organic or inorganic dust **SSx**: SOB, cough (non-productive), hypoxia **Diagnostic Test**: CXR and CT shows interstitial fibrosis
What are the associated **risk facors** for each example of pneumoconiosis? (Asbestosis, Berylliosis, Byssinosis, Coal worker's lung, Siderosis, Silicosis, Stannosis)	Asbestosis: **shipping**, **roofing**, **plumbing** (from the roof, but affects the base [**lower lobes**]) Berylliosis: **aerospace**, fluorescent bulbs Byssinosis: **cotton** Coal worker's lung: **coal** (from the base [earth], but affect the roof [**upper lobes**]) Silicosis: **foundries**, **sandblasting**, **mines**, increases risk for TB. (from the base [earth], but affect the roof [**upper lobes**]) Siderosis: arc welding (**iron**) Stannosis: **tin** welding
What are classically **abnormal labs** in patients with **sarcoidosis**?	Hypercalcemia (reaction associated with granulomas), high ACE
What are the **criteria** for diagnosis of **ARDS**?	1) **acute** onset (symptoms within 1 week of causative insult) 2) **bilateral opacities** on CXR/CT (pulm edema) 3) **no cardiac cause** 4) impaired O2 exchange (**PaO2/FiO2 < 300**)
Clinical features, Causes: ARDS	**Features:** Poor lung compliance, pulmonary edema, severe hypoxemia unresponsive to supplemental O2. **Causes:** shock states (**gram negative sepsis** = most common), trauma, almost anything EXCEPT heart failure.

What is the approach to "lung protection" in **ventilated ARDS** patients?	**Low tidal volume** (6-8 cc/kg), **high PEEP** (5-20), **permissive hypercapnia** but can increase RR as needed, supplemental O2, Plateau < 30, (PEEP & FiO2 should be titrated up together [ARDSnet trial])
What is the expected **PCWP** in ARDS vs. CHF?	Remember PCWP approximates LA Pressure. **ARDS:** low/normal PCWP (diagnosis requires it to not be caused by cardiac congestion) **CHF:** high PCWP
What mechanisms of hypoxemia cause an **increase in the A-a gradient** (>15)?	Right to left shunt, Diffusion impairment, V-Q mismatch
Diagnosis, CXR findings: Cough and ulnar neuropathy	**Dx: Pancoast tumor** **CXR:** mass at lung apex, causes brachial plexus compression
What **size** spontaneous pneumothorax can be managed with O2 and **observation** alone?	**20% or less.** Pneumothoraces resorb 1-2% per 24 hrs in healthy lungs. DOES NOT apply to secondary PTX (i.e. COPD, ILD, asthma, penetrating trauma)
What is the **signs and symptoms** and most common **airway location** for **foreign bodies** to lodge?	**SSx:** cough, wheezing, dyspnea, asymptomatic (20%). Adults: **proximal** airways (75%; larynx, trachea, main bronchi: **right mainstem bronchus** most common). Children: **<50% are proximal** (main bronchi branch from the trachea at more equal angles, lower airway foreign bodies are equally likely to affect the right and left lung fields in children)
Signs and Symptoms, Diagnostic Test, Treatment: COVID-19	**SSx:** Generalized viral syndrome symptoms including fevers, chils, body aches, diarrhea, headache, **loss of taste and smell.** **Dx:** SARS-CoV2 PCR testing, CXR reveals bilateral interstitial infiltrates. **Tx: Corticosteroids for patients with hypoxia**, symptomatic treatment. Monoclonal antibodies (not tested).
What are important **vent settings** in intubated **asthmatic** patients to reduce "breath stacking" and barotrauma?	Reduce minute ventilation, **adjust I:E ratio** (inspiratory to expiratory ratio) to allow for longer expiration. ideally 1:4 or greater.
Treatment: refractory hiccups (i.e., > 48 hours)	**Thorazine** (FDA approved), baclofen, reglan, antacids; Always investigate for serious cause of hiccups prior to symptomatic treatment.

Infectious Disease

Bizz	Buzz
Diagnosis, Treatment: fish tank granuloma	**Dx: *Mycobacterium marinum***, spreads on lymphatic channels - looks like sporotrichosis **Tx**: Clarithromycin, Doxycycline, TMP-SMX, or Ciprofloxacin
Diagnosis, Treatment: rose thorn injury and rash spreading up the arm	**Dx: *Sporothrix schenckii*** **Tx**: Itraconazole (amphotericin B if systemic)
Diagnosis, Treatment: dog and cat bite with rapid infection	**Dx: *Pasteurella multocida*** **Tx:** Amoxicillin-Clavulanate (Augmentin —> “dog-mentin”), second line: doxycycline ("Dogs-ycycline")
Diagnosis: reptile bites and infection	**Dx: *Salmonella***
Diagnosis: sickle cell disease and joint pain/infection	**Dx: *Salmonella* osteomyelitis**. **Staph auerus* is still most common cause of osteomyelitis in HbSS but Salmonella is very characteristic and testable
Diagnosis, Treatment: cat scratch, tender axillary lymphadenopathy two weeks later	**Dx: *Bartonella henselae*** **Tx**: Azithromycin
Diagnosis, Treatment: human bite and infection	**Dx: *Eikenella corrodens*** **Tx:** amoxicillin-clavulanate
Diagnosis: gastroenteritis on a cruise ship	**Dx: Norovirus/Norwalk virus**
Diagnosis: gastroenteritis at a daycare	**Dx: Rotavirus** *Remember, there is a vaccine now; also has an association with intussusception.
Compare general **diagnosis** and **treatment** of **toxin-mediated** vs. **invasive** **bacterial diarrheal illness**	**Toxin:** abrupt onset, watery, non-bloody **Tx**: IVF, ± loperamide, ± ciprofloxacin if prolonged or severe symptoms **Invasive:** gradual onset, bloody, systemic symptoms **Tx**: IVF, ± ciprofloxacin UNLESS pediatric or elderly patients with possible *E. coli* O157:H7 (can increase risk of HUS)
Diagnosis: watery diarrhea in the evening after eating eggs/mayonnaise at a picnic that day	***Staph. aureus;*** toxin-mediated with rapid onset
Diagnosis: watery diarrhea after eating reheated rice	***Bacillus cereus;*** toxin-mediated with rapid onset
Diagnosis, Treatment: diarrhea + flatulence + recent hiking and drinking from a freshwater stream	**Dx: *Giardia lamblia***. Parasitic infection. Test for it with a stool antigen, not ova and parasite. **Tx**: Metronidazole. People who are risk: hikers, children at daycare, and oral-anal sexual conduct.
Diagnosis, Treatment: watery diarrhea + travel with unfiltered drinking water	**Dx: Enterotoxigenic *E. coli*** (toxin, ETEC) **Tx**: if no blood in diarrhea, give one dose of ciprofloxacin 750 mg. If patient traveled to southeast Asia, it is likely *Campylobacter,* so give 1,000 mg of azithromycin.
Diagnosis: watery diarrhea + meat/poultry	**Dx: *Campylobacter*** or ***Clostridium perfringens*** (toxin-mediated)

Diagnosis, Treatment: watery diarrhea + dark meat fish + rash/flushing/itching	**Dx: Scombroid** (histamine fish toxicity). Dark fleshed, peppery tasting fish such as tuna, mahi-mahi, and mackerel. Excess histidine on fish is broken down by bacteria to histamine which causes anxiety, flushing, headache, palpitations, and vomiting. **Tx**: antihistamines
Diagnosis: watery diarrhea + carnivorous fish + neurologic symptoms	**Dx: Ciguatera.** Toxin causes neurologic symptoms such as **hot cold sensory reversal, paresthesias**, **nerve palsies**, **ataxia**,and **vertigo.**
Diagnosis: bloody diarrhea + undercooked eggs/chicken + relative bradycardia	**Dx: *Salmonella typhi*** (invasive), cafeteria outbreaks, classically with high fever and relative bradycardia; can cause osteomyelitis in sickle cell patients.
Diagnosis: bloody diarrhea (severe) + high fever + institutionalized	**Dx: *Shigella*** (invasive)
Diagnosis: bloody diarrhea + fever + seizure in pediatric patient	***Shigella***
Diagnosis, Treatment: bloody diarrhea followed by ascending weakness	**Dx: *Campylobacter*** (invasive) associated with appendicitis mimic and can cause Guillain-Barré **Tx**: Azithromycin or erythromycin (resistance to ciprofloxacin)
Diagnosis: bloody diarrhea + RLQ pain + farm animal exposure	**Dx: *Yersinia*** (invasive); pseudoappendicitis (appendicitis mimic), can cause terminal ileitis
Diagnosois, Treatment: bloody diarrhea + undercooked seafood + alcoholic who gets very sick	**Dx: *Vibrio parahaemolyticus*** (invasive) **Tx**: ciprofloxacin or doxycycline
Diagnosis: bloody diarrhea + poorly cooked ground beef/raw milk	**Dx: *E. coli* O157:H7,** associated with TTP (adults) and HUS (kids); **NO ANTIBIOTICS**
Diagnosis, Treatment: rice-water stools + contaminated water	**Dx:*Vibrio cholerae*** (toxin). **Tx: o**ral rehydration tablets.
Diagnosis, Treatment: profuse diarrhea after recent antibiotics	**Dx: *Clostridium difficile*** (invasive) **Tx:** PO vancomycin is first line, fidaxomicin
Diagnosis: diarrhea + AKI ± low platelets	**Dx: *E. coli* O157:H7** causing TTP/HUS
Diagnosis: food-borne illness associated with dairy that can lead to premature delivery in pregnant patients	**Dx: *Listeria monocytogenes***
What is the **most common cause** of **bacterial diarrhea** in the **US**?	***Salmonella***; second most common is *Campylobacter.*
What factors of a patient history prompt you to **obtain stools studies** for **patients with diarrhea**?	1. Fever > 38.5C 2. Symptoms for greater than one week 3. Concerns for *C. difficile* 4. Immunocompromised or advanced age 5. Underlying IBD

Signs and Symptoms, Treatment: Botulism	Paralytic illness caused by ***Clostridium botulinum,* a neurotoxin that blocks acetylcholine release** at the neuromuscular junction causing flaccid paralysis. Forms: food borne (canned foods, honey), wound, infantile (most common) **SSx:** floppy baby, constipation, weak cry (infants); **CN/bulbar sx**, dilated pupils (differentiates from myasthenia), **symmetric, descending flaccid paralysis/weakness** (most common finding), parasympathetic blockade (dry mouth/sore throat, urinary retention) **Tx:** supportive care, respiratory monitoring (respiratory failure is most common cause of death), antitoxin (infants: BabyBIG; age > 1 year: antitoxin; antibiotics (for wounds))
Leading **infectious cause** of **infertility**?	***Chlamydia trachomatis***
Diagnosis, Treatment: painless vesicular lesions or ulcers to groin + buboes (huge tender lymphnodes)	**Dx: Lymphogranuloma venereum (LGV).** Caused by *Chlamydia trachomatis*. **Tx**: Doxycycline or Azithromycin (and treat partners), drain abscesses
Diagnosis, Treatment: painful ulcer with irregular borders to groin + buboes (huge LNs)	**Dx: Chancroid**. Caused by *Haemophilus ducreyi*. Looks like syphilis but the lesion is painful. **Tx**: ceftriaxone, azithromycin or ciprofloxacin, drain abscesses
Diagnosis, Treatment: neonate with copious purulent discharge from eyes	**Dx: *Neisseria gonorrhoeae* conjunctivitis** **Tx**: IV cefotaxime
Review the **timing** of the **various causes** of **neonatal conjunctivitis**	**Chemical:** first 24 hours **Gonococcal**: first 2-5 days **Chlamydial:** five days to two weeks
Treatment: neonatal **chlamydial** conjunctivitis	**Tx:** systemic treatment with oral azithromycin or erythromycin (both increase risk for pyloric stenosis); Patients must be admitted to evaluate for pneumonia as well.
Diagnosis, Treatment: "gunmetal grey" pustules to hands/skin, septic arthritis ± tenosynovitis	**Dx: disseminated gonococcus; a**rthritis-dermatitis syndrome; gram-negative intracellular diplococci **Tx**: IV ceftriaxone
Diagnosis, Treatment: contact with armadillos, red patches of skin, paresthesias	**Dx: Leprosy,** caused by *Mycobacterium leprae* **Tx**: dapsone + rifampin (+ clofazimine for lepromatous disease)
Diagnosis, Treatment: contact with prairie dogs, eschar, buboes, sepsis	**Dx: bubonic plague,** caused by*Yersinia pestis* **Tx**: gentamicin, ciprofloxacin, or doxycycline.
Most common cause of **viral pneumonia** in **adults**?	Influenza
Diagnosis, Treatment: HIV + lung disease + pancytopenia	**Dx: *Mycobacterium avium intracellulare*** (MAI). Highest risk with CD4 count < 50. **Tx**: rifampin + ethambutol + azithromycin

Diagnosis, Treatment: primary tuberculosis	**Dx:** ***Mycobacterium tuberculosis*****.** Transmission via inhalation of droplets. Often asymptomatic. Can progress to latent or reactivation TB. **Tx**: isoniazid (INH) + pyridoxine (Vitamin B6) for nine months
Most common **chest x-ray finding** in **primary TB**?	**Most common overall:** a single lobar infiltrate associated with hilar adenopathy **Children**: pronounced hilar adenopathy **Elderly:** isolated pleural effusion **Ghon complex:** calcified lung lesion, ± calcified lymph nodes [a.k.a. Ranke complex] representing HEALED infection Immunocompromised patients often cannot form a Ghon complex
Signs and Symptoms, Diagnosis, Treatment: reactivation TB	**SSx:** often occurs if immunocompromised, other stressor; cough, fever, night sweats, weight loss, hemoptysis **Dx**: XR with upper lobe apical lesions ± cavitation; MTB culture/PCR of sputum (takes weeks), AFB smear (suggestive but not diagnostic, need culture to confirm) **Tx:** RIPE (rifampin, isoniazid, pyrazinamide, ethambutol), **respiratory isolation** (airborne precautions), test/treat contacts
Immunocompetent person undergoes a **high risk exposure to TB**, what should you do?	1. Test them now with PPD skin test or interferon gamma and test them again in three months for conversion. 2. If either of these tests are positive obtain a CXR and call an ID specialist.
What are the **common side effects** of **TB treatment** with **RIPE**?	**Rifampin:** orange body fluids, hepatotoxicity **Isoniazid:** neuropathy, hepatotoxicity, seizures (in overdose, treat with vitamin B6) **Pyrazinamide:** hepatotoxicity, gout, teratogenic (pregnancy) **Ethambutol:** optic neuritis (red-green color blindness)
What is the **most common treatment regimen** in **pregnant women** with **active TB**?	Rifampin, isoniazid (+B6), and ethambutol. No pyrazinamide because it is teratogenic.
Signs and Symptoms, Diagnosis, Treatment: rapidly progressive skin infection, unusually high heart rate, and indifferent patient	**Gas gangrene/myonecrosis**. Clostridial myonecrosis (usually *C. perfringens).* **SSx***:* similar presentation to necrotizing fasciitis, tachycardia out of proportion to fever, la belle indifference **Dx**: subcutaneous/intramuscular gas, incision with foul-smelling "dishwater" fluid and dead muscle **Tx**: antibiotics (vancomycin + zosyn + clindamycin) + wide surgical debridement (don't delay antibiotics). Clindamycin crucial to reduce toxin formation.

Review the **definitions** of **SIRS**, **sepsis**, **severe sepsis**, and **septic shock**	**SIRS:** At least two of: (1) Temperature < 36.0 (96.8) or > 38.0 (100.4), (2) HR > 90, (3) RR > 20, (4) WBC < 4k or > 12k or > 10% bands **Sepsis**: SIRS + source of infection **Severe Sepsis**: sepsis + end organ damage **Septic Shock**: sepsis + refractory hypotension *Note: ITE/boards still test these concepts
Review the **key components** of **Early Goal-Directed Therapy** for **sepsis.**	**Early IVF** (30 mL/kg crystalloid), early empiric **antibiotics**, **MAP > 65** (IVF or pressors), **SvO2** > 70%, **CVP** 8-12, transfuse **pRBCs** if hematocrit < 30% Note: strict adherence to this regimen has been debunked by several recent trials, but the necessity of **adequate fluid resuscitation** (30 mL/kg) and **early antibiotics** remains well-supported.
Give examples of **empiric antibiotic regimens** for **sepsis** by **suspected infectious source.**	**CAP**: ceftriaxone + azithromycin **HAP:** vancomycin + zosyn **Urinary**: ceftriaxone (if not culture-guided) **Intra-abdominal:** ceftriaxone/ciprofloxacin + metronidazole **Biliary:** zosyn **Device related**: vancomycin + gentamicin **Skin/Soft tissue:** vancomycin
Diagnosis, Treatment: young woman with high fever + rash + shock and organ failure	**Toxic Shock Syndrome.** Causes: tampon, surgical or nasal packing or other foreign body; bacterial superantigen. ***Staph*** (TSS): more common; erythematous rash with desquamation, hypotension, fever, and associated with foreign body ***Strep*** (STSS): fever, but less rash, often with existing wound **Tx**: remove foreign bodies FIRST, supportive care, and antibiotics (clindamycin first to combat toxin, then empiric broad-spectrum for sepsis coverage), IVIG for refractory cases
Signs and Symptoms, Diagnosis, Treatment: primary syphilis	***Treponema pallidum*** (spirochete) **SSx**: painless genital ulcer (chancre), regional lymphadenopathy **Dx**: VDRL/RPR are nonspecific and often negative at this stage **Tx**: penicillin G benzathine 2.4 million U IM x1
Signs and Symptoms, Diagnosis, Treatment: secondary syphilis	Onset 5-8 weeks after primary syphilis. **SSx:** rash (papulosquamous) trunk → palms/soles, condyloma lata **Dx:** VDRL or RPR, confirm with FTA-ABS **Tx**: penicillin G benzathine 2.4 million U IM x1 (if late disease three weekly doses)

Signs and Symptoms, Diagnosis, Treatment: tertiary syphilis	Onset years after primary **SSx:** gummatous lesions throughout body, neurosyphilis (meningitis, dementia, Argyll-Robertson pupils [accommodate but don't react to bright light], tabes dorsalis [dorsal column demyelination causing impaired proprioception and vibratory sense [ataxia]) **Dx**: CSF-VDRL, confirm with FTA-ABS **Tx:** admit for IV penicillin every 4 hours for two weeks
Diagnosis, Treatment: worsened rash and toxicity shortly after treatment of syphilis	**Jarisch-Herxheimer reaction** due to endotoxin release from dying spirochetes. **Tx**: Supportive care
Care plan if patient with **syphilis** is **allergic** to **penicillin?**	Preferred: **admit for desensitization**, they need penicillin. Alternative: doxycycline for early stages and ceftriaxone for neurosyphilis.
Pathophysiology, Signs and Symptoms, Treatment: tetanus	*Clostridium tetani* spores which enter into wounds. Sources: dust, soil, feces **Pathophysiology**: neurotoxin blocks inhibitory [GABA] firing, leads to unopposed excitatory firing **SSx:** muscle spasticity (lockjaw, painful tonic convulsions), but NORMAL mental status **Tx:** supportive (benzodiazpines, opioids, ± paralytics), wound care, antibiotics (metronidazole > penicillin), Tdap vaccine (prevention) + tetanus IG (unimmunized + high risk wounds)
Review **indications** for **tetanus prophylaxis**	≥ 3 vaccine doses + low risk wound: dT if > 10 years since last dose ≥3 vaccine doses + high risk wound: dT if > 5 years since last dose Uncertain or < 3 vaccine doses + low risk wound: dT Uncertain or < 3 vaccine doses + high risk wound*: dT & **TIG** ***High risk wound**: > 6 hours old, contaminated (dirt, saliva, feces), puncture/crush/avulsion wounds, foreign body, frostbite
Diagnosis, Treatment: red rash to diaper area with satellite lesions	**Dx: *Candida*** **Tx**: topical antifungals (also occurs in moist areas/skin folds espcially in patients with diabetes)
Diagnosis, Treatment: immunocompromised + odynophagia/dysphagia	**Dx: *Candida* esophagitis** **Tx**: oral fluconazole, low threshold for IV for those who can't tolerate PO *Nystatin swish and spit does not cover
Diagnosis, Treatment: indwelling catheter + yeast on blood cultures	**Dx: *Candida* fungemia** **Tx:** amphotericin B
Common **organisms** implicated in **diarrhea** in patients with **AIDS**?	***Cryptosporidium*, *Isospora*, CMV, *M. avium***; often unclear cause
Diagnosis, Treatment: immunocompromised + painless brown/black skin lesions	**Dx: Kaposi sarcoma** (classically on face, chest, oral cavity), AIDS-defining illness caused by HHV-8 **Tx**: HAART, chemo, radiation; steroids can worsen disease

Diagnosis, Treatment: AIDS + white plaque on oropharynx	**Dx: Candida/Thrush**: plaques scrape off. **Oral Hairy Leukoplakia**: lateral tongue, can't scrape off, caused by EBV, very specific for HIV, NOT precancerous **Tx**: clotrimazole or nystatin for candida; supportive care for oral hairy leukoplakia
Signs and Symptoms, Diagnosis, Treatment: meningitis and focal neurologic findings in patient with AIDS	***Cryptococcus neoformans*** (encapsulated yeast in soil with pigeon poop), most common cause of meningitis in patients with AIDS **SSx**: headache, neck pain, fever, altered mental status or cranial nerve abnormalities **Dx:** CSF cryptococcal antigen, LP with high opening pressure, + india ink stain **Tx**: amphotericin B + flucytosine
Signs and Symptoms, Treatment: histoplasmosis	Dimorphic fungus. Found in spelunkers, caves, bird/bat droppings; can cause epidemics if soil upturned. Endemic to Ohio and Mississippi River valleys. **SSx:** flu-like symptoms, disseminated disease or chronic progressive pulmonary disease (diffuse infiltrates and calcified nodes). **Tx**: itraconazole, amphotericin B.
Diagnosis, Treatment: immunocompromised + encephalitis + ring-enhancing lesions on CT	**Dx: *Toxoplasmosis gondii*** (protozoan); associated with cat feces; bad for fetus if infection occurs during pregnancy (TORCH) **Tx**: pyrimethamine, sulfadiazine
Signs and Symptoms, Diagnosis: travel + cyclical fever + splenomegaly	**Malaria.** *Plasmodium* protozoan transmitted by female *Anopheles* mosquito. Infects RBCs & hepatocytes. **SSx:** cyclical fevers (febrile during periods of RBC rupture and merozoite spread), splenomegaly, thrombocytopenia. Complicated disease: profound hypoglycemia, hemolytic anemia, seizures, coma **Dx:** thick + thin blood smears (ring forms) ± Giemsa or Wright stain
Treatment: malaria	**Uncomplicated + chloroquine-sensitive** (Central America, Caribbean): chloroquine **Uncomplicated + chloroquine-resistant (**South America, South Asia, Africa): quinine (hypoglycemia) + doxycycline **Complicated or *P. Falciparum*:** artesunate and quinidine IV (QT prolongation)
What is the **most dangerous/severe strain** that causes **malaria**? **Treatment**?	***P. falciparum*:** cerebral malaria, "blackwater" fever, death **Tx**: artesunate, IV quinidine
Signs and Symptoms, Diagnosis, Treatment: traveler + myalgias and fever. Worse symptoms on second infection	**Dengue fever.** Dengue virus + transmitted *Aedes aegypti* mosquito. Common in Caribbean (Puerto Rico) **SSx**: high fever, dramatic myalgias (“break-bone fever”), morbilliform rash **Dx**: serology or ELISA, leukopenia + thrombocytopenia **Tx**: supportive

What is the **cause**, **vector**, and **treatment** of **Lyme disease**?	**Cause/vecotr: *Ixodes* tick (deer tick)** carrying ***Borrelia burgdorferi*,** primarily in northeast US & Wisconsin; tick bite history is often absent **Tx**: doxycycline (adults and children), CNS/cardiac involvement: IV ceftriaxone. If pregnant: amoxicillin
What are the **typical stages** of **Lyme disease**? **Treatment**?	**Stage 1:** 1 week; erythema migrans ("bull's eye") rash **Stage 2:** days to weeks; neurologic changes (meningoencephalitis is the most common neurologic finding with cranial nerve palsies - bilateral Bell's palsy), cardiac changes (variable AV block is most common cardiac finding) **Stage 3:** months to years; arthritis, neurologic symptoms **Tx:** doxycycline for everything other than severe carditis or neurological manifestations - use IV ceftriaxone
Describe the **criteria** and **medications** for **prophylactic treatment** of **Lyme disease**	**Criteria**: tick attached for ≥ 36 hours, prophyolaxis started within 72 hours of tick removal, engorged tick at removal **Tx**: single dose doxycycline
Signs and Symptoms, Diagnosis, Treatment: recent hiking or camping, rash spreading inwards ("centripetal", palms/soles)	**Rocky Mountain Spotted Fever.** *Rickettsia rickettsii.* Transmission: wood tick (*Dermacentor andersoni*), eastern US (Carolinas, Oklahoma). **SSx**: fever (most common symptom), centripetal (towards trunk) rash (palms + soles), calf tenderness **Dx**: low platelets, hyponatremia **Tx**: ALWAYS doxycycline (even children)
Signs and Symptoms, Diagnosis, Treatment: ehrlichiosis	*Ehrlichia* spp. with tick vector. South central & south Atlantic US **SSx:** abrupt onset fevers/chills/myalgias/rigors (differentiates from other tick-borne illnesses), conjunctival injection ± rash **Dx**: blood smear with intracellular parasites (poor sensitivity), PCR, leukopenia, thrombocytopenia, and elevated LFTs **Tx:** doxycycline; rifampin if pregnant
Diagnosis, Treatment: fever, malaise, exudative pharyngitis, posterior lymphadenopathy, ± splenomegaly	**Dx: Infectious mononucleosis**. Epstein-Barr virus (EBV); **Tx**: supportive; warn against contact sports for 1-2 months due to risk of splenic rupture
Diagnosis: mononucleosis + amoxicillin for presumed strep	90% develop **maculopapular rash** (NOT an allergy)
What are associated **lab abnormalities** found in patients with **mononucleosis**?	**Atypical lymphocytes**, + heterophile antibodies (monospot test), hemolytic anemia, thrombocytopenia, elevated LFTs, false positive RPR or VDRL
What is the **difference** between **antigenic drift** and **antigenic shift**?	**Antigenic drift**: minor mutation **Antigenic shift**: major mutation Often used in context of influenza (orthomyxovirus) and HA/NA surface antigens
Who is at **high risk** for **death** with **influenza** and what is the **most common cause of death**?	**Extremes of age and pregnant women** are highest risk; most common cause of death is **secondary bacterial pneumonia**.

Describe the **indications for** and **side effects of <u>neuraminidase inhibitors</u>** when used for **influenza**.	Can reduce symptom duration by ~24 hours if within 48 hours of symptom onset OR hospitalized. Oseltamivir/Tamiflu causes GI symptoms, and Zanamivir/Relenza causes bronchospasm/wheezing.
Diagnosis, Signs and Symptoms, Treatment: exposure to rat feces, ARDS	**Dx: hantavirus**. Transmitted via aerosolized rodent excretions. **SSx:** hantavirus pulmonary syndrome - ARDS, thrombocytopenia. Starts with a flu-like syndrome and is then rapidly progressive (and therefore many patients are discharged and return critically ill). **Tx**: supportive
What is the **location** of **dormant herpes simplex**?	**Dorsal root ganglion;** reactivated with stress/immunocompromise.
What are the **classic locations/presentations** for **HSV 1 and 2** and how are they **diagnosed** and **treated**?	**<u>HSV-1</u>:** mouth, stomatitis, keratitis (possible corneal ulcer), vesicles on digits (Whitlow) **<u>HSV-2</u>:** anus, genital, & neonatal (C-section if pregnant and in labor) **Dx**: Tzanck smear (multinucleated giant cells), viral culture **Tx**: acyclovir or valacyclovir
Compare the **presentation** and **treatment** of **chickenpox** vs. **shingles** (Varicella Zoster Virus)	**<u>Primary varicella</u>** (chickenpox): highly contagious, incubation ~ 2 weeks **SSx**: crops of vesicles in <u>various stages of healing</u>. Rash: "dew drop rash on a rose petal", starts on hairline → chest, palms/soles (+ mucous membranes) **Tx**: <u>healthy/age <12</u>: supportive, monitor for bacterial superinfection; <u>immunocompromised, age >12</u>: acyclovir **<u>Shingles</u>:** reactivation of dormant VZV **SSx**: prodrome (itching, burning), rash- painful vesicular eruption (usually unilaterally in a single dermatome) **Tx**: acyclovir only started if rash present for < 72 hours, steroids (controversial), pain control. Complication: post-herpetic neuralgia
Diagnosis: Bell's palsy and vesicle on ear	**Ramsay-Hunt syndrome/Zoster Oticus** (VZV of CN VIII)
Diagnosis: vesicle on tip of nose	**Hutchinson's sign**, V1 zoster, **predicts corneal involvement**/ulceration (Zoster Ophthalmicus)
Treatment: herpes zoster ophthalmicus	**Tx: oral acyclovir or trifluridine drops**. This happens when the nasociliary branch of CN V is infected with VZV. **Emergent ophthalmology follow up** is needed.
Treatment: pregnant or immunocompromised patient after exposure to chicken pox	Send titers to check for immunity; if negative give varicella zoster IG.
Diagnosis, Treatment: pregnant woman presents with dyspnea, infiltrate on CXR, and widespread itchy vesicular rash in various stages of development.	**Dx: varicella pneumonia** **Tx**: admit and treat with IV acyclovir and CAP coverage. VZIG IS NOT ENOUGH treatment.
What is the **definition** of **<u>disseminated zoster</u>**?	Involvement of **<u>three or more</u> dermatomes**.

What **domestic** and **wild animals** are **high risk for rabies transmission**?	**Domestic animals:** cats > dogs (dogs in developing countries are HIGH risk) **Wild animals**: (account for ~90% cases in US): bats (most common cause in US) > raccoons > skunks > foxes > coyotes, mongooses; NOT rabbits or rodents
What are **symptoms** of **rabies infection**?	Incubation 3-7 weeks, pain/paresthesia at bite site, hydrophobia (drinking water causes painful spasm), seizure, encephalitis, death
What is the **treatment** for **rabies**?	**There is no treatment for active disease**. PEP: HRIG (at wound site), HDCV (rabies vaccine): 5 injections over a month Need Ig and full vaccine series for **close proximity** with a bat and exposure/bite cannot be ruled out (e.g. awakening to find bat in room, unattended children)
What defines **AIDS**?	HIV with CD4 < 200 OR AIDS defining illness such as esophageal candidiasis, cryptococcus, CMV, Kaposi, PJP, toxoplasmosis, TB (in an non-endemic area)
Signs and Symptoms: acute HIV infection?	**Acute Retroviral Syndrome**. Often missed, occurs 2-4 weeks post-exposure **SSx:** non-specific viral syndrome (fever, rash, lymphadenopathy, myalgias). Most infectious stage of HIV (high viral load + shedding), but antibody testing will be negative as seroconversion takes 3-12 weeks post-exposure
How is **HIV** diagnosed?	**ELISA**: to screen (sensitive), delayed (+) weeks to months **HIV-1/2 immunoassay & Western blot**: to confirm (sensitive + specific), blood test
Which **opportunistic infections** are more likely below the following CD4 counts: < 500, < 200, < 100, < 50?	**< 500**: TB, HSV, VZV, Kaposi's sarcoma **< 200**: PJP, HIV encephalopathy, candidiasis, PML **< 100**: toxoplasmosis, histoplasmosis, cryptococcus **< 50:** CMV (GI, pulm, retina), MAC avium, CNS lymphoma *NOTE: HIV patients get all usual infections as well, but have increased risk of opportunistic as CD4 count drops*
What **common lab test** can be used as a **surrogate** to determine **CD4 count**?	**Absolute lymphocyte count** (ALC); ALC < 1000 → suggests CD4 < 200
What is the **time range** for starting **post-exposure prophylaxis** after **HIV exposure**?	Should start within 72 hours. However, the earlier the better.
Signs and Symptoms, Diagnosois, Treatment: Immunocompromised + pneumonia with severe dyspnea/hypoxia + high LDH	**PJP pneumonia.** *Pneumocystis jirovecii* (formerly PCP). Most common opportunistic infection in AIDS. **SSx:** fever, cough, desat on exertion **Dx:** CXR shows interstitial perihilar infiltrates ("bat wing" pattern). Elevated LDH. BAL for diagnosis **Tx:** TMP-SMX, steroids (indications: children, PaO2 < 70 mm Hg [~SaO2 ~93%], A-a gradient > 35)
What are possible **side effects** of **pentamidine** (treatment for PJP pneumonia)?	Hypoglycemia, hypotension, pneumothorax

What are the **appropriate outpatient treatments** for **PJP pneumonia**?	**TMP-SMX** For sulfa allergic people: **primaquine + clindamycin**, or TIM-dapsone **Pentamidine** can be given but it's only available in IV and inhalation forms, making outpatient therapy complicated. It also has many side effects.
What are the **CT findings** on non-contrast and contrasted CT head in **toxoplasmosis**? **Treatment**?	**Non-contrast CT**: multiple subcortical lesions in basal ganglia **Contrast CT**: ring-enhancing lesions with surrounding edema **Tx**: pyrimethamine, sulfadiazine and leucovorin
Diagnosois: HIV + CD4 < 200, focal neurologic deficits with nonenhancing white matter lesions	**Dx: PML** (JC virus) - if ring-enhancing on CT, think toxoplasmosis or primary CNS lymphoma
Diagosis, Treatment: progressive blindness in AIDS patient	**Dx: CMV retinitis.** Exam shows "fluffy white perivascular lesions (cotton wool spots) with areas of hemorrhage." **Tx**: IV ganciclovir
Which **factors** increase the **risk of transmission** after **occupational exposure to HIV**?	Deep injury, visible blood, hollow bore needle from vein or artery, late stage HIV/AIDS or high viral load; transmission risk is 0.3% with needlestick, 0.1% with mucous membrane exposure
What are the **guidelines** for **post-exposure prophylaxis** for **HIV**?	HIV + and < 72 hours: HAART for 28 days; if low risk and > 72 hours no treatment is necessary All others per clinical judgement.
What are **potential oral antibiotic options** for **community acquired MRSA**?	Clindamycin, TMP-SMX, doxycycline, or linezolid. IV vancomycin required if hospital-acquired.
Diagnosis: skin lesion, gram positive rod	Anthrax
Diagnosis, Treatment: cutaneous vs. pulmonary anthrax	*B. anthracis* (Gram positive rod) **Cutaneous:** pruritic, black eschar + painful lymphadenopathy over 1-2 weeks **Pulmonary:** due to inhaled spores (not contagious), flu-like sx. CXR shows **wide mediastinum**; rapid progression to sepsis + death **Tx**: ciprofloxacin
Diagnosois, Treatment: pneumonic and bubonic plague	Dx: *Yersinia pestis* **Pneumonic:** inhaled aerosolized rat droppings, very contagious, severe pneumonia, bioterrorism agent **Bubonic**: transmitted via flea bite, causes buboes + acral necrosis (black/dead distal extremities), may travel to lungs (contagious at this stage) **Tx**: streptomycin, gentamicin, doxycycline.
What is the **appropriate management** of a patient with a **tick bite, targetoid rash, and Bell's palsy**?	**CT** and **LP** followed by **ceftriaxone** due to concern for **disseminated Lyme**
What is the **most infectious** blood-borne **pathogen**?	Hepatitis B, followed by Hepatitis C and HIV

Diagnosis, Treatment, Complications: military recruit or college student with fever, headache, petechial rash	**Dx: Meningococcemia**. *Neisseria meningitidis* (aerobic, gram-negative diplococcus) **Tx**: ceftriaxone + vancomycin **Complications**: myocarditis with CHF or conduction abnormalities; Waterhouse-Friderichsen syndrome: bilateral adrenal hemorrhage + meningococcemia
Signs and Symptoms, Diagnosis, Treatment: relative bradycardia in the setting of fever after travel to southeast Asia when patient presents with fever, malaise, relative anemia, and elevated LFTs.	**Dx: typhoid fever;** caused by salmonella typhi. Oral ingestion of contaminated food or water. **SSx**: fever, malaise, abdominal pain, fatigue, diarrhea in children, constipation in adults **Tx**: fluoroquinolones in adults, third-generation cephalosporin in children. Vaccine only gives 55% immunity.
Which **infections** are **most common** with **puncture wounds** to the plantar surface of the foot, either barefoot or through a shoe?	**Barefoot**: lower risk for infection, if infection occurs typically staph or strep **Through shoe**: pseudomonas
What **antibiotics** can be used as **chemoprophylaxis** against **meningococcal** disease?	Rifampin first line, other medications include ciprofloxacin, ceftriaxone
Signs and Symptoms, Treatment: leptospirosis	Comes from **contaminated fresh water** (urine of rodents/livestock) **SSx**: fevers, rigors, myalgia, CONJUNCTIVAL SUFFUSION (redness without exudates), jaundice, acute renal failure **Tx:** doxycycline or penicillin G (may precipitate Jarish-Herxheimer reaction)
Treatment of which infections can be associated with the **Jarisch-Herxheimer Reaction**?	Syphilis, Leptospirosis, Lyme Disease
Signs and Symptoms, Treatment: tularemia	History will discuss handling **rabbits**. Bioterrorism agent. **SSx**: skin ulcers, lymphadenopathy, fever. **Tx:** streptomycin. Alternative: ciprofloxacin, doxycycline.
Most common **infection** in a patient with an **indwelling urinary catheter**	***Pseudomonas***; human + plastic (ETT/foley/tracheostomy) = *Pseudomonas*
Diagnosis: AIDS + chronic watery diarrhea	Cryptosporidium
Diagnosis: AIDS (CD4 < 200) + pneumonia	PJP or TB (may have negative CXR/PPD)
Diagnosis: AIDS + ring-enhancing intracranial lesions + focal neurologic deficits	Toxoplasma gondii
Diagnosis: AIDS + ring-enhancing intracranial lesions + altered mental status	Primary CNS lymphoma
Diagnosis: AIDS (CD4 < 100) + meningitis	Cryptococcus
Diagnosis: AIDS (CD4 < 50) + focal neurologic deficits + nonenhancing white matter lesions	PML (JC virus)
Diagnosis: AIDS (CD4 < 50) + retinitis + cotton-wool spots	CMV
Diagnosis: AIDS + dark purple skin/mouth nodules	Kaposi's sarcoma
Diagnosis: AIDS + vesicular rash	HSV, zoster reactivation

HIV medication side effect: **didanosine**	Pancreatitis
HIV medication side effect: **efavirenz**	Vivid dreams, headache, severe rash (rarely SJS), dizziness
HIV medication side effect: **indinavir**	Nephrolithiasis (radiolucent), hyperbilirubinemia, hepatitis
HIV medication side effect: **lopinavir**	Nausea, vomiting, diarrhea, hepatitis
HIV medication side effect: **nucleoside/nucleotide reverse transcriptase inhibitors**	Lactic acidosis
HIV medication side effect: **ritonavir**	Paresthesias
HIV medication side effect: **zidovudine**	Bone marrow suppression

Neurology

Bizz	Buzz
Diagnosis: Eye down and out	**CN III palsy;** consider CVA, PCOM aneurysm, uncal herniation if with blown pupil
Diagnosis: Bilateral internuclear ophthalmoplegia	Combined 3rd & 6th nerve palsy; usually **multiple sclerosis**
Diagnosis, Treatment: Urinary incontinence, altered mental status, ataxia	**Dx: Normal pressure hydrocephalus**; "wet, wacky, wobbly"; will have normal opening pressure on LP **Tx:** high volume **CSF removal vs shunt**
Diagnosis: Young obese woman, headaches, vision changes, CN VI palsy	**Dx: Idiopathic intracranial hypertension** (pseudotumor cerebri); CT normal (may show emtpy sella); LP (↑ opening pressure) **Tx: LP** (drain to <20 cm H2O), **acetazolamide** **Complication:** permanent vision loss
Mechanism, Signs & Symptoms, Treatment: Neuroleptic Malignant Syndrome	**Mechanism:** Anti-dopaminergic/**antipsychotic use** or **dopamine withdrawal** **SSx:** "FEVER"; **fever**, encephalopathy, vital instability, elevated CK, **rigidity**, ***no clonus/DTR changes*** **Tx:** Supportive (**IVF, benzodiazepines, cooling**), ± dantrolene (direct skeletal-muscle relaxant), ± bromocriptine (dopamine agonist)
Mechanism, Signs & Symptoms, Treatment: Serotonin Syndrome	**Mechanism:** Serotonergic agent use (combo 2+ SSRIs) or multi-drug overdose **SSx: Fever**, autonomic instability, encephalopathy, **clonus + hyperreflexia (LE > UE)** **Tx:** Supportive (IVF, benzodiazepines, cooling), ± cyproheptadine (antihistamine w/ antiserotonergic properties); withdraw offending agent
Diagnosis: CNS mass lesion in AIDS	1) **Toxoplasmosis** (multiple ring-enhancing lesions w/ edema) 2) **CNS lymphoma** (hyperdense, round enhancing lesions) **Know that these are both differentials but treat as toxo on the boards.
Treatment: Intraparenchymal hemorrhage	"**BRAINS**": **B**P control (~160/90), **R**everse coagulopathy, **A**irway mgmt, **I**CP control if herniating (hyperventilate, elevate HOB 30°, mannitol), **N**eurosurgery consult (craniotomy for cerebellar vs. ventriculostomy), **S**eizure ppx (controversial)
Diagnosis: Contralateral hemiparesis/hemiplegia, contralateral sensory loss, homonymous hemianopia	**Putamen hemorrhage** (most common type of ICH)
Diagnosis: Ataxia, headache/vomiting, gaze palsy, facial weakness	**Cerebellar hemorrhage**
Diagnosis: Hemiparesis or hemisensory loss, upward gaze palsy, miotic pupils	**Thalamic hemorrhage**
Diagnosis: Deep coma, total paralysis, pinpoint pupils	**Pontine hemorrhage**

Presentation: ACA vs. MCA vs. PCA stroke	**ACA:** frontal lobe dysfunction, apraxia, contralateral paralysis (**LE > UE**) **MCA:** contralateral paralysis (**upper > lower**), ipsilatateral hemianopsia, aphasia **PCA:** LOC, nausea/vomiting, CN dysfunction, ataxia, vertigo, visual agnosia
Diagnosis: Unilateral CN deficits + contralateral hemiparesis or hemisensory loss	**Brainstem stroke** (this presentation is known as "crossed signs")
Treatment: Sickle cell patient with CVA	**Exchange transfusion**
Indications for tPA in CVA	Age ≥18, dx of **ischemic stroke** + neuro deficits, **symptoms < 4.5 hr,** CTH negative for bleed, no clear reversible cause.
Absolute contraindications to tPA in CVA	Stroke/neurosurgery/head trauma within 3 mo, **ANY ICH** (current or previous), known intracranial neoplasm/AVM/aneurysm, **BP >185/110** after reduction attempted, reversible cause, active bleeding or **coagulopathy** (Plt <100k, INR >1.7, PT>15 seconds), multilobar infarcts, glucose < 50
Relative contraindications to tPA in CVA	Pregnancy, seizure at onset with postictal period, major surgery in last 14 days, GI or GU bleeding in last 21 days, MI in last 3 mo, endocarditis (tested often)
Dosing: tPA/alteplase vs TNK/tenecteplase in ischemic stroke	**tPA:** 0.9 mg/kg (up to 90 mg) with 10% of the dose given as a **bolus** and the rest of the dose given as an **infusion** over 1 hour **TNK:** 0.25 mg/kg or 0.50 mg/kg with a maximum dose of **50 mg** given as a **bolus** dose without follow-up infusion
What is the major difference between **lacunar** and **cortical** infarcts?	**Cortical:** Large artery, cortical dysfunction (aphasia, neglect, ALOC), motor AND sensory sx, deficits to contralateral side **Lacunar:** Small artery, pure motor OR sensory sx, related to HTN
Localize the lesion: Neglect or "hemi-inattention"	**Non-dominant parietal lobe** (right hemisphere for most people)
Diagnosis, Treatment: Transient episode of slurred speech and unilateral arm weakness, now resolved	**Dx: Transient ischemic attack (TIA)** = episode of neurological ischemia without infarction **Tx: Aspirin ± clopidogrel** (without treatment 10% of TIA patients will go on to have a stroke within 90 days)
What is the further **workup** and management is needed for a patient after transient ischemic attack?	**Vessel imaging** (MRI/MRA head & neck), ECG, **echocardiogram** Start dual anti-platelet therapy (**DAPT**) for ABCD2 Score >3 (vs ASA alone)

How do you calculate an **ABCD2** Score and how is it used?	Used to determine disposition for patients with TIA; predicts likelihood of subsequent stroke within 2 days. **A**ge >60 (1), **B**P >140/90 (1), **C**linical features: unilateral focal weakness (2) speech disturbance w/o weakness (1), **D**uration of symptoms: >60 min (2), 10-59 min (1), <10 (0), **D**iabetes (1) **Hospitalize for score >2** (vs expedited outpatient workup)
What is the **best study** to diagnose venous sinus thrombosis?	Magnetic resonance venography (**MRV**)
Treatment: Suspected bacterial meningitis	ABCs, Antibiotics: **CTX + Vancomycin** ± Ampicillin (age >50, alcoholics) **± Acyclovir**, steroids, supportive (MAP/temperature mgmt, sz control PRN)
Diagnosis: Suspected bacterial meningitis	Obtain **CT head** first, then perform **lumbar puncture** (send CSF studies) **Do NOT delay antiobiotics** for diagnosis/lumbar puncture
Diagnosis, Treatment: Bloody, necrotizing encephalitis	**Dx:** Herpes encephalitis **Tx:** IV acyclovir
Physical exam findings: Upper motor neuron lesion	**Spastic** paralysis, ↑ DTRs, positive (upgoing) Babinski, ↑ tone
Physical exam findings: Lower motor neuron lesion	**Flaccid** paralysis, ↓ DTRs, muscle wasting, fasciculations/twitching
What distinguishes **Conus Medullaris Syndrome** (CMS) from **Cauda Equina Syndrome** (CES)?	CMS is similar to CES except it is ABOVE L1 & is an **UMN** lesion; **CMS will ALWAYS will have positive (upgoing) Babinski** (UMN lesion finding).
Signs & Symptoms, Diagnosis, Treatment: Guillain-Barré Syndrome (GBS)	**SSx**: preceding respiratory (mycoplasma) or GI illness (campylobacter = MCC), progressive, **ascending**, **symmetric motor weakness**, **↓ DTRs**, normal rectal tone GBS = most common peripheral neuropathy caused by autoimmune demyelination **Dx**: LP shows ↑ **CSF protein + mild pleocytosis** **Tx**: **plasmapheresis, IVIG, measure NIF** (intubate if worse than -30 cm H2O), vital capacity (respiratory monitoring)
What is the **Miller Fisher** variant of Guillain-Barré Syndrome?	**Descending** motor weakness (whereas GBS is ascending) + ataxia + opthalmoplegia and bulbar symptoms May present similarly to botulism.
What is the difference between Guillain-Barré Syndrome and **tick paralysis**?	**GBS:** ascending motor weakness, post-infectious autoimmune disorder **Tick paralysis**: symmetric ascending flaccid paralysis + ataxia + fixed dilated pupils; caused by neurotoxin in tick saliva (Tx: remove tick)
Mechanism: Botulism	Clostridium botulinum neurotoxins → **blocks ACh release** at neuromuscular junction → flaccid paralysis Forms: food borne (canned foods, honey), wound, infantile (most common)

Signs & Symptoms, Treatment: Botulism	**SSx: floppy baby**, constipation, weak cry (infants); **CN/bulbar sx**, dilated pupils (differentiates from myasthenia), **symmetric descending flaccid paralysis/weakness** (MC finding), parasympathetic blockade (dry mouth/sore throat, urinary retention) **Tx:** supportive care, resp. monitoring (**resp. failure = MCC death**) **Antidote:** <1 year-old gets botulism Ig; otherwise antitoxin
Signs & Symptoms, Diagnosis, Treatment: Syringomyelia	**SSx: headache** (2/2 Chiari malformation), **"cape-like" loss of pain/temp** sensation to UE, preserved proprioception/vibratory sense Cyst or cavity in upper spinal cord (**cervical spine = MC location**) **Dx:** MRI **Tx: neurosurgery consultation**, monitor vs. drain
Signs & Symptoms, Diagnosis, Treatment: Myasthenia gravis	**SSx: repeated muscle use = ↑ weakness/fatigue**, proximal muscle weakness, ocular sx (CNIII palsy, ptosis, dysphagia, diplopia) **Autoantibodies to nicotinic ACh receptors** (25% with associated thymoma) **Dx:** Tensilon Test (edrophonium) or Ice Pack test: ↓ sx **Tx:** Pyridostigmine **Myasthenic crisis:** triggered by infxn, meds; resp. failure → mechanical ventilation (follow vital capacity, NIF); treated with IVIG and/or plasmapheresis
What is the difference between **Myasthenia Gravis** (MG) and **Lambert-Eaton Myasthenic Syndrome** (LEMS)?	**MG:** fatigue with repeated movement **LEMS:** improvement repeated movement LEMS is often paraneoplastic, so look for underlying cancer if not already diagnosed.
Diagnosis, Treatment: Young man presents with lower extremity paralysis, hyperthyroidism, and hypokalemia	**Dx: Thyrotoxic periodic paralysis** Hallmark of periodic paralysis = **painless weakness precipitated by heavy exercise**, high carb meals Caused by transmembrane shift of K into cells **Tx: K repletion** (not aggressive) and beta blockers
Diagnosis, Treatment: Status epilepticus	**Dx: Seizure lasting > 5 minutes** or > 2 discrete seizures without return to baseline Common causes: AED discontinuation, **medication noncompliance** **Tx: benzodiazepines (IV lorazepam, IM midazolam)**, phenytoin/levetiracetam/divalproex (second line), intubation + phenobarbital/propofol (third line)
Treatment: Eclamptic seizure	**Magnesium sulfate** (4-6 g IV over 15 min followed by 2-3 g/hr) Side effects: loss of DTRs, dysrhythmia, resp. failure
Treatment: Respiratory depression due to hypermagnesemia	**IV Calcium**
Treatment: Seizure related to isoniazid overdose	**Vitamin B6/Pyridoxine** (1 gm per 1 gm of INH toxicity)

Physical exam findings: Meningismus	Jolt accentuation: baseline HA ↑ when the patient turns head horizontally 2-3 rotations/sec **Brudzinski's sign** (**B**end the brain): flexing the neck causes the hips and knees to flex **Kernig's sign** (extend **k**nees): knees/hips flexed to 90 degrees, knee extension causes pain
What is appropriate **chemoprophylaxis** for those exposed to ***N. meningitidis***? Who needs prophylaxis?	Ppx: **Rifampin** 600 mg BID x2d, **Ceftriaxone** 250 mg IM x1, OR Ciprofloxacin 500 mg PO x1 Indications: household contacts, **sleeping in the same room**, school or daycare contacts within past 7d, **direct exposure** to secretions (toothbrush, kissing, shared utensils), travel for >8 hours with the patient, intubation without facemask
Signs & Symptoms, Diagnosis, Treatment: HSV Encephalitis	**SSx: fever + headache + AMS**; neuro deficits, psych sx **Dx: CSF with ↑ RBCs** and no bacteria, usually focal at **temporal lobes** (may see hemorrhage on CT) **Tx: IV acyclovir**
Signs & Symptoms, Diagnosis, Treatment: Neurocysticercosis	**SSx: new onset sz** in adult Pt will be immigrant from tropical areas, Mexico. Infxn acquired by eating pork containing larval cysts of **Taenia solium** (tapeworm). **Dx:** CT shows multiple **ring-enhancing lesions** **Tx: Albendazole** Complication: obstructive hydrocephalus
What is the **most common cause** of meningitis in an adult?	***Streptococcus pneumoniae*** (Most common cause of **MOPS** - meningitis, otitis media, pneumonia, and sinusitis)
What are the expected cerebrospinal fluid findings for **viral meningitis**?	**Opening pressure:** normal **WBCs:** ↑ (< 300; lymphocyte predominance) **Protein:** normal to ↓ **Glucose:** normal **Culture:** negative
What are the expected cerebrospinal fluid findings for **bacterial meningitis**?	**Opening pressure:** ↑ **WBCs:** ↑↑ (>1000; neutrophil predominance) **Protein:** ↑ **Glucose:** ↓ **Culture:** positive
What are the expected cerebrospinal fluid findings for **fungal meningitis**?	**Opening pressure:** ↑ **WBCs:** ↑ (but < 500; lymphocyte predominance) **Protein:** ↑↑ **Glucose:** normal to slightly ↓ **Culture:** positive (fungal)
Treatment: Brain abscess	3rd generation cephalosporin (e.g. **ceftriaxone or cefotaxime**) + anaerobic bacterial coverage (e.g. **metronidazole**) + neurosurgical consultation

How is caloric testing used? What direction would you expect nystagmus with **normal caloric testing**?	Used to test vestibulo-ocular reflex; intact brainstem elicits nystagmus. Direction of fast beat of nystagmus depends on temperature of H20 used. "COWS": **C**old- **O**pposite, **W**arm-**S**ame
Signs & Symptoms, Diagnosis, Treatment: Posterior Reversible Encephalopathy Syndrome (PRES)	**SSx: HTN emergency w/ neuro sx** (severe headache, AMS, seizure, vision loss); often due to vasogenic edema of the brain Associated with **preeclampsia/eclampsia.** Most often in BILATERAL occipital and posterior parietal lobes **Dx:** mainly clinical; CT may show edema; MRI is more specific **Tx:** supportive, **BP reduction** (goal ~25% MAP reduction in ED)
Diagnosis: Diplopia on lateral gaze due to impaired adduction of the contralateral eye	**Internuclear ophthalmoplegia** (associated with MS)
Diagnosis: Diplopia on lateral gaze due to impaired adduction of the ipsilateral eye	**CN VI Palsy** (obtain brain imaging; neuro/ophtho consults)
What diagnoses typically present with **ascending vs descending weakness**?	**Ascending:** GBS, tick paralysis **Descending**: Botulism, myasthenia gravis, Miller Fisher variant GBS, Lambert-Eaton myasthenic syndrome
What are potential causes of **peripheral** and **central vertigo**?	**Peripheral vertigo:** BPPV, acute otitis media, labrynthitis, Meniere's dz, vestibular neuronitis **Central vertigo:** brainstem or cerebellar lesion
What are the differences between **peripheral** and **central vertigo**?	**Peripheral vertigo:** sudden onset, short duration, severe intensity (often with vomiting), worsened by position, fatigueable unilateral nystagmus, otherwise normal neuro exam . **Central vertigo:** often gradual, constant sx, less likely positional, nystagmus (multidirectional, non-fatigable), +addtional neuro deficits
Diagnosis, Treatment: Woman with shock-like unilateral lower face pain, worse with chewing or brushing teeth	**Dx: Trigeminal neuralgia** **Tx:** Carbamazepine
Signs & Symptoms, Diagnosis, Treatment: Temporal arteritis (Giant Cell Arteritis)	**SSx: monocular vision loss**, unilateral headache, jaw claudication; usually woman >50 years old; associated with polymyalgia rheumatica **Dx:** temporal artery tenderness on exam, ↑ **ESR** and ↑ **CRP**, temporal artery biopsy (gold standard) **Tx**: **high-dose IV steroids** ASAP (don't wait or refer if visual sx)
What causes **Bell's Palsy**?	CN VII palsy Causes: **idiopathic**, infection (**HSV** = MCC), malignancy

Signs & Symptoms, Diagnosis, Treatment: Bell's Palsy	**SSx: ipsilateral weakness of UPPER AND LOWER face**, lip droop/drooling, hyperacusis, loss of taste sensation **Dx:** clinical (head imaging not necessary) **Tx: prednisone, antivirals** (detemined by House-Brackmann score), **artificial tears** (complication: keratitis) *Bilateral palsy: consider Lyme, HIV, botulism, infectious mono*
Diagnosis, Treatment: Recurrent episodes of severe unilateral headaches w/ ipsilateral lacrimation, rhinorrhea, nasal congestion, and conjunctival injection	**Dx: cluster headache**, often men in their late 20s or early 30s Attacks last 45-90 minutes, happen 1-3x per day. Cluster period is 6-12 wks w/ remission for 12 months. **Tx: oxygen** via NRB (NC not effective)
Who needs a **CT head** prior to undergoing **lumbar puncture**?	1. Evidence of head trauma 2. AMS 3. Seizure 4. Focal neurological deficits 5. Papilledema 6. Immunocompromised pts
Diagnosis: 5 year-old boy with wide based gait, poor tone, and horizontal nystagmus that started suddenly two weeks after a URI	Dx: **Acute post-infectious cerebellar ataxia** (must rule out other causes)
Signs & Symptoms, Diagnosis, Treatment: Transverse myelitis	**SSx:** Young person with acute or subacute presentation of **back pain** that rapidly progresses to **sensory** and then **motor loss** at a **spinal level** Typically occurs after viral infection, but may be idiopathic. **Dx:** MRI **Tx:** manage ABCs, steroids, neurology consult
Signs & Symptoms, Diagnosis, Treatment: Cerebral Vein Thrombosis	**SSx:** headache, seizure, encephalopathy Typically female gender, prothrombotic state (pregnancy, malignancy) **Dx: MRV** (gold standard), CT may show DELTA sign (hyperdensity at superior sagittal sinus) **Tx: heparin gtt**
Signs & Symptoms, Diagnosis, Treatment: Slit Ventricle Syndrome	**SSx:** patient with a **VP shunt** prsenting for **positional headache** (worse with standing) due to over-drainage of CSF after VP shunt placement or revision (usually weeks/months) **Dx:** history and CT **Tx: neurosurgery** consult
What is a **rare but pathognomonic finding** on noncontrast head CT that is seen in some acute strokes?	**Dense MCA sign**

Endocrine & Metabolic

Bizz	Buzz
Review **expected bicarbonate** and **pCO2** levels for: Metabolic Acidosis Metabolic Alkalosis Respiratory Acidosis Respiratory Alkalosis	Metabolic Acidosis: ↓ HCO3, ↓ pCO2 (hyperventilation) Metabolic Alkalosis: ↑ HCO3, ↑ pCO2 (hypoventilation) Respiratory Acidosis: ↑ pCO2, ↑ HCO3 (↑ renal reabsorption) Respiratory Alkalosois: ↓ pCO2, ↓ HCO3 (↓ renal reabsorption) *Normal values: pH 7.4 / HCO3 24 / pCO2 40 / AG 12 ±
What is the **appropriate metabolic compensation** for respiratory acidosis and alkalosis?	**Respiratory acidosis:** for every ↑ of pCO2 by 10, HCO3 should ↑ by 1 (Acute) and 3 (Chronic) **Respiratory alkalosis:** for every ↓ in pCO2 by 10, HCO3 should ↓ by 2 (Acute) and 5 (Chronic) Mnemonic is "1325" If NOT true then a mixed disorder is present
What is the **appropriate respiratory compensation** for metabolic acidosis and alkalosis?	**Metabolic acidosis:** 1.5 x HCO3 + 8 (±2) = appropriate PCO2 **Metabolic alkalosis:** for every ↑ of HCO3 by 1, pCO2 should ↑ by 0.7 If NOT true then a mixed disorder is present
What is the **differential** for an **anion-gap metabolic acidosis**?	A CAT MUDPILE: **A**spirin **C**arbon monoxide, **C**yanide, **C**affeine **A**cetaminophen **T**heophylline **M**ethanol, **M**etformin **U**remia **D**KA (AKA) **P**ropylene Glycol **I**soniazid, **I**buprofen, **I**ron **L**actic Acidosis **E**thylene glycol
What are the **most common causes** of **non-anion-gap metabolic acidosis**?	**Diarrhea & spironolactone.** Mnemonic is HAARDUPS: **H**yperalimentation (TPN) **A**cetazolamide, **A**mpho B **R**enal tubular acidosis **D**iarrhea **U**reterosigmodostomy **P**ost-hypocapneic state **S**ulfamylon
What are the **most common causes** of **metabolic alkalosis**?	Vomiting, diuretics, and hypochloremia
What is the **primary difference** between **Type I** and **Type II diabetes**?	**Type I**: insulin deficiency (auto-immune) **Type II**: insulin resistance (acquired)

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What are the **criteria** for **diagnosis** of **diabetes**?	Fasting blood sugar >126 (2 separate occasions) Random glucose >200 with signs and symptoms of diabetes Glucose >200 after oral glucose tolerance test HbA1c > 6.5%
Diagnosis: Suspected **DKA** and **coffee-ground emesis**	**Erosive esophagitis & hemorrhagic gastritis** in up to 9% of DKA, rarely need treatment/endoscopy
Signs and symptoms, Diagnosis: DKA	**SSx:** Polyuria, polydipsia, abdominal pain, vomiting, acetone (fruity) smell, ± unstable vitals/shock, altered mental status, possible coffee-ground emesis **Dx:** Labs: glucose > 250, pH < 7.3 (VBG acceptable), HCO3 <18, AG >10, +Serum/urine ketones Note: workup should include evaluation for cause of DKA (infection rule out) and ECG due to electrolyte abnormalities.
What **lab value** is **critical** to know prior to giving **insulin** for **DKA**?	**Serum potassium**: patients have an overall deficiency of potassium (initial labs may show high K). Risking profound hypokalemia if started on insulin drip without potassium supplementation.
What is the **appropriate approach to fluid resuscitation** in **DKA**?	2 liters normal saline IVF bolus (kids: 10-20 mL/kg), when glucose < 250, start glucose-containing fluids (D5½ NS)
First intervention to start in **DKA**?	**IV fluids.** Often asked on tests. Give fluids before insulin or potassium.
What is the **appropriate approach** to **electrolyte repletion** in **DKA**?	**Key = POTASSIUM!** Know level before giving insulin. **K < 3.3**: HOLD Insulin & give potassium **K = 3.3-5.2:** can start insulin but supplement potassium and give potassium in each liter of IVF **K > 5.2:** Start insulin & normal saline, no supplemental potassium needed **Bicarbonate**: controversial, only start if severe DKA + intubated **Mg:** replete with K **Na:** pseudohyponatremia, abnormal Na will typically correct with fluids
What is the **appropriate approach** to **insulin administration** in **DKA**?	Evaluate potassium level first, then give **0.1 U/kg/hr** drip (double if glucose not decrease by 50 after first hour) Initial bolus not necessary; can also follow SQ regimen *Transition to regular insulin subcutaneous when gap closed and pH > 7.3, stop insulin drip 1 hour after patient given subcutaneous insulin
How do you correct **sodium** for **hyperglycemia** (pseudohyponatremia)?	Add 1.6 to sodium for each glucose value of 100 over 100 mg/dL Ex: If glucose is 600 and Na is 125, corrected Na is 125 + (5*1.6) = 132

Diagnosis, Treatment: DKA followed by **new altered mental status** or **seizure**	**Cerebral edema**, more common in kids and new onset type I diabetes, more common with insulin bolus before drip **Dx**: STAT CT head, frequent neuro checks, airway management as needed **Tx**: mannitol (1-2g/kg)
What is the **mechanism of action** and **possible adverse effect** of **Sulfonylureas** (Glipizide, glyburide)	**Stimulates insulin release** from the pancreas; can cause **prolonged hypoglycemia** in overdose.
What is the **mechanism of action** and **possible adverse effect** of **Biguanides** (Metformin)	**Suppress hepatic gluconeogenesis.** Adverse effects: diarrhea, **lactic acidosis** No hypoglycemia
What is the **mechanism of action** and **possible adverse effect** of **Thiazolidinediones** (TZDs- Actos, Avandia)	Increased sensitivity to insulin (muscle & fat). Adverse effects: hepatitis & edema No hypoglycemia
Signs and Symptoms, Diagnosis, Treatment: Hyperosmolar hyperglycemic state	Occurs in Type II DM. **SSx:** CNS symptoms (stupor/coma) **Dx:** Labs: glucose > 600, pH >7.3, HCO3 >18, ± urine ketones, AG <12, severe dehydration (8-12L deficit) **Tx:** IVF, insulin
Which **lab test** can **help identify** factitious **hypoglycemia** (exogenous administration)?	**C-peptide**. Only elevated when endogenous insulin is released from the pancreas, not with exogenous use.
What is the **rule to calculate** maintenance IVF rate?	4 mL/kg for first 10 kg, 2 mL/kg for second 10 kg, 1 mL for each additional kg to max of ~120 mL/hr total
What are **typical causes** and **appropriate treatment** for **Hypervolemic**, **Euvolemic** and **Hypervolemic Hyponatremia**?	**Hypervolemic:** CHF, ESRD, cirrhosis Tx: water restrict + diuretics **Euvolemic**: SIADH, psychogenic polydipsia Tx: water restrict **Hypovolemic**: vomiting, diarrhea, third spacing, diuretics Tx: NS vs 1/2 NS
What is the **approach** to **correction of hyponatremia**?	Overall goal correction rate 0.3 mEq/hr or 8-10 mEq/day. **Note: rapid correction risks central pontine myelinolysis/demyelination.** Tx: Na > 120 and asymptomatic = no emergent treatment Na < 120 and neurologic symptoms, give 3% NaCl (100 mL over 10 minutes, additional 100 mL over 50 minutes)
How and **when** does **central pontine myelinolysis** present?	**How**: Altered mental status (lethargy and coma) with spastic quadriplegia after treatment for hyponatremia. **When**: 1-6 days after treatment for hyponatremia. Patients with chronic hyponatremia (e.g. alcoholics) are most at risk for this.

What is the **approach** to **treatment** of **hypernatremia**?	Overall goal correction rate 1-2 mEq/hr **Note: rapid correction risks cerebral edema** **Free Water Deficit** = (0.6 x weight (kg) x (Current Na - 140)/140 and replace with NS until euvolemic, then D5W vs D5 1/2 NS Give 50% over 12 hours, remainder over the next 24 hours
What is the **most common cause** of **hyperkalemia**?	Lab error, resend lab
What **ECG** changes are seen in **hyperkalemia**?	Peaked T waves > PR prolonged > loss of P wave > wide QRS > sine wave > VT/VF
What is the **general approach** to **treatment** of **hyperkalemia**?	**Cardioprotection:** calcium gluconate or calcium chloride ONLY if ECG changes **K shifters:** Insulin/glucose, bicarbonate if acidotic, albuterol **K excretion**: lasix, kayexalate, lokelma, hemodialysis
Signs and Symptoms, Treatment: hypokalemia	Most common electrolyte disturbance, often secondary to GI or diuretic losses. **SSx**: cramps, weakness, arrhythmias, cardiac arrhythmias, rhabdo **Tx:** K repletion 10 mEq ~ ↑ 0.1mEq/L, give 10-20 mEq/hr; *Note: supplement with Magnesium (↑ absorption)*
What is the **most specific ECG change** associated with **hypokalemia**?	Flattened or inverted T wave, **U waves** = specific, prolonged QT, ST depression
Signs and Symptoms, Diagnosis, Treatment: Hypercalcemia	Ca > 10.5. Causes: hyperparathyroid (overall most common cause), malignancy (most common inpatient cause), dehydration **SSx:** BONES (bone pain), STONES (renal, biliary), GROANS (abdominal pain, nausea/vomiting), THRONES (polyuria) and PSYCHIATRIC OVERTONES (depression, anxiety, insomnia) **Dx:** labs: serum Ca, iCa; ECG with short QT **Tx:** immediate if Ca > 14 (12-14 if signs/symptoms) with IVF (first step), Calcitonin (↑ excretion, inhibits osteoclasts), Bisphosphonates (inhibits osteoclasts, requires days to work), Steroids (↓ GI absorption), Lasix (if volume overload)
Signs and Symptoms, Diagnosis, Treatment: Hypocalcemia	Ca < 8.5. Causes: hypoparathyroidism (thyroidectomy = most common cause), Vitamin D deficiency, high phosphorous, low/high magnesium **SSx:** paresthesias, tetany, Chvostek's sign, Trousseau's sign, seizure **Dx:** labs: serum Ca, iCa; ECG with long QT **Tx:** IV calcium (if <7.5 and severe signs/symtoms), give Vitamin D and Mg as needed
What are the **significant differences** between **calcium gluconate** and **calcium chloride**?	**Calcium chloride** contains three times as much calcium as **calcium gluconate.** Calcium chloride must be given via central access (scleroses veins and causes tissue damage if leaks from vessels), while calcium gluconate can be given through peripheral IV.

Signs and Syptoms, Treatment: Hypermagnesemia	On tests, this is seen most often when treating eclampsia **SSx:** weakness, loss of reflexes (first sign), dysrhythmias, respiratory depression **Tx:** IV calcium
Diagnosis, Treatment: patient with alcohol use disorder with altered mental status, ataxia, visual symptoms	**Wernicke's Encephalopathy**; Thiamine (B1) deficiency **Tx:** Thiamine 500 mg IV, improvement in hours
Diagnosis: patient with alcohol use disorder with short term memory loss	**Korsakoff's Psychosis**; Thiamine (B1) deficiency, irreversible
Diagnosis, Treatment: poor nutrition and high output cardiac failure (dyspnea, peripheral edema)	**"Wet" Beriberi** due chronic thiamine deficiency **Tx:** thiamine 100 mg IV
Diagnosis: diarrhea, dermatitis, dementia	**Pellagra (Niacin (B3) deficiency)**. Think about populations who eat untreated corn/cornmeal.
Diagnosis: Crohn's patient with macrocytic anemia and paresthesias	**Cobalamin (B12) deficiency**; high risk include Crohn's (B12 absorbed in ileum), vegans, alcohol use disorder, PPIs, pernicious anemia (antibody to intrinsic factor) Causes megaloblastic anemia + neurologic deficits, hypersegmented neutrophils
Diagnosis: patient with alcohol use disorder with macrocytic anemia	**Folic Acid deficiency** High risk: alcohol use disorder, elderly, phenytoin use; no neurologic changes Hypersegmented neutrophils seen as well
Diagnosis: child with poor diet and bowed legs	**Rickets, Vitamin D deficiency** >> poor calcium absorption Osteomalacia: adult equivalent, normal height
Diganosis: bad skin, bleeding gums, perifollicular hemorrhages, and poor wound healing	**Scurvy, Vitamin C deficiency** >> poor collagen formation
Which **vitamins** are **toxic** in overdose?	Fat soluble vitamins, ADEK: **A**: bear liver consumption, skin changes, pseudotumor cerebri **D**: hypercalcemia, hypercalciuria **E**: ↑ bleeding **K**: hemolytic anemia, jaundice in newborns
What are the **fat-soluble vitamins**?	A, D, E, K
Which **hormones** are secreted from the **pituitary gland**?	GOAT FLAP: **G**rowth Hormone **O**xytocin, **A**DH **T**SH **F**SH **L**H **A**CTH **P**rolactin ALL but Oxytocin and ADH are from anterior pituitary
What are the **most common causes** of **hypopituitarism**?	Mass lesions, bleeds (pituitary apoplexy), hypothalamic disease, Sheehan's syndrome

Diagnosis: low cortisol level but normal aldosterone	**ACTH deficiency,** causes 2° adrenal insufficiency. Aldosterone production means that the adrenal glands are working.
Diagnosis: fatigue and inability to lactate post-partum	Post-partum hemorrhage >> ischemia and necrosis of the pituitary gland >> **Sheehan's syndrome** causing prolactin deficiency (and panhypopituitarism).
Diagnosis, Treatment: visual field deficits, headache, hormonal abnormalities	**Pituitary adenoma** (macro if > 1 cm) **Tx**: transsphenoidal surgery
Treatment: prolactinoma	Most common pituitary tumor. **Tx:** bromocriptine or carbergoline (dopamine receptor agonists > decrease prolactin levels), typically doesn't require surgery
Signs and symptoms, Treatment: Cushing's syndrome	Cortisol excess. ACTH secreting pituitary adenoma or exogenous steroids (most common cause) **SSx:** ('CUSHING') **C**entral obesity 24 hr **U**rinary cortisol ↑ or ACTH level **S**triae **H**ypertension/**H**yperglycemia/**H**irsutism **I**atrogenic **N**eoplasms **G**lucose intolerance **Tx**: surgery (tumor)
Diagnosis, Treatment: Headache and tunnel vision in oversized person	Growth Hormone secreting pituitary adenoma Children: gigantism Adults: acromegaly **Labs:** ↑ GH & IGF 1 **Tx:** surgery
Which **hormones** are produced by the **adrenal glands**?	**Medulla**: epinephrine and norepinephrine **Cortex:** cortisol, androgens, aldosterone
Identify the **key differences** between **primary** and **secondary adrenal insufficiency.**	Both: deficiency of adrenal gland hormone production **Primary** (adrenal disease): ↑ **CRH & ACTH**, Addison's disease (autoimmune) = most common cause, rapid withdrawal of steroids = most common cause in US **SSx**: shock, hypoglycemia, ↓ mineralocorticoid = ↓ Na/glucose, ↑ K, HYPERpigmentation (buccal, due to ↑ ACTH) **Secondary** (pituitary disease): ↑ CRH, ↓ ACTH: ↓ Na/glucose, normal K, NO hyperpigmentation; **Tx**: IVF, glucocorticoids, vasopressors
Signs and Symptoms, Diagnosis, Treatment: adrenal crisis	**SSx:** shock (refractory to fluids and pressors), fatigue, abdominal pain, AMS **Dx:** hypoglycemia, hyponatremia, hyperkalemia **Tx:** IVF, dextrose, replacement of GC and MC with hydrocortisone
What is the **strategy** for **stress dosing steroids** in **ill patients** on **chronic steroids**?	Double (minor symptoms) or triple (more severe symptoms) their home dose for 2-3 days. 1-2 mg/kg hydrocortisone if in adrenal crisis with hypotension.

Diagnosis: young child with abdomoinal mass and hypertension	**Neuroblastoma** (adrenal medulla tumor)
Diagnosis: hypertension, headache, palpitations, elevated catecholamines	**Pheochromocytoma** (adrenal medulla tumor)
Review the **hormone cascade** and **general function** of **thyroid** hormones	Thyroid Releasing Hormone (hypothalamus) → Thyroid Stimulating Hormone (anterior pituitary) → T4 (inactive from thyroid gland) → converted to T3 (active form) in peripheral tissues, requires iodine for conversion; T3 functions in glucose absorption, muscle building, increases catecholamines, increases basal metabolic rate
What are **common causes** of **hyperthyroidism**	Graves Disease (most common cause, young person) Toxic nodular goiter (elderly) Iodine-induced (amiodarone) Thyroiditis (amiodarone)
Signs and Symptoms, Diagnosis: thyrotoxicosis	**SSx:** heat intolerance, palpitations, wt loss, tachycardia, anxiety, hyperreflexia, goiter, exophthalmos, pretibial edema **Dx:** ↓ TSH level, ↑ T4/T3
Difference between **thyrotoxicosis** and **thyroid storm**?	**Thyrotoxicosis**: any condition that results in excessive thyroid hormone concentration. **Thyroid storm:** life threatening decompensation of thyrotoxicosis (hyperthyroid + acute event)
What is the **appropriate treatment** (and sequence) for **Thyroid storm**?	1) Beta-blockers (Propranolol): ↓ sympathetic activity + blocks peripheral conversion of T4 → T3 2) Antihormone medication: **P**TU (if **P**regnant) or Methimazole (blocks new hormone synthesis) 3) Potassium Iodide (AFTER above, blocks release of preformed hormone) 4) Steroids (blocks peripheral conversion of T4 → T3 5) Treat precipitant & prevent decompensation (IVF, tylenol, cool as needed) The order is controversial. Just know that **PTU comes BEFORE iodine** as this is typically tested.
What are **common causes** of **hypothyroidism**?	Hashimoto's (most common cause in US, autoimmune), medications, postpartum, iodine deficiency (most common cause worldwide)
Signs and Symptoms, Diagnosis, Treatment: hypothyroidism	**SSx**: fatigue, weight gain, cold intolerance, brittle hair and nails, constipation, periorbital edema, slow reflexes, edema **Dx:** TSH (↑ with 1°, ↓ with 2°), ↓ free T3 / T4 **Tx:** levothyroxine
Signs and Symptoms, Treatment: Myxedema Coma	**SSx/Dx:** AMS, hypoglycemia, hypothermia, bradycardia, hypotension, edema **Tx:** hydrocortisone, IV levothyroxine, supportive care (warming)

Diagnosis, Treatment: Thyroid Cancer	Five percent of thyroid nodules are cancerous, common cancer overall but low mortality **Dx:** fine-needle aspiration (biopsy) **Tx:** thyroidectomy, radioactive iodine-131, thyroid supplementation
Signs and Symptoms, Diagnosis, Treatment: Hyperparathyroidism	**SSx:** those of hypercalcemia - stones, bones, groans, psych overtones **Dx:** ↑ PTH → ↑ Ca, ↓ Phos **Tx**: lower Ca with IVF (first line), calcitonin, bisphosphonates, steroids, surgery
Signs and Symptoms, Diagnosis, Treatment: hypoparathyroidism	May be secondary to thyroid surgery **SSx:** same as hypocalcemia (paresthesias, tetany, Chvostek's sign, Trousseau's sign, seizure) **Dx:** ↓ PTH → ↓ Ca, ↑ Phos **Tx:** replacement of Ca, Vit D
Diagnosis, Treatment: Patient with a history of anorexia presents with signs of heart failure after starting an outpatient refeeding program.	**Refeeding syndrome.** Occurs when refeeding begins before correcting electrolyte abnormalities. **Dx:** hypophosphatemia, hypokalemia, hypomagnesemia, and ultimately volume overload and CHF. **Tx:** stop refeeding, correct electrolyte abnormalities.
How do you manage **sulfonylurea overdose**?	Glucose supplementation, octreotide (decrease insulin release from pancreas), and observation admission for at least 24 hours.
Signs and Symptoms, Treatment: Thyroid Storm	**SSx:** profound tachycardia, GI symptoms (nausea/vomiting/diarrhea), CNS dysfunction (anxiety, confusion, apathy, coma), goiter and multiorgan dysfunction. **Tx:** order is important! 1. Beta blockers 2. Thionamides (PTU, methimazole) 3. Iodine (only given 1 hour after methimazole) 4. Glucocorticoid (hydrocortisone) 5. Bile acid sequestrants (cholestyramine) *Dispo to ICU.

Toxicology

Bizz	Buzz
What is the mechanism of **activated charcoal**? What is the dosing and route of administration?	Activated charcoal has a high surface area to bind toxin in GI tract and **prevent systemic absorption** Administered orally: 10 g activated charcoal per 1 g drug
When is activated charcoal **contraindicated** or ineffective?	**Contraindicated**: **AMS**/obtunded patient (aspiration risk), intestinal obstruction/ileus **Ineffective**: Cyanide, Hydrocarbons, Ethanol/alcohols, Metals, Iron, Caustics, Lithium, CAMphor, Potassium (CHEMICaL CAMP)
What is the proposed mechanism of **whole bowel irrigation**? How should it be administered?	**Proposed mechanism**: Iso-osmotic agent taken in large volume will hasten toxin's progress through intestines and prevent absorption **Administration**: Dose 1-2 L/hr (adults) or 500 mL/hr (pediatrics), consider giving by NGT Continue until rectal effluent is clear (typically collected via rectal tube). Consider for “drug packers” and sustained-release BBs.
For what types of ingestion is whole bowel irrigation **most effective**?	**Metals** (iron or lithium), **sustained-release** formulations, enteric-coated medications, **"body packers"**
What toxins are cleared by **hemodialysis**?	"I STUMBLE": **I**sopropyl alcohol, **S**alicylate (aspirin), **T**heophylline, **U**ric acid, **M**ethanol, **B**arbiturates/**B**eta-blockers, **L**ithium, **E**thylene glycol
Pathophysiology: Acetaminophen (APAP) overdose	At **therapeutic** levels, APAP is metabolized mostly via **sulfation & glucuronide conjugation** with a small component of CYP450. CYP450 metabolism → toxic NAPQI metabolite **In overdose**, sulfation and glucuronidation is overloaded → **excess NAPQI** accumulates → **liver toxicity**
Signs & Symptoms, Diagnosis, Treatment: Acetaminophen (APAP) overdose	**SSx:** intentional or unintentional ingestion, delayed presentation can present with **abdominal pain, nausea/vomiting, AMS** **Dx:** can use Rumack-Matthew **nomogram** for SINGLE, ACUTE ingestions; get **APAP level at ≥ 4 hours** (< 4 hours NOT useful, unless ZERO) High risk of toxicity: **>150 mg/kg (acute)** or >4 g/day (chronic) **Tx: N-acetylcysteine (NAC)** → restores glutathione Best if given w/n **8 hours** of ingestion **Dose:** PO (140 mg/kg load, 70 mg/kg q4hr) or IV (150 mg/kg load, 50 mg/kg over 4hr, 100 mg/kg over 16 hr) Safe for pregnant women and children. **Side effect:** anaphylactoid reaction

When can you use the **Rumack-Matthew nomogram** for acetaminophen toxicity?	For **single acute ingestions** (not for chronic ingestions); serum APAP level must be drawn at least **4 hours** after ingestion.
Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: NSAID overdose	**Pathophysiology: COX inhibitor → decreased prostaglandin** production **SSx:** AMS, coma, ataxia, metabolic acidosis, seizure (massive overdose) **Tx:** supportive
Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Aspirin overdose	**Pathophysiology: Uncouples oxidative phosphorylation** → increased metabolic rate, stimulates respiratory centers, hyperthermia **SSx:** ↑ RR, ↑ temp, ↑ HR (sinus tach = MC sign), tinnitus, vertigo, AMS, seizure **Dx: Primary metabolic alkalosis (EARLY), anion gap metabolic acidosis (LATER)** **Serum salicyte levels:** 10-30 therapeutic, >40-50 toxicity **Tx:** GI decon; activated charcoal if within 1-2 hrs of ingestion; **urine alkalinization** with bicarb (+K, +Mg) infusion (enhances urinary excretion of salicylate, also prevents CNS distribution); dialysis (acute level >100, chronic level >60, OR +renal failure, severe acidemia, pulmonary/cerebral edema) **Avoid intubation** if possible; set high respiratory rate if intubated.
Signs & Symptoms, Treatment: Opioid overdose	**SSx: decreased LOC + respiratory depression + miosis** (pinpoint pupils) **Tx: naloxone** (titrate to RESPIRATORY RATE)
What are the unique **clinical complications** of meperidine, tramadol and methadone?	**Meperidine**: seizures, serotonin syndrome, often **dilated pupils** (different from other opioids!) **Tramadol:** seizures, serotonin syndrome, anticholinergic effects (mydriasis) **Methadone:** QT prolongation (& TdP), hypoglycemia
Which opioids are NOT seen on **urine toxicology screen**?	Will NOT detect synthetics including **fentanyl**, **hydromorphone**, buprenorphine, meperidine. Natural derivatives will show up (heroin, morphine, codeine).
What is the potential **risk** of using meperidine, tramadol, or dextromethorphan in the setting of antidepressant use?	**Serotonin syndrome**
Mechanism, Signs & Symptoms, Treatment: Clonidine toxicity	**Mechanism:** alpha-2 agonist **SSx: AMS + miosis + respiratory depression**; similar to opioid toxidrome but causes **bradycardia and hypotension** **Tx:** supportive, atropine, pressors, naloxone

What **common substances** are associated with methanol, ethylene glycol, and isopropyl alcohol ingestions?	**Methanol**: **windshield washer fluid**, wood alcohol, moonshine, paint solvent **Ethylene glycol: antifreeze**, radiator coolant, aircraft de-icing **Isopropyl alcohol**: **rubbing alcohol**, hand sanitizer
Clinical manifestations of ethylene glycol and methanol toxicities?	**Comatose**, mild hypothermia, tachypnea, **metabolic acidosis** with normal respiratory compensation **remember metabolic acidosis w/ respiratory compensation = last two numbers of pH roughly equal the PCO2 (pH 7.23 —> PCO ~ 23)
Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Methanol toxicity	**Pathophysiology**: metabolized to **formic acid** **SSx**: altered mental status, **optic neuropathy** ("snowy" field of vision or blindness), and basal ganglia injury **Dx**: **anion gap metabolic acidosis** and increased osmolar gap **Tx**: **fomepizole**, ethanol, dialysis
Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Ethylene glycol toxicity	**Pathophysiology**: metabolized to **glycolic and oxalic acids** **SSx**: altered mental status, hematuria, **oliguria**, renal failure **Dx**: hypocalcemia, **anion gap metabolic acidosis**, and increased osmolar gap **Tx**: **fomepizole**, ethanol, dialysis
Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Isopropyl alcohol toxicity	**Pathophysiology**: metabolized to **acetone** (uncharged ketone) **SSx**: CNS depression similar to EtOH toxicity **Dx**: increased osmolar gap and **ketosis WITHOUT acidosis** or anion gap **Tx**: supportive
What is the biggest **lab difference** between ethylene glycol and methanol ingestions as compared to isopropyl alcohol ingestion?	**Ethylene glycol and methanol** will lead to an **anion gap metabolic acidosis with** ↑ osmolar gap. **Isopropanol** will cause osmolar gap and **ketosis but no acidosis**.
How do you **calculate** the **osmolar gap**?	Serum Osmolality = 2xNa + Glucose/18 + BUN/2.8 + EtOH/4.6 Gap = Calculated - Measured Normal is less than 10.
What **cofactors** are required to treat ethylene glycol ingestions? Methanol ingestions?	**Ethylene glycol**: thiamine & pyridoxine **Methanol**: folinic acid
What are potential **adverse effects** of ethanol intoxication?	"4 Hs": **H**ypotension, **H**ypoventilation, **H**ypothermia, **H**ypoglycemia; atrial tachycardias ("holiday heart")
What is the **time course** of symptoms in alcohol withdrawal?	**Alcohol withdrawal syndrome**: cessation/reduction of etoh + etoh withdrawal sx Symptoms begin within 6-24 hours: Tremulousness (6-12 hrs) → hallucinations (12-48 hrs) → seizures (12-48 hrs) → **delirium tremens (>48hrs)**

Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Lidocaine toxicity	**Pathophysiology: Na channel blockade** → nerve conduction delays **Toxic dose:** >4 mg/kg plain or >7 mg/kg with epi **SSx:** CNS toxicity (perioral numbness, slurred speech, seizure), CV toxicity (VT/VF, AV block, AVNRT), methemoglobinemia, allergic rxn **Tx:** benzodiazepines for seizure, **bicarb for arrhythmia or QRS widening**, methylene blue for methemoglobinemia, epi for anaphylaxis, consider **intralipid** for CV collapse
What is the difference between **ester versus amide anesthetics**?	**Esthers** (one 'i' in name); cocaine, procaine, benzocaine; shorter acting; higher risk of allergic reaction 2/2 preservative or PABA **Amides** (two i's in name): lidocaine, mepivacaine, bupivacaine; longer acting; can use amides if allergic to esther/preservative
What are reasonable **local anesthetic** options for a patient with lidocaine allergy?	Allergy is usually to the preservative in lidocaine. Can use **crash cart lido** (preservative free) or locally injected diphenhydramine.
Causes, Signs & Symptoms, Treatment: Anticholinergic toxidrome	**Causes:** tricyclic antidepressants, atropine, **antihistamines (MCC)**, belladonna (nightshade), jimsonweed, phenothiazines. **SSx:** "Blind as a bat (mydriasis), mad as a hatter (agitation/AMS), red as a beet (flushing), hot as a hare (**hyperthermia**), dry as a bone (**anhidrosis**), bloated as a toad (stool or **urinary retention**), the heart runs alone (**tachycardia**)" **Tx:** supportive, benzodiazepines (seizures), sodium bicarb (wide complex dysrhythmias) ± physostigmine (cholinesterase inhibitor; avoid if known TCA overdose, QRS widening, seizure)
How might you identify **tricyclic antidepressant overdose** in a patient with anticholinergic toxidrome?	**Get an ECG!** TCA overdose is suggested by wide QRS (threshold is >100 ms) or terminal R wave in aVR.
How can you distinguish an **anticholinergic toxidrome versus sympathomimetic** toxidrome?	**Anticholinergic:** dry skin **Sympathomimetic:** diaphoresis
Signs & Symptoms, Treatment: Cholinergic toxidrome	**Causes:** insecticides, organophosphates, chemical warfare **SSx:** Clinically WET, "DUMBBBELLS" (**D**iarrhea, **U**rination, **M**iosis, **B**radycardia, **B**ronchorrhea, **B**ronchospasm, **E**mesis, **L**acrimation, **L**ethargy, **S**alivation) **Tx: atropine** (often high doses, **titrate to dry secretions**), 2-PAM (pralidoxime) if administered early Do not intubate w/ succinylcholine (prolonged paralysis).

Pathophysiology, Diagnosis, Treatment: Heparin-induced thrombocytopenia (HIT)	**Pathophysiology:** Formation of antibodies → **platelet inactivation** **Dx: +HIT antibody**, **t**hrombocytopenia, **t**ime of onset (5-10 d), **t**hrombosis, no o**t**her cause (4 T's) **Tx: STOP heparin** or LMWH; can change to DTI (argatroban)
What is the mechanism of **clopidogrel**? How is it reversed?	**Mechanism**: antiplatelet agent monitored with **P2Y12 level** **Reversal**: platelet transfusion
Pathophysiology, Signs & Symptoms, Treatment: Phenothiazines (e.g., prochlorperazine, promethazine, chlorpromazine) toxicity	**Pathophysiology: dopamine receptors blockade** (also block ACh receptors, ion channels) **SSx:** CNS effects (sedation, seizures, **extrapyramidal symptoms**, dystonia); cardiovascular effects (**long QTc**, hypotension); miosis; NMS **Tx:** supportive (IVF, benzodiazepines, Mg)
Signs & Symptoms, Treatment: 5HT3 (serotonin) antagonists (i.e. ondansetron)	**SSx:** palpitations and hemodynamic instability related to **prolonged QT & Torsades De Pointes** **Tx: Mg 2g (IV push)**, cardioversion/pacing
What **drugs** increase the risk of prolonged QT/Torsades and what is the treatment?	**Causes:** Class 1A & 1C antiarrhythmics, **TCAs**, **antipsychotics**, abx (**macrolides, fluoroquinolones**), **antiemetics** **Tx: Mg 2 g IV push**, overdrive pacing, cardioversion (unstable)
Pathophysiology, Signs & Symptoms, Treatment: Cocaine intoxication	**Pathophysiology: inhibits neuronal reuptake of catecholamines** (e.g. norepinephrine), Na+ channel blockade **SSx:** HTN, hyperthermia, tachycardia, rhabdomyolysis, MI 2/2 **coronary vasospasm**, seizure, VT **Tx:** benzodiazepines, cooling, nitrates, nicardipine, phentolamine for tachycardia **AVOID β-blockers** d/t risk of unopposed α activity.
Pathophysiology, Signs & Symptoms, Treatment: Amphetamine intoxication	**Pathophysiology: ↑ catecholamine release** **SSx: HTN**, **tachycardia**, **hyperthermia**, **rhabdomyolysis**, hypertensive intracranial hemorrhage **Tx: benzodiazepines**, cooling, nitrates, nicardipine (avoid beta blockers)
Signs & Symptoms, Treatment: Synthetic cannabinoid ("K2," "Spice," "Herbal Marijuana") intoxication	**SSx: anxiety**, paranoia, **tachycardia**, diaphoresis, psychosis, seizures **Tx:** supportive (IVF, **benzodiazepines** for agitation & seizures)
Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Hallucinogenic amphetamines (e.g. MDMA/ecstasy)	**Pathophysiology: ↑ catecholamine and serotonin release** **SSx**: appears like amphetamine OD with serotonergic properties (hyperthermia, rhabdo, bruxism, hyponatremia). **Dx**: **elevated CK**, **hyponatremia** **Tx**: supportive (IVF, benzodiazepines, cooling, intubation/paralysis PRN)

Signs & Symptoms, Diagnosis, Treatment: Gamma-hydroxybutyrate (GHB) intoxication	**SSx**: "date rape drug," bradycardia, ↓ **RR**, poor coordination, hypotension, coma, **rapid awakening** after metabolism **Dx**: lab testing not useful (in blood 6hr, urine 12hr) **Tx**: supportive, intubate PRN
Signs & Symptoms, Treatment: Irritant gas (e.g. chlorine, ammonia, hydrogen chloride) exposure	**SSx**: respiratory tract and mucosal irritation, **cough**, SOB, pulmonary edema, and conjunctivitis **Tx:** ABCs, O2, bronchodilators, **supportive care**
Compare **alkaline versus acidic ingestion**. How are they treated?	**Alkaline: liquefactive necrosis** → deep injuries, perforation (4-7 d), subsequent stricture **Acidic: coagulative necrosis** → limited injury, perforation risk (3-4 d), gastric outlet obstruction (2-4 w) **Tx:** NPO, do NOT attempt to induce emesis or neutralize, **early endoscopy**, supportive care
Common associations, Signs & Symptoms, Diagnosis, Treatment: Hydrofluoric acid burns	**Common associations: glass etching**, electronic manufacturing, **rust removal**, metal cleaning **SSx: painful skin burns** leading to eschar formation, also binds Ca & Mg **Dx: severe hypocalcemia** & hyperkalemia (muscle spasms, arrhythmia) **Tx:** copious low-pressure irrigation, **calcium gluconate gel and injection** **can cause systemic effects**
Why are **button battery ingestions** so dangerous? How are they treated?	Mechanism: generation of electrical current against mucosal surface; severe burns; **high perforation risk** **If found in nose, ear, or esophagus → requires emergent removal** Do not use vasoconstrictive agents in the nose (e.g. oxymetazoline). If in stomach and pt asymptomatic → can monitor
Signs & Symptoms, Treatment: Beta blocker overdose	**SSx: Bradycardia (most common)**, hypotension, **HYPOglycemia** (or normoglycemia), HYPERkalemia, AV blockade, QT prolongation, seizures (propranolol) **Tx:** GI decontamination, atropine, glucagon, **high-dose insulin** (1 U/kg/hr) + glucose, calcium, dialysis, epinephrine bolus/drip, intralipid (if crashing), pacing (minimally effective)
Signs & Symptoms, Treatment: Calcium channel blocker overdose	**SSx: Bradycardia**, hypotension (most common), **HYPERglycemia** (often refractory to even high-dose insulin), AV blockade, any bradyarrhythmia, warm extremities **Tx:** GI decontamination, atropine, **calcium**, **high-dose insulin** (1 U/kg/hr) + glucose (may not be necessary given refractory hyperglycemia), **high-dose pressors**, intralipid (if crashing), pacing (minimally effective)

Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Cardiac glycoside intoxication (e.g., digoxin, foxglove, oleander)	**Pathophysiology: Blocks Na-K-ATPase** → ↑ Ca in cell → ↑ contractility **SSx:** ANY **dysrhythmia** possible (PVCs MC, **bidirectional VT** and slow A fib = pathognomonic), agitation, **yellow-tinted vision**; **Dx:** hyperkalemia (correlates with severity of toxicity), serum digoxin levels. **Tx:** activated charcoal, **Fab fragments (e.g. Digifab, Digibind)**, IVF, atropine, pressors, transcutaneous pacing (minimally effective), **AVOID Ca for HyperK** (stone heart - occurs on the test but not in real life)
What are the indications to give **Dig-Fab** in digoxin overdose?	**Ventricular dysrhythmias**, symptomatic bradycardias, **hyperkalemia >5**, elevated Dig level > 10 ng/dl in adults or > 4 ng/dl in children
What characteristic **ECG changes** may be seen with digoxin effect vs digoxin toxicity?	**Dig effect:** short QT, **downsloping or "scooped" ST** segment ("Salvador Dali mustache"), biphasic T wave **Dig toxicity**: can do anything to the ECG including PVCs, AV block, atrial tachycardia with block, polymorphic and **bidirectional VT (pathognomonic but rare)**
Name 4 common medications that cause **bradycardia and hypotension** ("Brady Bunch") in overdose.	Beta blockers, calcium channel blockers, digoxin, clonidine
Diagnosis: Major depression + new seizure + wide QRS	Tricyclic antidepressant (TCA) overdose
Pathophysiology, Signs & Symptoms, Treatment: TCA overdose (amitriptyline, nortriptyline, doxepin)	**Pathophysiology: inhibits reuptake of bioamines** (serotonin, norepinephrine, and dopamine), **SSx:** anticholinergic effects, sodium channel blockade (wide QRS), α-1 blockade (vasodilation, hypotension), antihistamine effects (sedation), GABA antagonism (seizures) **Tx:** supportive, **sodium bicarb for wide QRS (threshhold >100)** or dysrhythmia, benzodiazepines for seizures
What common medications are associated with **Na channel blockade** in overdose?	**TCAs (most common)**, diphenhydramine, propranolol, procainamide, cocaine
Pathophysiology, Triggers, Signs & Symptoms, Treatment: MAOI toxicity (phenelzine, selegiline)	**Pathophysiology:** inhibition of monoamine (dopamine, norepinephrine, serotonin) metabolism/degredation **Triggers:** tyramine-containing foods (**salami, red wine, aged cheese)** and drugs (meperidine, cocaine, dextromethorphan, SSRIs, lithium) **SSx:** sympathomimetic toxidrome, **hypertensive crisis** **Tx:** supportive, IVF, phentolamine, nitroprusside PRN, cooling, benzodiazepines for seizures
What are primary concerns in **selective serotonin reuptake inhibitor** (SSRI) **overdose**? What management is indicated even in asymptomatics patients?	**Serotonin syndrome** (AMS, autonomic instability, hyperthermia, clonus), delayed seizures, arrhythmia (QTc prolongation) Telemetry monitoring indicated even in asymptomatic patients.

Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Carbon monoxide toxicity	**Pathophysiology:** binds to Hgb with high affinity (higher than O2)→ causes **left shift of the O2 dissociation curve** (poor O2 delivery) **SSx:** flu-like symptoms (multiple people with same SSx), **cherry-red skin** (with severe toxicity or when dead), **O2 sat inaccurate** **Dx: co-oximetry**, carboxyhemoglobin level (on ABG) **Tx: supplemental O2**, hyperbaric oxygen therapy (HBOT)
What are the indications for **hyperbaric oxygen therapy** for carbon monoxide (CO) poisoning?	**End-organ damage** at any COHb level, LOC/coma/seizure, CNS effects (neuro findings, AMS), **COHb >25%** (15% in pregnant women)
What is the **half-life of carboxyhemoglobin** on 1) room air, 2) 100% NRB, and 3) hyperbaric O2?	1) Room air: 4-6 hours 2) NRB: 60-90 minutes 3) Hyperbaric O2: 30 minutes
What are the expected O2 sat, PCO2, and PO2 values in **carbon monoxide toxicity**?	**O2 sat likely to appear norma**l (most pulse oximeters cannot distinguish COHb from oxyhemoglobin). PCO2 is unaffected. PO2 is dissolved O2 (not bound) and is unaffected. Co-oximetry will be abnormal.
Sources, Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Cyanide toxicity	**Sources:** burning of wool, silk, plastics, **smoke inhalation** **Pathophysiology: inhibits oxidative phosphorylation**, blocks ATP production **SSx: "bitter almond"** smell, bradycardia, hypotension, confusion, seizure, coma **Dx:** SEVERE **lactic acidosis** **Tx: hydroxocobalamin** (forms carboxy-B12) OR amyl nitrate (converts to MetHbg → binds CN) AND Na thiosulfate (converts CN → thiocyanate → excreted in urine)
What is the appropriate treatment for combined **carbon monoxide (CO) and cyanide (CN)** toxicity?	**Oxygen**, Na thiosulfate or hydroxocobalamin Do NOT give amyl nitrate & Na nitrate → can cause methemoglobinemia → will worsen oxygen carrying capacity (aready compromised by CO)
Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Methemoglobinemia	**Pathophysiology:** state in which Hgb exists in **ferric form (Fe3+)** → can't transport O2 (Hgb only binds in its Fe2+ form) and ↓ oxygen delivery (**O2 sat classically 85%** regardless of degree of toxicity) **SSx: "chocolate" brown blood**, central cyanosis **Dx:** abnormal co-oximetry **Tx:** oxygen, **methylene blue** (except if G6PD → hemolysis)
When do you give methylene blue for **methemoglobinemia**?	Cyanotic but otherwise asymptomatic w/ **methemoglobin levels >20%** OR Symptomatic w/ methemoglobin levels >10%

What are potential **causes** of methemoglobinemia?	**Dapsone**, **nitrates/nitrites**, antimalarials, **local anesthetics** (**teething baby acting normally but has cyanosis d/t benzocaine-containing gel on gums **), aniline dyes, phenazopyridine (Pyridium), benzodiazepines, **well water**
How can you determine if a baby is **cyanotic** because of a congenital heart defect or because of acquired methemoglobinemia?	**Congenital heart defect**: on 100% O2 → still has low PO2 on ABG; baby becomes cyanotic when crying **Acquired methemoglobinemia**: on 100% O2 → PO2 improves; baby is always cyanotic
Sources, Pathophysiology, Signs & Symptoms, Treatment: Hydrogen sulfide toxicity	**Sources:** decay of sulfur material (**industrial sources**, volcanoes, sulfur springs, septic tanks) **Pathophysiology:** similar to CN; **inhibits oxidative phosphorylation**; blocks ATP production **SSx: "rotten egg smell"**, industrial worker with unknown cause of LOC, dyspnea, cyanosis, headache, conjunctivitis, GI upset, bradycardia, AMS **Dx:** ABG with metabolic acidosis and normal SpO2/PaO2; elevated lactate **Tx:** remove from source; **100% oxygen**; hydroxocobalamin; amyl nitrate (induce MetHgb); HBOT
Signs & Symptoms, Diagnosis, Treatment: "Metal fume fever"	**SSx: welder with flu-like illness**; symptoms **worst on Monday** and improve by repeat exposure through the week (tachyphylaxis); aka "**Monday morning fever**" **Dx:** normal CXR **Tx:** supportive
Associations, Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Arsenic toxicity	**Associations:** wood preservatives, **garlic taste/smell** after ingestion **Pathophysiology: decouples oxidative phosphorylation** → interferes with ATP production → multisystem organ failure **SSx:** GI sx (TRIAD of abd pain, hematuria, jaundice), heme (massive RBC hemolysis), renal failure, shock, arrhythmia, CNS (seizure, ascending flaccid paralysis) **Dx: URINE arsenic level** (spot and 24hr); serum arsenic not useful because it clears too quickly **Tx:** chelation therapy with **dimercaprol** (preferred) or dimercaptosuccinic acid (DMSA)
Presentation, Treatment: Hydrocarbon intoxication (paint thinners, gasoline, chloral hydrate, lighter fluid)	**Presentation:** Commonly **sniffed or huffed**; can cause ARDS if aspirated; can also cause VF/VT (**sudden sniffing death**) **Tx:** beta blockers, supportive care
What is the difference between **sniffing, huffing, and bagging**?	**Sniffing:** from container into nose **Huffing:** from impregnated cloth into mouth/nose **Bagging:** from plastic bag into nose/mouth

Pathophysiology, Signs & Symptoms, Treatment: Iron overdose	Pathophysiology: **mucosal corrosive**; **inhibits oxidative phosphorylation**; impairs ATP synthesis Toxicity: **>20 mg/kg is toxic**, >60 mg/kg is lethal **Stages of toxicity:** **I**: GI ssx (0-6 hrs) **II**: latent; asymptomatic (6-24 hrs) **III**: shock & lactic acidosis (6-72 hrs) **IV**: hepatotoxicity/necrosis (12-96 hrs) **V**: GI scarring & gatrics outlet obstruction (2-8 wks) **Tx:** whole bowel irrigation, IVF, **deferoxamine** (indications: level >500 mcg/dL OR >300 mcg/dL and symptomatic)
Sources, Pathophysiology, Signs & Symptoms, Diagnosis, Treatment: Lead poisoning	**Sources:** paint, old batteries, occupational exposure **SSx: microcytic anemia with basophilic stippling**, abd pain, AMS, seizure, encephalopathy **Dx:** peripheral smear, whole blood lead level, xray showing lead lines **Tx:** chelation with PO succimer (only used in kids) or IM **dimercaprol** followsed by IV EDTA **Chelate levels >45 if symptomatic** or >70 if asymptomatic.
How and when to treat a child with **lead toxicity**?	No level is safe! ASYMPTOMATIC child w/ lead level: - 5 to 44 mcg/dl: remove the source, education, get public health involved - 45 to 69 mcg/dl: oral chelation therapy - **70 mcg/dl or higher: hospitalize for chelation therapy** OR symptomatic child at any level: hospitalize for chelation tx Chelators: - oral: **succimer** (dimercaptosuccinic acid or DMSA) - IV or IM calcium disodium **EDTA** or british anti-lewisite (**dimercaprol**) **kids w/ encephalopathy get treated w/ both EDTA and BAL**
Pathophysiology, Signs & Symptoms, Treatment: Isoniazid (INH) overdose	**Pathophysiology:** inhibits pyridoxine (B6) **SSx:** hepatotoxicity, metabolic acidosis, **seizures**/status epilepticus **Tx: IV pyridoxine** (1 g of B6 for every 1 g of INH)
Cause, Signs & Symptoms, Treatment: Lithium toxicity	**Cause:** often occurs 2/2 interactions with medications that affect renal function (NSAIDs, diuretics, ACEi) **SSx: GI sx (acute)**, **neuro sx (chronic)**, nephrogenic diabetes insipidus **Tx:** IVF, whole bowel irrigation, **hemodialysis** (indications: renal failure, level >5, severe neuro sx)

What rare but severe condition can be precipitated by abruptly **stopping lithium**?	**Thyroid storm:** Lithium inhibits thyroid hormone release from the thyroid gland. Thus, stopping it abruptly can uncover thyroid pathology that was previously present but "managed" with the lithium.
How does the general timing of symptoms in **mushroom ingestions** help predict prognosis?	If symptoms **(n/v/d) start within 6 hr of ingestion → likely non-toxic** If symptoms start **after 6 hr → hepatotoxicity** may occur
Signs & Symptoms, Treatment: Cyclopeptide mushroom ingestion (*Amanita, Galerina, Lepiota*)	**SSx:** delayed GI sx (usually > 6 hrs) followed by **liver failure**, renal failure, AMS, and death **Tx:** supportive care, multidose charcoal during first 24 hours (speeds up enterohepatic clearance), GI decontamination, NAC
Signs & Symptoms, Treatment: Monomethylhydrazine mushroom ingestion (*Gyromitra* - "false morel")	**SSx:** delayed GI sx (> 6 hrs) followed by **seizures** (think 'gyri' like brain), hepatorenal failure. Most have full recovery. **Tx:** supportive, benzodiazepines, B6 for seizures (can be refractory)
Signs & Symptoms, Treatment: Muscarine mushroom ingestion (*Inocybe, Clitocybe*)	**SSx**: muscarinic symptoms (cholinergic/"DUMBBBELLS") **Tx:** atropine, 2-PAM
Signs & Symptoms, Treatment: Psilocybin mushrooms ("magic mushrooms" - *Psilocybe, Conocybe, Gymnopilus, Panaeolus*)	**SSx: hallucinations**, euphoria, agitation **Tx:** benzodiazepines
What is the key clinical effect of **Coprin mushrooms** (inky caps)?	**Disulfiram-like reaction**
Signs & Symptoms: Phenytoin toxicity (PO and IV)	**PO:** gingival hyperplasia, seizure uncommonly, no cardiac effect with PO **IV: hypotension (2/2 propylene glycol)**, can give fosphenytoin instead
Pathophysiology, Signs & Symptoms, Treatment: Carbamazepine toxicity	**Pathophysiology: Na channel blockade**, anticholinergic effects **SSx:** ataxia, GI sx, QRS widening, seizure at high doses **Tx:** supportive, sodium bicarb if wide QRS
Pathophysiology, Signs & Symptoms, Treatment: Benzodiazepine overdose	**Pathophysiology: GABA agonist**, increases <u>frequency</u> of channel opening **SSx:** ataxia (MC sign), lethargy, **respiratory depression** **Tx:** supportive, intubate PRN Flumazenil is the reversal agent, but generally not given; precipitate withdrawal in patients with benzo or EtOH dependence.
Pathophysiology, Signs & Symptoms, Treatment: Barbiturate overdose	**Pathophysiology: GABA agonist**, increases <u>duration</u> of channel opening **SSx: hypotension**, bradycardia, respiratory depression, rhabdo ("barb blisters") **Tx:** supportive, intubate PRN
What ingestions are **radiopaque** on X-ray?	CHIPES: **<u>C</u>**hloral hydrate, **<u>H</u>**eavy metals, **<u>I</u>**ron/Iodine, **<u>P</u>**henothiazine, **<u>E</u>**nteric-coated, **<u>S</u>**olvents

Signs & Symptoms, Treatment: Antipsychotic use	**SSx:** AMS, **lead pipe rigidity**, **hyperthermia**, autonomic instability. **Tx:** supportive (IVF, benzodiazepines, cooling), Bromocriptine (dopamine agonist)
Signs & Symptoms, Treatment: Serotonin Syndrome	**SSx:** AMS, **clonus/hyperreflexia**, hyperthermia **Tx:** supportive (IVF, benzodiazepines, cooling) ± Cyproheptadine
Association, Pathophysiology, Signs & Symptoms, Treatment: Strychnine poisoning	**Associations:** gopher poison, adulterant in heroin **Pathophysiology:** inhibits glycine (**similar to tetanus**) **SSx:** agitation, myoclonus, severe and painful muscle contractions, rhabdo, seizures, "awake seizures" **Tx:** IVF, benzodiazepines, paralysis PRN
Pathophysiology, Signs & Symptoms, Treatment: Sulfonylurea overdose (e.g., glipizide, glyburide)	**Pathophysiology: stimulation of pancreatic insulin release** **SSx:** sulfonylureas are long-acting → severe recurrent hypoglycemia **Tx:** dextrose (IVP ± drip), **octreotide** (inhibits release of insulin), admit for monitoring
Signs & Symptoms, Treatment: Insulin overdose	SSx: **hypoglycemia** Note: Duration of effect and timeframe for monitoring are determined by the specific insulin formulation and its half life. Tx: **glucagon, dextrose PRN**
What are common toxic causes of **hypoglycemia**?	**Ethanol (especially in kids)**, insulin/**hypoglycemics** (NOT metformin), beta blockers, salicylates, quinine
Pathophysiology, Treatment: Metformin overdose	**Pathophysiology:** inhibition of gluconeogenesis → reduces hepatic glucose output → converts glucose to lactic acid → **lactic acidosis** **Tx:** bicarb, lasix (increases excretion), hemodialysis PRN (clears metformin and acidosis)
Pathophysiology, Signs & Symptoms, Treatment: Theophylline toxicity	**Pathophysiology: Methylxanthine derivative** (like caffeine) & beta agonist, metabolized by hepatic CYP450 enzymes (many drug interactions) **SSx:** hypotension, **dysrhythmia (MAT = classic)**, seizures **Tx:** IVF, beta blocker, consider hemodialysis in severe intoxication
Signs & Symptoms, Treatment: Hydrogen peroxide ingestion	**SSx:** stroke-like sx (**cerebral gas embolism**) **Tx:** hyperbaric oxygen
Antidote for **acetaminophen** toxicity?	N-acetylcysteine (NAC)
Antidote for **aspirin** toxicity?	Bicarb, hemodialysis
Antidote for **beta blocker** toxicity?	Glucagon, high dose insulin + dextrose
Antidote for **calcium channel blocker** toxicity?	Calcium, insulin + dextrose, high-dose pressors
Antidote for **carbon monoxide** toxicity?	Oxygen (hyperbaric O2 for severe toxicity)
Antidote for **cyanide** toxicity?	**Hydroxocobalamin** OR Dual therapy (sodium nitrite/amyl nitrate and sodium thiosulfate)

Antidote for **digoxin** toxicity?	Digoxin Fab Fragments
Antidote for **ethylene glycol and methanol** toxicity?	Ethanol or **fomepizole**, hemodialysis
Antidote for **benzodiazepine** toxicity?	Flumazenil (rarely used; can precipitate withdrawal sz)
Antidote for **opioid** toxicity?	Naloxone
Antidote for **malignant hyperthermia**?	Dantrolene, benzodiazepines, bicarb
Antidote for **serotonin** syndrome?	Cyproheptadine, benzodiazepines
Antidote for **neuroleptic malignant syndrome**?	Dantrolene, bromocriptine, benzodiazepines
Antidote for **anticholinergic syndrome**?	Physostigmine, benzodiazepines
Antidote for **iron** toxicity?	Deferoxamine
Antidote for **mercury** toxicity?	**Dimercaprol** OR Dimercaptosuccinic acid (**succimer**)
Antidote for **lead** toxicity?	PO dimercaptosuccinic acid (**succimer**) OR **Dimercaprol** (IM) **and EDTA** (IV)
Antidote for **isoniazid** toxicity?	Vitamin B6 (pyridoxine)
Antidote for **organophosphate** toxicity?	Atropine, 2-PAM
Antidote for **valproic acid** overdose?	L-Carnitine
What treatments for (1) hyperkalemia and (2) bradycardia are classically **contraindicated in digoxin toxicity**?	(1) Hyperkalemia: don't give **calcium** - rare risk of "stone heart" (this is debunked but still on boards). (2) Bradycardia: don't do **transvenous pacing** - associated with increased ventricular arrhythmias 2/2 irritable myocardium.
What marker predicts mortality in digoxin toxicity?	Hyperkalemia > 5.0
Signs & Symptoms, Treatment: Opioid withdrawal	**SSx:** tachycardia, HTN, abd pain, N/V/D, sweating, agitation, **dilated pupils**, **piloerection**, yawning **Tx:** antiemetics, clonidine, fluids, buprenorphine (more complex decision) Note: opioid withdrawal is NOT life-threatening in adults.
Signs & Symptoms, Diagnosis, Treatment: Valproic acid toxicity	**SSx:** GI distress, AMS **Dx**: high valproic acid level, high serum ammonia **Tx:** activated charcoal, **L-carnitine**, hemodialysis (if renal failure)
What is **body packing**? How do you treat these patients?	**Body packing** - intentionally swallowing prepared packets of recreational drugs **Tx** (**stable/asymptomatic**)**:** cardiac monitoring + polyethylene glycol **Tx** (**unstable**): surgery and supportive care
Toxin that smells like **garlic**?	**Arsenic** or organophosphates
Toxin that smells like burnt **almonds**?	Cyanide
Toxin that smells like **fish**?	Zinc
Toxin that smells like **fruit**?	Isopropanol, ethanol
Toxin that smells like **rotten eggs**?	**Sulfur**-containing compounds
Treatment: Severe hydrofluoric acid exposure	Topical and intra-ARTERIAL **calcium gluconate**

Associations, Signs & Symptoms, Treatment: Phosgene toxicity	Phosgene is a colorless gas associated with plastics, dyes, pesticides. **SSx:** minimal conjunctival and pulmonary irritation; leads to **DELAYED noncardiogenic pulmonary edema** **Tx: admission** and supportive care (intubation, ventilation); no antidote
Toxin that smells like **freshly cut hay** or grass?	Phosgene
Diagnois: Chemical ingestion associated with severe hypocalcemia and hypomagnesemia	Hydrofluoric acid
Diagnosis, Treatment: Cyanosis and hypoxia after using "poppers" at a club	**Dx:** "poppers" commonly contain amyl nitrite, which induces **MetHb** **Tx: methylene blue**, 100% O2

Eye, Ear, Nose & Throat

Bizz	Buzz
Diagnosis, Treatment: Blepharitis	**Dx: inflammation of the eyelid** **Tx:** wash with gentle soap, topical antibiotics (*Strep/Staph*)
What is a **hordeolum**? How is it treated?	**Dx:** acute **painful** blockage and infection of gland (Zeis = sebaceous or Moll = sweat) at or near the eyelash follicle **Tx: warm compresses**
What is a **chalazion**? How is it treated?	**Dx:** chronic or gradual-onset **nontender** granuloma due to blockage of **meibomian gland** (above eyelash or on upper lid) **Tx: warm compresses**, ophtho excision (if recurrent/persistent)
What is the difference a **hordeolum** and a **stye**?	**None** (they are the same)
Cause, Signs & Symptoms, Diagnosis, Treatment: Iritis, Uveitis, Choroiditis	**Cause:** inflammation of the iris, ciliary body, choroid (respectively) **SSx:** painful red eye, photophobia, decreased visual acuity **Dx: cell and flare** or **ciliary flush** on slit lamp exam **Tx:** ophtho consult, dilate, steroids, pain meds
Cause, Signs & Symptoms, Diagnosis, Treatment: Dacryocystitis	**Cause: infection** of the **nasolacrimal gland** (tear duct), most common organism = ***S. aureus*** **SSx:** swelling, purulent discharge, possible adjacent cellulitis **Dx:** clinical exam **Tx:** warm compresses, antibiotics, ophtho f/u
Signs & Symptoms, Diagnosis, Treatment: HSV keratitis	**SSx:** pain, photophobia **Dx: dendritic pattern** on blue light **Tx**: ophtho consult, topical trifluridine +/- oral acyclovir
In bacterial conjunctivitis, **contact lens** use is a risk factor for which organism? What is the treatment?	Risk for ***Pseudomonas*** infection Tx: **fluoroquinolone drops** (increasing resistance) or Tobramycin
Diagnosis, Treatment: Metal worker + eye pain	**Dx: Intraocular foreign body** **Tx:** look for teardrop pupil and/or **Seidel's sign** to r/o globe rupture, remove foreign body, rust rings removed in 24-48 hours
Signs & Symptoms, Diagnosis, Treatment: Skier or welder + eye pain	**SSx:** bilateral decreased visual acuity, pain, and redness **Dx: UV keratitis**; exam shows **multiple punctate lesions** **Tx:** analgesia, cycloplegics, eye rest
Diagnosis, Treatment: Hyphema	**Dx: bleeding in the anterior chamber** of the eye (often traumatic) **Tx:** consult ophtho, bedrest, HOB elevation, pain meds, cycloplegics, discontinue any anticoagulation *More urgent ophtho consult needed for patients with **sickle cell disease***
What are two potential complications of **hyphema**?	**Rebleed** (most common complication), risk for **glaucoma**

Cause, Signs & Symptoms, Diagnosis, Treatment: Endophthalmitis	**Cause:** infection of anterior, posterior and vitreous chambers of the eye, often d/t iatrogenic etiology (**cataract surgery = MCC in US**) or trauma **SSx:** severe pain & visual impairment **Dx:** exam with decreased visual acuity, injected conjunctiva, chemosis, possible **hypopyon** (pus in the anterior chamber) **Tx:** ophtho consult, intraocular + systemic antibiotics
What is the **risk** of laceration close to the medial canthus? How should it be evaluated and repaired?	High risk for **lacrimal duct injury.** Evaluate with **fluorescein** staining. Should be repaired by **oculoplastics.**
Treatment: Acute angle closure glaucoma	1. Decrease intraocular pressure (consider mannitol or hypertonic saline). 2. Constrict the pupil to promote drainage of aqueous fluid. **↓ aqueous production:** α-agonist (**apraclonidine**), β-blocker (**timolol**), carbonic anhydrase inhibitor (acetazolamide) **↑ outflow:** pilocarpine (miotic)
Diagnosis: Sudden painless unilateral vision loss, retina with "box-cars" or "cherry-red macula"	**Central retinal artery occlusion** (stroke equivalent)
Diagnosis: Sudden painless unilateral vision loss, retina with "blood and thunder" appearance (dilated retinal veins, diffuse hemorrhage, cotton wool spots)	**Central retinal vein occlusion** (increased risk with chronic glaucoma)
Diagnosis, Treatment: Painless unilateral loss of vision with floaters and visual field cuts	**Dx: retinal detachment** - clinical diagnosis, though often visible on ocular ultrasound **SSx:** classically described as a "**curtain coming down**" over the visual field or as "**floaters** and flashes of light" **Tx:** ophthalmology consult
Diagnosis, Treatment: Painful red eye, decreased visual acuity, ciliary flush, "cell and flare" on slit lamp	**Dx: Iritis or anterior uveitis** **Tx:** Cycloplegics to dilate (e.g. cyclopentolate, tropicamide), pain control, ophtho consult or follow up w/n 24 hrs
Diagnosis: Dizzy + vertical, multidirectional, or non-fatigable nystagmus	**Central vertigo**
Differential diagnosis: Gingival hyperplasia	Acute necrotizing ulcerative gingivitis, **HIV**, phenytoin toxicity, acute leukemia
Diagnosis: White plaques on oral mucosa, can be scraped off	**Candida,** associated with immunocompromise, abx use, diabetes, oral steroid inhalers
What are the **Centor criteria** for acute bacterial pharyngitis? What score indicates the need for empiric treatment?	1. Fever 2. Tender anterior lymphadenopathy 3. Lack of cough 4. Tonsillar exudates **4/4 → empiric abx** 3/4 → culture/rapid strep
What **medication** is most likely to improve symptoms of viral pharyngitis?	**Dexamethasone**

Associations, Cause, Signs & Symptoms, Diagnosis, Treatment: Peritonsillar abscess	**Association:** complication of acute tonsillitis, most common deep facial infxn in adults **Cause:** ***Strep*** **(GAS)** = most common **SSx:** sore throat, odynophagia, **muffled voice**, referred otalgia. **Dx:** exam w/ trismus, **deviation of uvula** + soft palate **Tx: needle aspiration**, abx (augmentin vs clindamycin), ENT follow up
Diagnosis, Cause, Treatment: Fever, sore throat, brawny neck edema, tongue elevation, dysphagia, drooling	**Dx: Ludwig's Angina** **Cause:** dental infection = MCC, immunodeficiency **Tx:** airway management, ENT consult, broad spectrum abx
What is the most common cause of death in a patient with **Ludwig's Angina**?	Sudden **asphyxiation** (laryngospasm)
What are the three **Ellis classifications of dental fracture**? What is the exam and appropriate management for each?	**Ellis I**: fracture of **enamel**; tooth appears white and painless; treatment = smooth rough edges, dental follow-up **Ellis II:** fracture through **dentin** & enamel; exposed tooth appears yellow and painful; treatment = smooth rough edges, apply **calcium hydroxy paste**, dental follow-up **Ellis III:** fracture through **pulp**, dentin & enamel; exposed tooth appears pink/red and painful; treatment = cover with moist cotton & dental foil, give antibiotics (pencillin), and obtain **emergent dental consult**
Diagnosis, Signs & Symptoms, Treatment: Dry socket (alveolar osteitis)	**Dx: localized osteomyelitis** due to loss of protective clot; exam with exposed bone **SSx:** severe **pain 3-5 days after dental extraction** **Tx:** irrigate with saline, **iodoform gauze**, **eugenol** (oil of clove), abx if needed (signs of infection), PAIN CONTROL, oral surgery referral
Signs & Symptoms, Diagnosis, Treatment: CMV retinitis	**SSx:** ↓ visual acuity, floaters/visual field cuts, photophobia **Dx:** white fluffy retinal perivascular lesions with hemorrhage, **CD4 <50 (AIDS defining illness)** **Tx: IV ganciclovir**
Compare/contrast the appearance of **vitreous versus retinal detachment** on ultrasound.	BOTH show serpiginous structure within the globe **Vitreous detachment:** can cross over the optic nerve **Retinal detachment**: will NEVER cross the optic nerve
What is an **afferent pupillary defect**? What does it indicate?	Dx: "**swinging flashlight test**" performed by moving a light from one eye to the other; affected eye will dilate when light is shined directly into it (cannot sense light but can constrict as a consensual response) Indicates a **lesion of the retina or optic nerve**.
Name **4 possible causes** of afferent pupillary defect.	CRAO, CRVO, optic neuritis, and retrobulbar neuritis
Diagnosis, Treatment: Monocular vision loss, worse centrally, afferent pupillary defect, pain with extraocular movements, diminished color vision	**Dx: Optic neuritis** **Causes:** Idiopathic > **multiple sclerosis** (MS) > toxicological (methanol, ethambutol) or infectious (herpes zoster virus) **Tx:** Consult neurology & ophtho, IV steroids, MRI (for evidence of MS)

Treatment: Central retinal artery occlusion	↓ **IOP** (acetazolamide, mannitol, timolol), vasodilators (nitro), may also see TPA as an option (per AHA guidelines)
Compare/contrast the etiology, exam findings, and treatment of **pinguecula vs. pterygium**.	**Pinguecula:** degenerative eye lesion 2/2 chronic inflammation from wind and UV light; exam shows yellow **raised fleshy conjunctival mass (lateral)**; no treatment **Pterygium:** slow growing thickening of conjunctiva 2/2 wind/sand/dust; exam shows **vascular triangular mass in "bat wing" shape (medial)**; surgical treatment if affecting vision
What should be the approach to stopping **anterior epistaxis**?	**Direct pressure**, vasoconstrictors (**oxymetazoline**), silver nitrate cautery (unilateral), balloon **tamponade** device Send home with ENT f/u in 2-3 days. Note: Use of abx is controversial.
What are the most common sources of **anterior and posterior epistaxis**?	Anterior: **Kiesselbach plexus** Posterior: **sphenopalatine artery**
What is the appropriate **treatment and disposition** for patients with posterior nasal packing?	Prophylactic **antibiotics** + **admit to ICU/monitored bed** d/t risk of vagally-mediated bradycardia and airway compromise
Most common **site** of sialadenitis? Treatment?	**Most common site: submandibular gland** (Wharton duct) **Tx:** milk stone, **sialogogues**, sour candy, abx if abscess
Diagnosis, Exam, Treatment: Sudden onset vertigo, worse with change in head position, no other neurologic symptoms	**Dx: Benign Paroxysmal Positional Vertigo (BPPV)** **Exam: Dix Hallpike** maneuver (look for unidirectional nystagmus) **Tx:** Epley maneuver, meclizine
Diagnosis, Cause, Treatment: Episodic peripheral vertigo + hearing loss + tinnitus	**Dx: Meniere disease** aka "idiopathic endolymphatic hydrops" **Cause:** increased endolymph in the inner ear **Tx:** treat vertigo symptomatically, diuretics, refer to ENT
Diagnosis, Treatment: Severe vertigo + URI	**Dx: vestibular neuritis** **Tx:** supportive (will resolve w/o intervention)
Diagnosis, Treatment: Severe vertigo + acute otitis media (plus or minus hearing loss)	**Dx: Labrynthitis** **Tx:** Suppurative labyrinthitis (caused by extension of bacterial infxn) should be treated with intravenous antibiotics and ENT referral.
How does **vestibular neuritis** differ from **Ménière disease**?	**Vestibular Neuritis:** SSx: recent URI, vertigo (NOT recurrent) + hearing loss + unstable gait Tx: steroids, self limited **Ménière:** SSx: episodic vertigo + hearing loss + tinnitus Tx: avoid triggers, antihistamines, diuretics, benzodiazepines, surgery (refractory cases)
What potential causes are indicated by a **positive head impulse test** (i.e. presence of corrective saccade) in a patient with continuous vertigo?	**Peripheral causes** (vestibular neuritis or labyrinthitis) If NO corrective saccade >> central cause

Etiology, Signs & Symptoms, Treatment: Perichondritis	**Etiology: infection of the cartilage**; presents after ear surgery, trauma, or upper ear piercing; ***pseudomonas***, staph/strep spp. **SSx:** swollen, warm, tender, erythematous auricle; no TM or earlobe involvement **Tx: fluoroquinolone** (e.g. cipro); admit for IV coverage if severe.
Etiology, Signs & Symptoms, Diagnosis, Treatment, Complications: Acute otitis media	**Etiology: viral (RSV) > bacterial (*Strep. Pneumo*)** **SSx:** ear pain, fever, URI symptoms **Dx:** TM bulging/erythema & **decreased mobility of TM (most sensitive)** **Tx: amoxicillin** (simple); augmentin (recurrent/persistent) **Complications:** hearing loss, perforation (add abx in suspension), facial nerve paralysis (needs myringotomy)
Mechanism, Signs & Symptoms, Diagnosis, Treatment: Acute mastoiditis	**Mechanism:** Bacterial infection of mastoid air cells most often d/t **direct extension** from AOM **MCC: *Strep. Pneumo*** **SSx:** postauricular erythema & tenderness, **protrusion of the auricle** **Dx:** CT temporal bone **Tx:** abx, surgical drainage **Complications:** osteomyelitis, intracranial infxn, venous sinus thrombosis
Etiology: Signs & Symptoms, Diagnosis, Treatment: Necrotizing (malignant) otitis externa	**Etiology:** necrotizing infection of auditory canal + skull base (a form of osteomyelitis); risk factors = elderly, **diabetes**; MCC = ***Pseudomonas*** **SSx:** otorrhea, otalgia, severe/persistent pain, CN VII palsy **Dx:** CT temporal bone **Tx:** ciprofloxacin (outpatient), antipseudomonal ß-lactam + aminoglycoside (inpatient) **Complication:** CN VII palsy, intracranial infxns
Diagnosis, Treatment: Sudden pain + decreased hearing after ear irrigation	**Dx: TM perforation** **Tx:** pain control, keep ear dry, antibiotics only if concurrent infection, ENT follow-up in 1-2 wks Overall, **infection is the MCC** of TM perforation.
Diagnosis, Etiology, Treatment: Pain/swelling/tenderness over parotid gland + fever, trismus, dysphagia	**Dx: Suppurative (bacterial) parotitis** ***Staph aureus*** *= MCC* **Tx:** abx (ampicillin-sulbactam)
Signs & Symptoms, Diagnosis, Treatment: Preseptal cellulitis	**SSx:** eyelid swelling WITHOUT painful EOM or proptosis **Dx:** infection of the anterior portion of the eye (NOT orbital structures); clinical diagnosis but obtain CT orbits if concerned for orbital cellulitis MCC = **staph/strep spp.** **Tx:** amoxicillin-clavulanate, outpatient ophtho follow-up

Presentation, Signs & Symptoms, Diagnosis, Treatment: Orbital cellulitis	**Presentation: infection of the contents of the orbit** (posterior to orbital septum); children > adults **MCC:** bacterial rhinosinusitis **SSx:** eyelid swelling, deep eye pain, **pain + limitation with eye movements, proptosis** **Dx:** CT orbits **Tx:** broad spectrum abx (vancomycin + piperacillin-tazobactam), ophtho consult, admit **Complications:** vision loss, **cavernous sinus thrombosis**, meningitis
What structures travel through the **cavernous sinus**? What is the most common cranial nerve palsy associated with cavernous sinus thrombosis?	CN III, IV, V1, V2, VI Internal carotid artery Most common CN palsy = isolated CN VI (abducens) palsy
Association, Signs & Symptoms, Diagnosis, Treatment: Cavernous sinus thrombosis	**Association:** classically follows acute bacterial sinusitis; ***staph*** = MCC **SSx: headache (MC sx)** + fever + CN palsies (MC is CN VI) + periorbital edema **Dx: magnetic resonance venography** **Tx:** IV abx (nafcillin, ceftriaxone, and metronidazole); ENT consult; ICU admit Anticoagulation is controversial.
Diagnosis: Patient with recent tracheostomy placement + brisk bleeding from the tracheostomy site	**Tracheoinnominate artery fistula (TIF)**
Management: Tracheoinnominate fistula	Needs **ENT consult** for emergent OR management. In the interim: **overinflate trach cuff**, visualize the source of bleeding, apply direct pressure (**digital pressure in the trach stoma against the sternum**), intubate from above (unless s/p laryngectomy).
Etiology, Signs & Symptoms, Diagnosis, Treatment: Vitreous hemorrhage	**Etiology: trauma**, diabetic retinopathy, retinal detachment, posterior vitreous detachment **SSx:** blurry or tinted (reddish) vision, floaters/fashers **Dx: ocular US** shows hyperechoic opacities in vitreous chamber **Tx:** ophtho consult w/n 24-48 hrs, avoid NSAIDs/anticoagulants, elevate head of bed
Is **alkali or acidic injury** more dangerous to the eye? How is each treated?	**Alkali injury** is more dangerous (leads to liquefaction necrosis). Treatmet is the same: copious **saline irrigation** to a normal pH (7.4), ophtho consult
Diagnosis, Treatment: Globe rupture	**Dx:** vision loss, **teardrop pupi**l, flattened anterior chamber, **Seidel's sign** is present DO NOT CHECK PRESSURES! **Tx:** antibiotics, CT orbit, cover with eye patch, emergent ophtho consult

What medication is **contraindicated** in sickle cell patients presenting with **hyphema**?	**Acetazolamide** (induces sickling of RBCs)

Obstetrics & Gynecology

Bizz	Buzz
What size **ovarian cyst** is **high risk for torsion**?	**5-10 cm**
What is the **cause** of **injury in ovarian torsion**?	Twisting leading to **obstruction of VENOUS and lymphatic flow** → congestion → edema and ischemia Arterial obstruction is rare 2/2 dual blood supply.
What is the most common finding on **US** with **ovarian torsion**?	MC: **Ovarian enlargement** Other findings: loss of echogenicity, pelvic free fluid, diminished blood flow
What is the most common type of **ovarian cyst**?	**Simple follicular cysts** that are thin walled and fluid filled. Present in first 2 weeks of the menstrual cycle.
What is the most likely **type of ovarian cyst to bleed**?	**Corpus luteal cyst** Present in the last 2 weeks of the menstrual cycle. It can cause significant hemorrhage.
What is the next step in management if you have **high suspicion for ovarian torsion** but a **normal ultrasound**?	OB/Gyn consult for **laparoscopy** (gold standard)
Diagnosis: Vaginal bleeding in postmenopausal woman	**Gynecologic cancer** until proven otherwise Will need outpatient **TVUS** and **endometrial biopsy**.
What type of **cancer** is **CA-125** a marker for?	**Ovarian**
Classic presentations for ovarian, endometrial, and cervical cancers	**Ovarian:** age 50s-60s, gradual subacute abd pain, abdominal distention (ascites), CA-125+ **Endometrial:** vaginal bleeding in postmenopausal women **Cervical:** h/o HPV or HIV, postcoital bleeding, abnormal cervix on pelvic exam
What is the **age range** for administering the **HPV vaccine**?	**9-26 yrs**
What are the most common causes of **vaginal bleeding in prepubertal female**?	**Vaginitis, anovulation, trauma or foreign body** (malodorous and slightly bloody) **Consider vaginal foreign body (usually toilet paper) in young girl who just started school and has bloody foul smelling discharge.
What are the most common causes of **vaginal bleeding in reproductive age female**?	**Menses, pregnancy, anovulation** Less likely fibroids, exogenous hormones
What are the most common causes of **vaginal bleeding in perimenopausal women**?	**Anovulation, fibroids, cervical and endometrial polyps, thyroid dysfunction**
What are the most common causes of **vaginal bleeding in postmenopausal women**?	**Endometrial cancer, exogenous hormones, atrophic vaginitis**
What are potential **medications** for **non-pregnant vaginal bleeding**?	**Mild/Moderate**: combined OCP's, Progesterone, NSAIDs **Severe**: IV premarin (estrogen), TXA

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Diagnosis, Treatment: Middle aged female with "ball coming out of vagina"	**Uterine prolapse** or cystocele Worse with valsalva **Tx:** pessary or surgery
What patient population has a **higher risk of uterine fibroids**?	**African-American women**
What is the difference between **menorrhagia** and **metrorrhagia**?	**Menorrhagia:** excessive flow (heavy periods) **Metrorrhagia:** irregular cycles
Diagnosis, Treatment: Abdominal pain and tenderness, vaginal discharge, cervical motion tenderness	**Pelvic inflammatory disease (PID**) **Cause: C. trachomatis (MCC)**, N. gonorrhoeae, polymicrobial **Dx**: consider pelvic US to r/o TOA **Tx: Ceftriaxone** IM 500mg, 14 days of **doxycycline** (azithro 1g not recommended for PID) and **metronidazole** **Note: They won't always have CMT, but may just have focal uterine or adnexal pain.
Diagnosis, Treatment: PID with RUQ and shoulder pain	**Fitz-Hugh-Curtis syndrome (perihepatitis):** Infection to perihepatic space causing liver capsule inflammation and adhesions **MCC:** Chlamydia **Dx: TVUS** (if concerned for TOA). **CT: ±"violin-string" adhesions** (usually normal LFTs) **Tx:** 500mg **ceftriaxone** IM and 14 days of **doxycycline** and **metronidazole (just like PID)**
Most common **GYN problem** in **children**	**Vulvovaginitis**
Diagnosis, Treatment: Vaginal discharge and clue cells	**Bacterial vaginosis** **Cause:** *Gardnerella*/anaerobes **Dx**: Amsel criteria (3 out of 4 means positive test): **thin, white d/c, "clue cells", vaginal pH >4.5, fishy odor (+whiff test)** **Tx**: **metronidazole** (including if pregnant)
Diagnosis, Treatment: Vaginal discharge and pseudohyphae on wet mount	**Candidal vaginitis:** overgrowth of normal flora, causing pruritus **Dx**: **"cottage cheese"** discharge, +wet prep **Tx: fluconazole x1 week**. If pregnant, intravaginal Clotrimazole or Miconazole.
What other **conditions** are **associated with frequent yeast infections**?	Diabetes, HIV, pregnancy, antibiotics, steroids, SGLT2 inhibitors (-flozins)
Signs & Symptoms, Diagnosis, Treatment: Vaginal discharge and "strawberry cervix"	**Trichomoniasis:** protozoal infection **SSx**: **"frothy yellow-green"** discharge **Dx**: pH >5, WBCs, **motile trichomonads** **Tx: PO metronidazole** for patient and partner
What is the **definitive treatment** for **Bartholin's cyst/abscess**?	**Marsupialization** In ED: I&D of abscess, place Word catheter
Diagnosis, Treatment: Early pregnancy with big uterus and high hCG	**Hydatidiform mole:** painless vaginal bleeding, uterus bigger than dates, hyperemesis, preeclampsia **Dx**: **hCG >100,000**; US: "grape-like vesicles", "snowstorm" **Tx: D&C** **Complication:** high risk of malignancy (**choriocarcinoma**)

What is the **ultrasonographic** and **prognostic difference** between **partial** and **complete hydatidiform moles**?	**Partial:** nonviable fetus, <5% become malignant, triploid karyotype **Complete:** "snowstorm" appearance on US, 20% become malignant, diploid karyotype
Treament: Asymptomatic bacteriuria in pregnancy	Treat with ABX (otherwise high risk of pyelonephritis) **ABX: Keflex, macrobid**
What is the **most common side** for **pyelonephritis in pregnancy**?	**Right sided** (70-80%) Pregnant women are much more likely to have pyelonephritis than non-pregnant women.
Treatment: pregnant woman with pyelonephritis	**IV ABX and admission**
Define components of labor progression: dilation, effacement, station	**Dilation:** opening of cervical os, up to 10 cm **Effacement:** thinning of the cervix, up to 100% **Station:** fetal presenting part location, ranges neg (above) to positive (below) cm relative to ischial spines (0)
Define: stages of labor 1-4	**1**: regular contractions to full cervical dilation (10cm) **2**: full dilation to delivery of infant **3**: delivery of infant to delivery of placenta **4**: recovery/treatment of lacs/tears/hemorrhage
What is the duration of **stage 1, 2, and 3 of labor**?	**First stage-** primips: 6-20 hrs; multiparous: 2-14 hrs **Second stage-** primips: 30 mins-3 hrs; multiparous: 5-60 mins **Third stage-** everyone: 0-30 mins.
What is the concern with **late decelerations** on tocodynamometer monitoring during labor?	**Uteroplacental insufficiency** → move to c-section
What is the concern with **variable decelerations** on tocodynamometer monitoring during labor?	**Cord compression**
What do **early decelerations** on tocodynamometer monitoring during labor indicate?	**Fetal head compression** (not concerning)
Review the initial management of **low FHR** on tocodynamometer monitoring	**Change mom's position** (left lateral is best to move uterus off of IVC), give **oxygen**, stop any supplemental oxytocin
What are signs of **placental separation** during **Stage 3 of labor**?	**Cord lengthening**, fresh flow of **blood**, **uterus** becomes **firm**/globular, **fundus rises**
What **vessels** are present in a normal **placenta**?	3 vessels total: **2 arteries and 1 vein**
Apgar scoring	Max 10pts measured, **0-2 pts for each** **Appearance** (pink, acrocyanosis, central cyanosis) **Pulse** (>100 bpm, <100 bpm, absent) **Grimace** (crying, grimace on suctioning, no response) **Activity** (flexing BUE and BLE, weak tone, flaccid) **Respirations** (robust cry, weak cry or irregular/gasping, not breathing)

What are **management** options for **dystocia**?	Dystocia = abnormal labor, full dilation but can't deliver fetus **C-section, oxytocin, forceps/vacuum delivery, maneuvers**
What is the appropriate **management** for **shoulder dystocia**?	**Inability to deliver anterior shoulder** 2/2 impaction against mother's pubic symphysis. Call for OB/neonatology/anesthesia. **1st line (and most tested): McRobert's Maneuver (hyperflex hips), suprapubic pressure.** Next steps: Rubin/Woods rotational maneuvers, deliver posterior arm, episiotomy, empty mother's bladder with foley. If all of these have failed, manually break newborn's clavicle, C-section.
What **risks** are associated with **c-section** compared to vaginal delivery?	Higher risk of **thromboembolism**, **bleeding**, **infection**, **longer hospital stay/recovery**
What is the appropriate **management** of a **nuchal cord**?	Prevent compression of cord by **gently reducing it over the head** (loose) **or clamping and cutting the cord** (tight) with rapid delivery of the fetus
What is the appropriate **management** of a **cord prolapse**?	**Obstetrical emergency** **Elevate presenting part to reduce cord compression** (mother in **knee-chest position** or Trendelenburg). Keep the presenting part elevated while the patient is moved to the OR for c-section.
What **risks** are associated with **breech presentation**?	Higher risk of **cord prolapse**, **premature rupture of membranes**, **dystocia**
What defines **postpartum hemorrhage**?	10% drop in Hct or blood loss requiring transfusion → **Typically 500 cc for vaginal birth** or **1 L for c-section**
What are the most **common causes of postpartum hemorrhage** based on timing of presentation (< 24 h or > 24 h)?	Early (< 24 hr): **uterine atony (most common)**, retained POC, lacerations Late (> 24 hr): retained POC, lacerations
What is the appropriate **management** of **postpartum bleeding 2/2 uterine atony, lacerations, and retained products**, respectively?	**Atony:** MCC < 24hrs; **Tx: bimanual massage**, **oxytocin**, IVF, NO MAG **Lacerations:** birth trauma = 2nd MCC. **Tx: surgical repair** **Retained products**: early or late bleeding; **Dx:** US; **Tx: surgical removal** All: transfuse as needed
What is the **incidence** of **postpartum depression**?	**Up to 50%**, overall underdiagnosed
Signs & Symptoms, Diagnosis, Treatment: Uterine rupture	**Higher risk:** trauma, previous c-section or trauma **SSx**: fetal distress, **palpation of fetal parts**, **loss of uterine tone**, shock **Dx:** US, **nonreassuring FHR = most reliable sign** **Tx: emergency C-section** (and likely hysterectomy)

Signs & Symptoms, Treatment: Fever and abdominal pain 2-3 d postpartum	**Endometritis (**infxn of decidua) Polymicrobial MC postpartum infxn Risks: **PROM>24hrs**, **multiple pelvic exams** **SSx**: foul-smelling lochia, uterine ttp, leukocytosis **Tx:** IV abx, admission
What are **risk factors** for **endometritis**?	**C-section** (MCC), PROM, prolonged labor, internal monitoring, absence of prenatal care, high number of cervical checks
What is the most common **cause** of **third trimester vaginal bleeding**?	**Abruptio placentae:** premature separation of placenta
What can **increase** the **risk of placental abruption**?	**HTN** (MCC), **preeclampsia** (most significant risk factor), sympathomimetics (**cocaine**, meth), trauma, high parity, smoking, heavy EtOH, advanced maternal age
Signs & Symptoms, Diagnosis, Treatment: Placental abruption	**SSx**: (TRIAD): **vaginal bleeding** (**may be concealed = painless**) + **painful uterine contractions** + **fetal distress** **Dx**: US to rule out placenta previa before pelvic examination; Labs: thrombocytopenia, hypofibrinogenemia (DIC = MC complication) **Tx:** fetal monitoring, Rho(D) immunoglobulin, **stabilize mother** (IVF, blood), **non-reassuring mother/fetus = c-section**, **term+stable = delivery** (vaginal or OR), **preterm+stable = inpt conservative mgmt**
What is the most **sensitive test** for predicting **placental abruption**? What is the most **specific test** for predicting **placental abruption**?	Most **sensitive**: **Tocodynamometer monitoring** Most **specific**: **ultrasound** but can miss placental abruption especially if there is a retroplacental clot. If you think they're abrupting, call OB and start toco
What's the best way to determine **fetal distress after trauma**?	**Tocography.** Monitor all viable (> 20 wk) women for 4 hrs. Okay to go home: If there are less than 3 contractions per hour for four hours, no late decelerations, or baby bradycardia
Most **common cause of painless vaginal bleeding** during third trimester?	**Placenta previa:** placenta partially or completely covering cervical os, which causes bleeding when the os starts to dilate. **No digital or speculum exams until previa ruled out by US
What are **risk factors** for **placenta previa**?	**Prior c-section**, high parity, multiple induced abortions, advanced maternal age
What **percentage** of **placenta previa** diagnosed on US **before 20 wks will resolve spontaneously**?	**50%**
What distinguishes **PROM** and **PPROM**?	**Premature rupture of membranes (PROM):** rupture of membranes before onset of labor **> 37 wks** **Preterm PROM (PPROM):** PROM **< 37 wks**
What are potential c**omplications of PROM**?	Infection (**chorioamnionitis**), **cord prolapse**

What are methods to **confirm rupture of membranes**?	**Clinical:** "gush" of fluid, **pooling of amniotic fluid in vaginal fornix** **least specific** **Nitrazine paper: pH > 7** turns paper **blue**, has high false positive rate from using lubricant on speculum, sperm, trichomonas infection) **Ferning test:** dried secretions will show **branching pattern of crystallization** (ferning = amniotic fluid) **most specific**
For what OB conditions are **digital pelvic exams** in ED **contraindicated**?	**Placenta previa**, **suspected premature rupture of membranes** (requires sterile speculum)
What is the **treatment** for **PROM** and **PPROM**?	If full term or late preterm (34-37 weeks): admit, continuous fetal monitoring, induce labor **< 27 weeks:** expectant management (if no infxn) **24-34wks**: corticosteroids (hasten lung delivery)
What **medications** can be given for **premature/preterm labor**?	**Premature/Preterm labor:** contractions + cervical changes < 37 wks **Tx: Tocolytics** (Mag [IV 4-6g then infusion], indomethacin, nifedipine, terbutaline). **Don't delay labor if there is concern for other serious OB complications or the fetus is nonviable. Consider steroids to promote lung development if 24-34 weeks.
What **medications** are typically used (and safe) in **pregnancy** for **HTN**?	**Alpha-methyldopa, labetalol, hydralazine, nifedipine**
What distinguishes **chronic HTN** vs. **pregnancy-induced HTN** vs. **preeclampsia/eclampsia**?	**Chronic HTN:** onset **prior to pregnancy** or **before 20 wks** **Gestational HTN:** onset **> 20 wks but no sx** **Preeclampsia/eclampsia** (vascular endothelial dysfunction): **HTN > 20 wks (up to 6 wks post-partum)** and sx to include proteinuria, edema, seizures
What is the time range in which **pregnant women** are at **risk for preeclampsia/eclampsia**?	**20 wks gestation until 6 wks postpartum**
What are **risk factors** for **preeclampsia/eclampsia**?	**First pregnancy**, **< 20y/o or > 35y/o**, **multiple gestation** (e.g. twins), **HTN**, **DM**
What defines **mild preeclampsia** vs. **severe preeclampsia** vs. **eclampsia**?	**Mild:** BP **140-160/90-110**, proteinuria > 300 mg/24hr but < 5g/24hr. **Severe:** BP **>160-180 or >110** diastolic on 2 occasions 6 hrs apart, proteinuria >5g/24hr (or Udip 4+ protein), Cr > 1.1, LFTs 2x normal, pulmonary edema cerebral/visual sx. **Eclampsia:** preeclampsia + **seizures**
What are clinical **symptoms** for **severe preeclampsia**?	**Headache, blurred vision, RUQ pain, clonus** Can progress to HELLP syndrome.
What is the appropriate **treatment** for **severe preeclampsia or eclampsia**?	**Emergent delivery**, hydralazine/labetalol/nifedipine for **BP control**, steroids if < 36 wks (fetal lung development), **IV Mg sulfate** (4-6 g) to treat/prevent seizures
Signs & Symptoms, Treatment: Magnesium toxicity	**SSx**: neurotoxic (**loss of DTRs**, respiratory failure, asystole) **Tx**: IVF, **calcium gluconate/chloride**

What defines **HELLP syndrome** and how is it **treated**?	**Hemolysis, Elevated Liver enzymes, Low Platelets (<100)** Smear will have schistocytes. **Tx:** similar to severe preeclampsia/eclampsia with HTN control, **Mg**, **steroids if < 36 wks**, **emergent delivery**
Diagnosis: Abdominal pain in a woman w/ HELLP	**Subcapsular liver hematoma**
What patients are at **risk** for **Rh incompatibility** and what is the associated **complication**?	**Rh- mom with Rh+ baby after bleeding event** Mom makes antibodies to baby's blood → immune response to future Rh+ pregnancies Risk of **fetal hydrops** (hemolysis causing fetal anemia) usually with next exposure to fetal blood.
When should Rh immune globulin **(RhoGam)** be **given during pregnancy**?	Usually given to **Rh- mom at 28-29 wks and delivery** Also be given to **Rh- mom with any chance of fetal blood exposure** (vaginal bleeding, any trauma, ectopic pregnancy)
How much **RhoGam** do you give and **when**?	Gestational age less than 12 wk: **50 mcg** Gestational age greater than 12wks or UNKNOWN gestational age: **300 mcg** Must be **given within 72 hrs of the bleeding event.**
How much blood does **300 mcg of Rhogam neutralize**?	**300 ml** If patient undergoes significant trauma, they may need a second dose.
What is the **Kleihauer-Betke Test**? Who should have it done?	Used for certain **Rh- moms to detect and quantify the amount of fetal RBCs in maternal circulation**. ONLY used in cases of **significant maternal-fetal hemorrhage** (test is insensitive, requires 5 ml of fetal hgb and it only takes 0.01ml of fetal RBCs to cause maternal Rh sensitization). This is used to see if another dose of Rhogam is needed.
Review the definitions of **threatened**, **inevitable**, **incomplete**, **complete**, **septic**, and **missed abortions**	**Threatened**: vaginal bleeding + IUP + closed os. **Inevitable:** vaginal bleeding + IUP + open os. **Incomplete:** vaginal bleeding + open os + some POC expelled/some still in uterus. **Complete:** vaginal bleeding + closed os + complete passage of POC. **Missed:** nonviable fetus (no heart tones) aged <20 wks in the uterus for at least 8 wks w/o passage. **Septic:** infxn of uterus during SAB. Staph infxn. open os with purulent drainage
What is the appropriate **management** of **threatened abortion** in the ED?	**Confirm IUP with TVUS** Refer for **serial hCG** if no IUP and below discriminatory zone (important if early ectopic possible) Pelvic rest and **outpatient OB f/u** **RhoGam if Rh- mom**
Diagnosis: Young woman with abdominal pain, +FAST but no trauma	**Ruptured ectopic pregnancy**

What is the **most common location** for **ectopic pregnancy implantation**?	**Fallopian tube ampulla**
What is the **most common cause** of **ectopic pregnancy**?	**Adhesions/scarring** is MC (often from PID), previous surgery Others: previous ectopic (greatest risk factor), IUD, previous abortion, and tubal ligation
What is the **discriminatory zone** for visualization of **IUP** on **transvaginal** and **transabdominal US**?	**Transvaginal: hCG 1,500 mU/mL** **Transabdominal: hCG 2,400-4,000 mU/mL** If no IUP and hCG below these cutoffs, patient needs OB f/u in 48 hours for repeat hCG and US to rule out ectopic
What must be seen on **US** to **confirm an IUP**?	**Gestational sac and yolk sac**; otherwise ectopic is still on the differential
What are the **requirements** for giving **methotrexate** to treat **ectopic pregnancy**?	**Hemodynamic stability**, **gestational sac < 3.5 cm**, **no fetal cardiac activity**, **no evidence of rupture**, **reliable for follow up**
Diagnosis: Patient presents 1 week after being started on methotrexate for an ectopic. Workup?	**"Separation pain"** - thought to be from tubal abortion or hematoma formation Needs **labs** and **TVUS** to **rule out treatment failure**
What **vaccines** are **safe** in **pregnancy**; what common **vaccines** are **unsafe**?	**SAFE**: Tdap, HepB, Influenza (inactivated) **UNSAFE**: live virus vaccines including Hep A, MMR, Varicella, Pneumococcal, Polio
What are the ED options for **emergency contraception**? How long after intercourse can each be used?	**Copper IUD** is **most effective** and can be used **up to 5 days out**. **Ulipristal** can be used **up to 5 days** but is **not as effective as Copper IUD.** **Combined OCPs** can be used **up to 72 hours out**. **Progestin** is recommended **within 48 hours**.
What suggests **hyperemesis gravidarum**?	No strict clinical definition, however **nausea** and **vomiting** causing **ketonuria** and **loss of > 5% of body weight** are commonly used. Peak incidence is **8-12 weeks GA.**
High risk time for **fetal radiation exposure**?	**Between 2-7 weeks**, during **organogenesis**
Signs & Symptoms, Treatment: Mastitis/breast abscess	Due to **blocked duct and secondary infection** (*Staph>Strep*). **SSx:** breast pain, fever, erythema, induration **Tx:** warm compresses, I&D if abscess is present, antibiotics (**dicloxacillin**, cephalexin). **Patient should **continue breastfeeding****
What is first line pharmacological **management of nausea and vomiting in pregnancy**?	**Pyridoxine (B6)** and **doxylamine (antihistamine)**

Renal & Genitourinary

Bizz	Buzz
What defines **acute renal failure**?	50% increase from baseline Cr OR 50% decrease in GFR
Causes, Labs: prerenal cause of acute renal failure	Most common cause of acute AKI in the community. **Cause:** most common is ↓ **Renal hypoperfusion** (ACEI, NSAIDs); ↓ **Intravascular volume** (hypovolemia, sepsis, blood loss, etc). **Labs: BUN:Cr ratio >20 and FENa < 1%** (use FEUrea if on diuretics), urine Na <20, relatively normal UA.
Causes, Labs: intrinsic renal cause of acute renal failure	**Causes:** 2/2 pathology within the kidney, with **acute tubular necrosis** being the most common cause (90%). **Labs: BUN:Cr ratio < 20, FENa > 2%** (damaged kidney is unable to retain Na), **low urine osmolality** (injured kidney is unable to concentrate causing dilute urine), **granular casts on UA**.
Causes, Labs, Diagnostic Test: postrenal cause of acute renal failure	**Cause:** 2/2 **obstruction** of urine outflow, with **BPH** being the most common cause. Others - bladder CA, ureteral stone, urethral stricture. **Labs:** relatively normal UA. **Diagnostic Test:** US looking for **post-void residual** (**>150 cc** is abnormal).
What is the most likely **cause** of **cardiac arrest before and after HD** in a patient with ESRD?	**Before:** hyperkalemia. **After:** hypokalemia or blood loss.
What are indications for **emergent HD**?	"AEIOU": **A**cidosis **E**lectrolytes (hyperkalemia refractory to medical management) **I**ntoxication (toxins like ethylene glycol, methanol, Li, etc.) **O**verload (volume, any pulmonary edema, hypoxia) **U**remia with symptoms (e.g.pericarditis, AMS, BUN 100 or Cr 10)
Treatment: bleeding AV fistula	Apply tourniquet proximal to the fistula (for arterial supply) and a blood pressure cuff distally (for venous flow). Purse string or figure of eight sutures with a non-cutting needle. Can use topical/IV DDAVP for uremic bleeding syndrome. Alt: press plastic soda bottle cap with hollow side toward wound and secure in place with tight coban
What are **symptoms** of uremia?	Pericardial effusion/tamponade, altered mental status, n/v, anemia/bleeding (2/2 platelet dysfunction)
Treatment: uremic bleeding syndrome	DDAVP - topical or IV
What percentage of kidney stones **<5mm** will pass **spontaneously**?	90%
What **life threat** should always be considered on the **differential** of a patient with **potential kidney stone**?	AAA

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What is the **most common site** of impaction for **kidney stones**?	Ureterovesical junction (UVJ)
What is the **composition** of most **kidney stones** and what patients are at increased for these stones?	**Calcium oxalate.** Patients with **hypercalcemia** (2/2 sarcoid, multiple myeloma, hyperthyroid and hyperparathyroid, cancer), **Crohn's disease** (2/2 increased oxalate absorption).
What is the **composition** of **Struvite kidney stones**? What are the **risk factors** for these stones?	**Magnesium-ammonium-phosphate stones**. Most common cause of staghorn calculi. Increased risk with **chronic UTIs**, caused by urease-splitting bacteria (e.g. ***Proteus***).
What are the major **risk factors** for **uric acid** kidney stones? What is the recommended **treatment**?	Increased risk with **gout**, **leukemia**, myeloproliferative disorders, tumor lysis syndrome. **Tx:** IVF, bicarb to alkalize urine, surgical removal PRN. Note: **U**ric acid stones are radiol**U**cent (don't show up on Xray)
How often is there **hematuria** on UA when the patient has **kidney stone**?	75-80%
What are absolute **indications** for **admission** for **kidney stones**?	Obstruction + infection, obstruction + solitary kidney, intractable pain or vomiting, urinary extravasation, hypercalcemic crisis
Most common cause: glomerulonephritis	Post-streptococcal GN
Signs and symptoms, Treatment: glomerulonephritis and nephritic syndrome	**Ssx: Proteinuria**, **hematuria**, edema, **HTN**, **renal failure** (AKI/intrinsic); UA may show red cell casts. **Tx:** largely supportive, find and treat cause.
What is an important **secondary risk** for patients with **nephrotic** syndrome?	Thromboembolism 2/2 loss of anticoagulant proteins in urine
Signs and symptoms, Treatment: nephrotic syndrome	"NEPHROTIC" **N**a decrease (hypoNa) **A**lbumin decrease (hypoalbuminemia) **P**roteinuria (>3.5g/day) **H**yperlipidemia **R**enal vein thrombosis **O**rbital edema **T**hromboembolism **I**nfection (lose Ig's in urine) **C**oagulability (lose ATIII in urine) **Tx:** IVF, Na restriction, steroids, ACE-I (dilates efferent arterioles, reduces glomerular pressure, and decreases protein loss), VTE prevention
Most common causes: nephrotic syndrome in kids and adults	Kids: **Minimal change** disease Adults: **Focal segmental** glomerulosclerosis
Most common cause: painless hematuria in older men, children, and young adults/older women	Older Men: **Bladder cancer** followed by renal cancer. Children: **glomerulonephritis**. Young Adults/Older Women: **UTI**.
Diagnosis: UTI + fever + nausea, vomiting	**Pyelonephritis** (cystitis rarely presents with fever)
Diagnosis: UA with WBC but no bacteria	**Sterile Pyuria**, think of STIs and non-urinary causes (appy, diverticulitis, etc.)

Interpretation of **+nitrites** on UA	Specific for nitrite reducing bacteria - **Gram negative** infection (esp. *E. coli*). Not sensitive
What distinguishes **direct from indirect inguinal** hernias?	Indirect: through **inguinal canal** into scrotum (lateral to inferior epigastric arteries) Direct: through muscle of **abdominal wall**.
What are potential **complications** of hernias?	Bowel obstruction, incarceration (hernia gets stuck out), strangulation (no blood flow, dead tissue)
Cause: balanitis/balanoposthitis	Inflammation of glans 2/2 **fungal infection**, less commonly bacterial; seen in **uncircumcised** men, **diabetics**, obese.
Cause: bilateral orchitis	**Mumps** virus, often associated with parotitis. Think about college age patients
Most common cause, Treatment: epididymitis/orchitis in young vs. old men	**Young (<35 yo):** Cause - STIs Tx - CTX + doxycycline **Old (>35 yo):** Cause - *E. coli* Tx - fluoroquinolone
What is **Prehn's sign**?	**Relief of pain** with **scrotal elevation** in patients with **epididymitis/orchitis**
Signs and Symptoms, and Treatment: Prostatitis	**SSx:** dysuria, urinary frequency, pain with defecation, tender prostate. **Tx**: If <35 yo cover for STDs, otherwise give cipro to cover gram negatives and enteric flora **Avoid Foley as this will increase inflammation.**
What are the key differences between **low-flow** and **high-flow priapism**?	Low-flow: **most common** form; due to venous obstruction, **ischemic** and **painful**. Causes: **sickle cell** (most common), **meds** (antipsychotics, penile injections). High-flow: usually **painless**. Cause: **trauma** and **AV fistula** (most common).
ABG analysis: ischemic priapism	academic (pH < 7.25), hypoxic (pO2<30), hypercapnic (pCO2 >60)
Treatment: priapism	Pain control (opiates, dorsal penile or ring nerve block); **Intracavernosal aspiration** (first line Tx); **Intracavernosal phenylephrine** (Tx after irrigation has failed), consider terbutaline (IM), and consult urology. In sickle cell patients consider exchange transfusion (but low threshold to drain).
Signs and Symptoms, Diagnostic Test, Treatment: Testicular torsion	**SSx:** Acute severe unilateral testicular pain, n/v/abd pain, scrotal swelling and tenderness, **absent cremasteric reflex**. **Dx: US** with Doppler (although this may be normal - trust your exam). **Tx:** emergent **urologic consultation** for orchiopexy, can try manual detorsion via external rotation. **Consider this diagnosis in young male child with nonstop crying or abdominal pain.**

What is the appropriate **technique** for **manual detorsion** of testicular torsion?	**Medial to lateral** rotation, "open the book"
What is the most **sensitive sign** for **RULING OUT** testicular torsion?	A normal cremasteric reflex
Characteristic clinical finding, Diagnostic Test, Treatment: torsion of the appendix testis	**"Blue dot sign"** (tender bluish nodule on the upper pole of the testis on physical exam - present in 25%). **Diagnostic Test:** US. **Tx:** scrotal support, NSAIDs
What is the most common **misdiagnosis** in patients with testicular cancer?	**Epididymitis.** Testicular cancer is the most common cancer in men aged 15-35. Exam will show a painless, firm, fixed nodule or mass.
CXR findings: metastatic testicular cancer	"Cannonball" lesions in lungs
What are **extrarenal problems** commonly associated with **polycystic kidney disease**?	Liver cysts, cerebral berry aneurysms
What is the most common **sign** of **bladder injury**?	Gross hematuria
What **medication** can **cause epididymitis**?	Amiodarone
Diagnostic Test, Treatment: Peritonitis in a patient on peritoneal dialysis	**Diagnostic Test:** cloudy effluent, UA with 100 WBC, > 50% neutrophils or + Gram stain. **Tx**: Stable**:** intraperitoneal antibiotics and continued use of catheter. Unstable**:** admission + IV antibiotics. All antibiotics should cover skin flora (Strep and Staph).
Definition, Treatment: Phimosis	**Definition:** Condition of **uncircumcised** penis where **foreskin is constricted** and **unable to be retracted**. **Tx:** topical steroid cream, improved hygiene and gentle retraction. If able to urinate: no signs of infection or ischemia can be discharged w/ follow up with urology for elective circumcision. If unable to urinate: needs foley.

Hematology & Oncology

Bizz	Buzz
Diagnosis, Treatment: Transfusion + Fever + Otherwise well	**Dx: Febrile non-hemolytic transfusion reaction.** Most common transfusion reaction. **Tx**: tylenol, pause transfusion for 30 minutes, likely restart if hemolytic reaction ruled out
Diagnosis, Treatment: Transfusion + Urticaria + Otherwise well	**Dx: Simple Allergic (Urticarial) Reaction** **Tx**: IV benadryl (premedicate in future) but don't need to stop transfusion unless they have other signs of anaphylaxis
Signs and Symptoms, Diganosis, Treatment: Transfusion + Shock + AKI	**Acute Hemolytic Transfusion Reaction.** Often due to ABO incompatibility. **SSx:** fever, flank pain, shock **Dx**: +Coombs test, drop in Hgb, low haptoglobin, elevated LDH **Tx:** stop transfusion, IVF, diuretics, treat hyperK; Alternate Dx SEPSIS
Diagnosis, Treatment: Transfusion + Shock + Angioedema + Normal CXR	**Dx: Severe Allergic Reaction (Anaphylactic)**. Associated with hereditary IgA deficiency. **Tx**: stop transfusion, epinephrine, IV benadryl, IV fluids, supportive care
Signs and Symptoms, Diagnosis, Treatment: Transfusion + Pulmonary Edema without other signs of heart failure	**Transfusion Related Acute Lung Injury (TRALI)** **SSx: HIGH fever, hypoxemia, hypotension.** **Dx:** ARDS after transfusion. CXR with pulmonary infiltrates but no other signs/symptoms of overload **Tx**: stop transfusion, supportive, don't benefit from diuresis. Most common cause of death following blood transfusion.
Signs and Symptoms, Treatment: Transfusion + Pulmonary Edema WITH other signs of heart failure	**Transfusion-Associated Circulatory Overload (TACO)** **SSx**: Presentation similar to TRALI but differentiated by hypertension, signs of volume overload (e..g JVD, peripheral edema, high bnp), NO Fever **Tx**: stop transfusion, supportive care, diuresis
Which patients are higher risk for developing **TRALI**?	Those with existing systemic inflammation (e.g. **sepsis**, trauma); linked to **platelet and FFP transfusions**
What is the **most common infection** transmitted by **blood transfusion**?	Hepatitis B
What is the **underlying pathology** in **Hemophilia A** and **Hemophilia B**? Which **coagulation studies** will be abnormal?	Bleeding disorder due to **lack of Factor 8 (A; 85%) or Factor 9 (B)**; both **X-linked recessive** and clinically indistinguishable. **Dx:** factor activity levels, normal PT, **abnormal PTT**
What are the **common clinical features** of **Hemophilia A** and **Hemophilia B**?	Minor trauma causing large amounts of bleeding or hemarthrosis (hallmark sign). **Children:** ankle (most common joint) **Adults:** knee (most common) > elbow & ankle CNS bleeding is the leading cause of death in hemophilia. In CNS bleeding, factor replacement should precede diagnostic imaging.

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What are the **appropriate dosages** of **factor replacement** for a patient with **Hemophilia A** with **Minor**, **Moderate** or **Severe** Bleeding?	Number of Factor VIII units = weight (kg) x (desired % increase in factor activity) x 0.5. (each unit increases by 2%) **Minor (hemarthrosis)**: 20-30% factor desired (10-15 U/kg of Factor VIII) **Moderate (epistaxis, GI bleed):** 50% factor desired (25 U/kg of Factor VIII) **Severe (CNS, RP bleed):** 100% factor required (50 U/kg of Factor VIII)
What are the **appropriate dosages** of **factor replacement** for a patient with **Hemophilia B** and **Minor**, **Moderate** or **Severe** Bleeding?	Number of Factor IX units = weight (kg) x (desired % increase in factor activity); (each unit increases by 1%) **Minor (hemarthrosis):** 20-30% factor required (25 U/kg of Factor IX) **Moderate (epistaxis, GI bleed):** 50% factor required (50 U/kg of Factor IX) **Severe (CNS, RP bleed):** 100% factor required (100 U/kg of Factor IX)
What are **alternative treatments** if **Factor is not available** for **bleeding hemophilia** patient?	**FFP** (1 mL FFP = 1 U F8) **Cryoprecipitate** (1 bag = 100 U F8) **DDAVP**: 0.3 mcg/kg IV/SQ, 150 vs 300 mcg nasally, increases F8 activity & vWF (carries F8) **PCC**
What is the function of **Von Willebrand Factor** (vWF) during hemostasis?	**1° hemostasis:** attaches subendothelium to platelets (platelet aggregation) **2° hemostasis:** protects factor VIII from degradation + delivers Factor VIII to site of injury (Factor VIII carrier protein)
Signs and Symptoms, Diagnosis, Treatment: Von Willebrand's Disease	Most common inherited bleeding disorder. **SSx:** easy bruising, skin bleeding, prolonged bleeding from mucosal surfaces (mouth, GI/GU) **Dx**: **platelet count normal**, normal PT/INR, possibly prolonged PTT (affects F8), prolonged bleeding time **Tx:** DDAVP (first-line treatment, increases release of vWF), non-recombinant Factor VIII, Cryo NOT recommended (risk of viral transmission), no FFP (very little F8); ± Antifibrinolytics (Amicar, Tranexamic acid) which inhibit clot breakdown
Signs and Symptoms, Diagnosis, Treatment: Polycythemia Vera	Clonal proliferation of RBCs/increased RBC mass. **SSx:** pruritus (aquagenic, plethora (facial), hypertension, engorged retinal veins, thrombosis, erythromelalgia (burning of hands/feet), splenomegaly **Dx**: all cell lines inc (especially RBC) **Tx**: serial phlebotomy, hydroxyurea, aspirin
How does **heparin** work? How is it **monitored**? How can it be **reversed**?	**Mechanism**: activates antithrombin III (inactivates Factor X and thrombin) **Monitoring**: PTT **Reversal**: Protamine Sulfate 1 mg per 100 U heparin, give slowly to avoid anaphylactoid reaction

How does **LMWH** work? How is it **monitored**? How can it be **reversed**?	**Mechanism**: activates antithrombin III (inactivates ONLY Factor X) **Monitoring**: Xa level **Reversal**: Protamine Sulfate (dose based on timing since last LMWH injection). Doesn't work nearly as well as it does for unfractionated heparin
How does **warfarin** work? How is it **monitored**? How can it be **reversed**?	Inhibits vitamin K clotting factors (2, 7, 9, 10, proteins C & S) **Monitoring**: PT and INR **Reversal**: FFP/Vitamin K (alternate PCC), dosage based on type of bleeding and INR
Review **appropriate treatment** to **reverse coumadin** based on severity of bleeding and INR.	**INR < 5 & NO bleeding:** lower or skip 1 dose **INR ≥ 5 but ≤ 10 & NO bleeding:** skip next 1-2 doses, alternative: skip 1 dose + Vitamin K 2.5-5 mg PO **INR ≥ 10 & NO serious bleeding:** hold med until INR is therapeutic + Vit K 5 mg PO **ANY serious bleeding regardless of INR:** hold med + Vitamin K 10 mg IV + FFP or PCC
How does **tPA** work? How can it be **reversed**?	**Mechanism:** converts plasminogen to plasmin to breakdown clots **Reversal:** no specific reversal agent. Can give large amount of everything (pRBCs, cryo, FFP, platelets, PCC, amicar, tranexamic acid)
How does **clopidogrel** work? How can it be **reversed**?	**Mechanism**: blocks glycoprotein 2b/3a & prevents platelet activation (crosslinking with fibrin) **Reversal**: nothing specifically reverses, can give platelets
How does **Dabigatran** (**Pradaxa**) work? How can it be **reversed**?	**Mechanism**: Direct thrombin inhibitor, associated with GI bleed **Reversal**: **Idarucizumab,** PCC/pRBC/platelets, can also do hemodialysis
How does **Rivaroxaban** (**Xarelto**) work and how can it be **reversed**?	**Mechanism**: Factor 10a inhibitor **Reversal**: no specific reversal (exam may want andexanet alfa, even though evidence is murky), NOT dialyzable, can try thrombin activation with PCC, FFP, cryo
Signs and Symptoms, Diagnosis: Elderly with chronic back pain, lytic lesions on x-ray	**Multiple myeloma** **SSx:** ("CRAB"): hyperCalcemia, Renal failure, Anemia, Bone lesions/Back pain **Dx:** abnormal SPEP (M-spike) & UPEP (Bence-Jones protein); peripheral smear: rouleaux formation; XR skull: "punched out lesions." Complications: hypogammaglobulinemia (leads to sepsis), hyperviscosity syndrom
What **symptoms** suggest **aggressive Lymphoma**?	"B symptoms": fever, night sweats, lymphadenopathy, weight loss
What **distinguishes Non-Hodgkins** from **Hodgkin's Lymphoma**?	**NHL:** more common, more widespread, less curable, leading cause of non-solid organ cancer-related death **HL:** less common, related to viral infection; often presents with B symptoms and local spread, high cure rates

What are the **two most common types** of **Non-Hodgkin's Lymphoma** and **what distinguishes them**?	**Follicular Lymphoma:** indolent, slow growing, widespread at diagnosis, no cure **Diffuse Large B cell Lymphoma**: aggressive and symptomatic, rapid spread, 50% cured
What are the **two types** of **Burkitt's (non-Hodgkin's) lymphoma**?	Associated with EBV **Endemic (African) Burkitt lymphoma (eBL)**: most common; jaw and facial bone including the orbit (> 50%) **Sporadic Burkitt lymphoma (sBL):** less common; abdominal tumors with bone marrow involvement
Signs and Symptoms, Diagnosis, Treatment: Hodgkin's lymphoma	Bimodal age (teens/young adults, older adults) **SSx**: non-tender cervical lymphadenopathy, mediastinal mass on CXR, B symptoms **Dx**: Reed-Sternberg cell ("owls eye") **Tx**: chemotherapy, radiation
What is the **difference** between **Acute** and **Chronic Leukemia?**	**Acute:** rapid increase in blasts, most common in children **Chronic:** mature abnormal WBCs, slow growing, most common in elderly
What is the **difference** between **cell types** seen in **Lymphocytic** and **Myelogenous Leukemias**?	**Lymphocytic:** B & T cells **Myelogenous**: RBCs, platelets & other WBCs
What are the **similarities** and **differences** between the **presentations of ALL vs AML**?	**BOTH**: bony pain, big liver/spleen, anemia, bleeding, thrombocytopenia, infection and blasts in blood **ALL:** most common childhood leukemia, +LAD **AML:** more common in adults, no LAD, + gingival infiltration, Auer rods on blood smear
What are the **similarities** and **differences** between the presentations of **CLL vs CML**?	**BOTH**: slow onset, elevated WBCs **CLL:** most common adult leukemia, smudge cell, worst prognosis **CML**: mostly adults, Philadelphia chromosome, high platelets, good prognosis
Diagnosis, Treatment: neutropenic fever	**Dx**: one oral temp ≥ 38.3°C or ≥ 38°C for ≥ 1 hour + ANC < 500; obtain cultures (gram positive most common) **Tx:** admission, empiric antibiotics (solo coverage with zosyn or cefepime; add vancomycin if you suspected skin or soft tissue infection)
Signs and Symptoms, Diagnosis, Treatment: Hyperviscosity syndrome	Increased serum viscosity that causes sludging & vascular stasis Causes: Leukemias (**AML or CML in blast crisis**, WBC > 100k), multiple myeloma, **Waldenstrom macroglobulinemia** (most common cause), **polycythemia vera**. **SSx:** mucosal bleeding (epistaxis), CNS symptoms (blurred vision, headache, AMS, stroke), end-organ ischemia **Dx**: severe out of proportion elevations of the affected cell line, Rouleaux formation **Tx:** phlebotomy (polycythemia) + IVF, plasmapheresis (high proteins), leukapheresis for blast transformations (induction chemotherapy = definitive treatment)

Diagnosis, Treatment: Tumor Lysis Syndrome	Massive cytolysis + release of the intracellular contents, can occur with aggressive heme malignancies, large solid tumors/steroids **after start of chemotherapy**. **Dx**: HIGH uric acid, phosphate, potassium & LOW calcium. **Tx:** aggressive IVF, correct electrolytes (hyperUA: Allopurinol, Rasburicase; hyperphosphatemia: aluminum hydroxide, Renagel, iHD; hyperkalemia: calcium, insulin/glucose, bicarb, kayexalate, HD; hypocalcemia: secondary to high phosphate, treat hyperphosphatemia first, only treat if symptomatic). Complications: cardiac arrhythmias, renal failure
Name the **criteria** for emergent **HD** in **tumor lysis syndrome**	K ≥ 6, uric acid ≥ 10, Cr ≥ 10, phosphorus ≥ 10, volume overload, symptomatic hypocalcemia
Signs and Symptoms, Diagnosis, Treatment: Thrombocytopenia, otherwise normal labs, well patient	**Idiopathic Thrombocytopenic Purpura (ITP)**, results from rapid destruction of plts (fxn is normal). Types: children (2-6 years): acute, post-infectious; adults (20-50 years) **SSx:** petechiae (most common), purpura, gingival bleeding, epistaxis, menorrhagia **Dx:** thrombocytopenia **Tx:** observation (only if asymptomatic + platelets > 50K), supportive (kids), steroids (platelets < 50K) & IVIG, platelets (only for severe bleeding, VERY low platelets), others: splenectomy (refractory cases)
Signs and Symptoms, Diagnosois, Treatment: Thrombotic Thrombocytopenic Purpura	**Thrombotic Thrombocytopenic Purpura (TTP)**: enzyme defect leads to unstable platelet plugs & hemolytic anemia **SSx** (PENTAD): **F**ever **A**nemia (MAHA, schistocytes; HIGH indirect bili, LDH, retic count; LOW haptoglobin) **T**hrombocytopenia (10-50k) **N**euro symptoms **Dx**: decreased ADAMTS-13 activity, schistocytes, normal: PT/INR, fibrinogen, dimer **Tx:** supportive, **plasmapheresis** (treatment of choice); others: plasma exchange transfusion, steroids, DMARDs, IVIG, splenectomy; DO NOT GIVE PLATELETS
What **types** of **patients** are at **higher risk** for developing **TTP**?	African-American females, Lupus, HIV, medications (Clopidogrel, Quinine)
Diagnosis, Treatment: child with thrombocytopenia, hemolytic anemia, renal failure	**Hemolytic Uremic Syndrome (HUS);** often after diarrheal illness (O157:H7- shiga-like toxin) **Dx**: with evidence of hemolysis (schistocytes, high unconjugated bilirubin, high LDH) **Tx**: supportive care, transfuse pRBC's for Hgb < 6, DO NOT GIVE PLATELETS OR ANTIBIOTICS

What defines **Heparin Induced Thrombocytopenia (HIT)** and what is the **treatment**?	Antibodies that inactivate platelets usually at 5 days after initiating heprain if naive and only minutes to hours after initiation if prior exposure. Diagnosis: (4 T's): **T**hrombocytopenia (platelets < 150 K or > 50% drop after starting heparin [less often LMWH]), **T**ime of onset (5-10 days), **T**HROMBOSIS (thrombosis, skin reactions, PE, CVA, MI) no o**T**her cause. Labs: +HIT antibody. **Tx:** STOP heparin or LMWH, can change to direct thrombin inhibitor (Argatroban, Dabigatran), NO platelets
Diagnosis, Treatment: Disseminated Intravascular Coagulation (DIC)	Microvascular thrombosis AND consumptive coagulopathy causing multi organ failure. Related to underlying severe illness (sepsis is most common cause) & massive inflammation (trauma, pregnancy complications, cancers). Labs: LOW: platelets (most common) & fibrinogen; HIGH: PT/INR, fibrinogen degradation, dimer **Tx:** underlying cause **Tx:** (primarily bleeding): FFP, platelets, RBCs; **Tx:** (primarily thrombosis): heparin, LMWH
In what **thrombocytopenic disorders** are **platelets** contraindicated?	TTP, HIT, HUS
What are the **3 main causes** of **microangiopathic hemolytic anemia**?	TTP, HUS, DIC
What are **diseases** commonly associated with **thrombocytopenia**?	TTP, HUS, DIC, SLE, HIV
What are classic causes of **microcytic** and **macrocytic anemias**?	**Microcytic** (MCV < 80): iron deficiency, thalassemia, anemia of chronic disease **Macrocytic** (MCV > 100): B12 or Folate deficiency
Anemia + Low reticulocytes Low ferritin Low iron High TIBC	**Iron Deficiency Anemia**
Anemia + High retic Normal to high ferritin Normal to high iron Target cells (smear)	**Thalassemia -** defective hemoglobin chains (A - Africa, B - India)
Anemia + Headache Abdominal pain Basophilic stippling (smear)	**Chronic Lead Poisoning**, may also see Burton's line (blue line on gums)

Anemia + Low retic, Low iron Normal ferritin Normal TIBC	**Anemia of Chronic Disease:** microcytic or normocytic
Anemia + Hypersegmented neutrophils + Neurologic changes	**B12 deficiency**, hypersegmented neutrophils (on peripheral smear), macrocytic
What patients are at **higher risk** for **B12 deficiency**?	Crohns Disease (B12 is absorbed in the ileum), on PPI (decreased absorption), vegan diet (decreased intake)
Anemia + Hypersegmented neutrophils + NO neurologic changes	**Folate Deficiency** (also consider in alcoholics with anemia)
Which patients are at **higher risk** for **Folate deficiency**?	Alcohol use disorder, tea and toast diet (elderly) - both from malnutrition
What are the **most common causes** of **pancytopenia**?	Malignancy (leukemias), nutritional deficiency (B12 or folate deficiency), infection, toxin exposure, aplastic anemia (complication of hepatitis)
Most common **initial presentation** of **sickle cell disease** in **infants**?	**Acute Dactylitis**: pain and swelling of hands and feet secondary vaso occlusive crisis, due to infarction NOT infection **Tx:** supportive
Treatment of **Sickle Cell patient** with **Priapism**?	Low-flow (venous/ischemic) causes erect penis with soft glans **Tx**: aspirate corpus, intracavernosal phenylephrine, IM terbutaline, surgical drainage as needed
Treatment of **Sickle Cell patient** with **Stroke**?	Emergent **exchange transfusion**
Diagnosis, Treatment: Acute Chest Syndrome	Sickle cell patient with fever, dyspnea and pneumonia, HIGH mortality (most common cause of death in sickle cell patients) Causes: infection, vaso-occusive crisis, fat embolism **Dx**: infiltrate on chest x-ray **Tx:** ICU admit, supportive (incentive spirometer, IVF, supplemental oxygen, pain control) antibiotics for CAP, pRBCs vs. exchange transfusion (severe crises marked by PaO2 < 60 mm Hg, not first line)
Signs and Symptoms, Diganosois, Treatment: child with sickle cell + non-traumatic rapid drop in hemoglobin	**Aplastic Crisis** **SSx:** pallor, weakness/lethargy, shock; arthralgias, arthritis (adults) **Dx**: Hgb drop by at least 2 points from their baseline, LOW reticulcytes <2%; associated with Parvovirus B19. **Tx:** pRBCs, IVIG
Signs and Symptoms, Diagnosis, Treatment: child with sickle cell, abdominal pain + rapid drop in Hb	**Splenic Sequestration**: rapid sequestration of RBCs in the spleen causing splenomegaly and severe anemia **SSx:** pallor, splenomegaly **Dx**: low Hgb, high retic **Tx:** IVF, transfuse prn, splenectomy

Which **infections** are **more common** in **sickle cell patients**?	**Encapsulated organisms**: *S. pneumoniae, H. influenzae, N. meningitidis* because these patients have a non-functional spleen.
Diagnosis: African American, +HIV, + anemia after starting on dapsone	**G6PD deficiency** X-linked recessive. Most common disease-producing enzymopathy in humans. Found in African, Asian, and Mediterranean ancestry. Oxidative stress causes hemolytic anemia. Protective against malaria. **Dx**: negative Coombs, Heinz bodies on smear.
What are potential **G6PD triggers**?	Fava beans, Infections, Meds: dapsone, **TMP-SMX**, phenazopyridine, nitrofurantoin, antimalarials, rasburicase, and methylene blue
Diagnosios: Elderly patient, gradual face swelling, periorbital edema, cough, and cyanosis. History of smoking.	Superior vena cava syndrome **Dx**: CT chest with contrast
Thresholds for **platelet transfusions** in **adults**	Trauma or active bleeding ITP: only for platelets < 10k and severe bleeding Coagulation disorder if < 20k Everyone else: <5-10k
Diagnosis: Paresthesias and arm/face spasms after massive transfusion protocol	Hypocalcemia related to citrate in blood transfusion products

Dermatology

Bizz	Buzz
Diagnosis, Treatment: Erythema Multiforme	Often **viral** trigger (HSV most common); Hallmark = **TARGET lesions**, SYMMETRIC on palms & soles (± trunk, face), minimal to no mucosal involvement,-Nikolsky. **Tx**: remove trigger, supportive
What is the most common **cause** of **Erythema Multiforme**?	**Infections:** HSV (most common viral cause) > Mycoplasma (most common bacterial cause)
Which **drugs** are most commonly associated with **Erythema Multiforme**?	**SOAPS**: **S**ulfa **O**ral hypoglycemics **A**nticonvulsants **P**enicillin N**S**AIDS
What are the **similarities** and **differences** between **Stevens Johnson Syndrome** and **Toxic Epidermal Necrolysis**?	BOTH: **mucosal involvement**, **+Nikolsky**, drugs = most common cause, flu-like prodrome, painful target lesions **SJS:** <10% TBSA, most common in children **TEN:** >30% TBSA, more common in elderly, fluid / lyte problems common; **Treatment** (both): supportive, remove trigger, transfer to burn center
What distinguishes **Staph Scalded Skin Syndrome** (SSSS) from **SJS/TEN**?	**SSSS:** NO mucosal involvement, younger children/infants/newborns, caused by infection (Staph exotoxin) & treated with antibiotics (Nafcillin/Dicloxacillin), NO STEROIDS **BOTH**: painful rash, bullae, + Nikolsky
Signs and Symptoms, **Diagnosis**, **Treatment**: Necrotizing Fasciitis?	**Type 1**: Polymicrobial (most common), abdomen/perineum, Type 2 diabetes = risk factor **Type 2**: Monomicrobial (GAS), extremities **SSx:** severe pain out of proportion to exam, rapid progression, erythema (most common finding), crepitus, necrosis, cellulitis turns dusky blue with bullae/vesicles, dirty dishwater discharge, La Belle Indifference (patient unconcerned) **Dx**: Clinical diagnosis! CT/radiograph with subcutaneous emphysema. **Tx:** Broad spectrum IV antibiotics (vancomycin/zosyn + clindaycin) AND surgical debridement (definitive treatment).
Diagnosis, Treatment: Urticaria	**Dx**: **Transient/migratory pruritic edematous plaques**, red border with central clearing, NOT symmetric **Tx:** remove trigger, benadryl/steroids/epinephrine as needed

Signs and Symptoms, Diagnosis, Treatment: Rocky Mountain Spotted Fever?	*Rickettsia rickettsii*. Transmission: Dermacentor tick, must be attached for 6 hours to transmit, eastern US (Carolinas, Oklahoma) **SSx**: fever (most common symptoms), centripetal (wrists/ankles → trunk) maculopapular rash (palms + soles), calf tenderness. **Dx**: low platelets, hyponatremia **Tx:** Doxycycline
Diagnosis, Treatment: College kid with petechiae → purpura presents in shock	**Meningococcemia**; seen in college kids, military barracks (close quarters), caused by *Neisseria meningitidis* (requires airborne precautions). **Dx**: LP with CSF studies **Tx:** ceftriaxone, supportive
Who needs **N. Meningitidis prophylaxis**? Which **medications** are used?	**Ppx**: household contacts, intimate partners, flights >8 hours next to infected person, daycare exposure, **intubation without proper PPE (mask, faceshield)** **Antibiotcs**: ceftriaxone, rifampin, or ciprofloxacin
What is the **difference** between **Pemphigus Vulgaris** and **Bullous Pemphigoid**?	Pemphigu**S**: **S**uperficial, flaccid bullae → break easily & crust, +mucosal involvement, +Nikolsky; Associations: Myasthenia, thymoma **Treatment**: steroids Pemphigoi**D**: **D**eeper, elderly, pruritic papules → tense bullae, NO mucosal involvement, -Nikolsky **Treatment**: steroids, tetracycline or dapsone
Signs and symptoms, Treatment: Shock + Erythroderma and possible foreign body	**Toxic Shock Syndrome.** Bacteria that produce toxins. **Staph** (TSS): more common; erythematous rash with desquamation + hypotension + high fever ≥3 organ systems, associated with foreign body **Strep** (STSS): fever, but less rash often with existing wound, not associated with foreign bodies **Tx:** remove foreign bodies FIRST, supportive care, and antibiotics (**clindamycin** first to reduce protein production, then empiric broad-spectrum for sepsis coverage), IVIg for refractory cases
Signs and symptoms, Diagnosis, Treatment: Gunmetal gray pustules on palms	**Disseminated Gonococcemia** (arthritis-dermatitis syndrome) **SSx**: fever + migratory arthritis + rash (papules → pustules with gray necrotic or hemorrhagic center) **Dx**: genital + throat culture **Tx:** ceftriaxone. Complications: tenosynovitis, septic arthritis
Signs and Symptoms, Treatment: Impetigo	**SSx**: most often in kids, facial vesicles rupture and become "**honey-crusted**", + contagious, **Staph** more common cause than **strep** **Tx**: topical **mupirocin** if small or localized area; systemic **keflex** if more extensive or bullous
What is the characteristic **rash** and **cause** of **Erysipelas**?	**Well demarcated, slightly raised**, beefy red plaque. **Group A Strep** = most common cause

Diagnosis and Treatment: Obese woman with **red macular rash** under breasts, noted **satellite** lesions	**Dx: Candida**; also associated with **immunocompromised** state **Tx:** Topical **azoles** for rashes, dry skin care
What is the **difference** in **presentation** and **treatment** between **Candida** and **Tinea** rashes?	**Candida**: seen in babies, immunocompromised, diabetes mellitus, obese adults (intertriginous), rash: red + macular with characteristic **satellite lesions** **Tx**: PO **nystatin** for thrush, Topical **azoles** for rashes, dry skin care **Tinea**: sharply marginated, annular lesion with raised or vesicular margins with **central clearing and scaling** **Tx**: topical **azoles** for everything except **scalp and nails** (**griseofulvin** or **terbinafine**)
What are the **names** for **Tinea infections** in the following areas: **groin, foot, scalp, nail?**	**Groin**: Crura (jock itch) **Foot**: Pedis **Scalp**: Capitis **Nail**: Unguium
Compare the **rashes** of **HSV** and **HPV.**	**HSV**: vesicular clusters with painful erosions (T1- mouth, T2- genitals); **HPV**: cauliflower-like and painless (anogenital warts) = most common sexually transmitted infection in US (> Chlamydia)
What is the **significance** of a **vesicle** or **ulcer** noted on **tip of nose or ear**?	Herpes Zoster (shingles) infection **Tip of nose** (Hutchinson sign) for **herpes ophthalmicus (V1)** **Ear** (Ramsay-Hunt) inidicates **involvement of CN 7/8**
What is the characteristic rash **Molluscum Contagiosum**? What are common **risk factors**? **Treatment**?	Dome-shaped fleshy papule with **central umbilication** on face/torso/ext; most common in **kids in daycare** or **adults with HIV** Caused by a **pox virus** **Tx:** self-limited, cryotherapy
Compare the **rashes** of **Scabies** and **Pediculosis**. What are the **treatments**?	**Scabies:** linear burrows in interdigital web space and intertriginous areas with extreme pruritus **Pediculosis** (lice): erythematous macules/wheals, extreme pruritus, nits visible **Tx:** (BOTH): decontamination, Permethrin cream (often repeat at one week, especially with lice)
Compare atopic dermatitis and **psoriasis**. What are the **treatments**?	**Atopic dermatitis** (eczema): usually kids <5, allergy/asthma history, winter months, dry pruritus skin with lichenification (hyperpigmentation/thickening) in flexural areas **Psoriasis:** well-demarcated erythematous plaques/papules with silvery white scales in extensor areas, +Auspitz sign (small bleeding points after successive layers of scale have been removed from the surface of psoriatic papules or plaques) **Tx** (BOTH): emollients, topical steroids, biologics (psoriasis)
Diagnosis, Treatment: Seborrheic Dermatitis	**Cradle cap** **Dx**: Occurs in infants. Yellowish, greasy scales on scalp, ± diaper area & axillae **Tx**: salicylate shampoo, mineral oil, avoid steroids

Which **disease** is **associated** with **seborrheic dermatitis** in **adults**?	HIV
Diagnosis, Treatment: Contact Dermatitis	**Dx**: Discrete, well-defined or demarcated rash (papules/vesicles/bullae) secondary to direct irritant vs allergic reaction **Tx**: remove trigger, protect skin, steroids
What is the **indication for** and **duration of oral steroid treatment** for **poison oak/ivy**?	**Indication**: large areas of affected skin, usually with involvement of the face and genitals. **Duration**: Requires 3 weeks of oral steroids with a taper. Normal steroid bursts can cause rebound dermatitis.
What are the **distinguishing features** of **Basal Cell** vs **Squamous Cell Carcinoma**? **Treatment**?	**BCC**: pink, pearly papules with telangiectasia in sun-exposed areas, more common **SCC**: UV exposure, ulcerated center with firm-raised border **Tx**: BOTH referred for biopsy
What **characteristics** are concerning for **melanoma**? **Treatment**?	ABCDE: **A**symmetry **B**order (irregular) **C**olor (different shades, not uniform) **D**iameter (>6 mm) **E**volution **Tx**: excisional biopsy; depth = most important prognostic factor
Diagnosis, Treatment: Purple papules on gums and skin	**Dx: Kaposi Sarcoma**; lesions most commonly oral, also gastrointestinal and pulmonary, they are painless and non pruritic, seen in HIV/AIDS patients **Tx:** treat HIV
What is the most common **diagnosis** for a **blanching strawberry lesion** on an **infant's head**?	**Hemangioma**; 50% resolve by 5 years of age Head > trunk > extremity
What **distinguishes** a **Lipoma** from a **Sebaceous Cyst**?	**Lipoma**: well-circumscribed, mobile and painless, "Slippage sign" with normal overlying skin **Sebaceous Cyst**: central punctum, cottage cheese discharge, no slippage, may have secondary infection **Tx** (both): referral for excision
What defines the **stages** of **decubitus ulcers**?	**I**: non blanching erythema, intact skin **II**: partial thickness, exposed dermis **III**: full thickness skin loss, exposed subcutaneous fat **IV**: full thickness tissue loss, exposed bone/tendon/muscle
Diagnosis, Treatment: Painful red nodules on shins	**Dx: Erythema Nodosum**; Associated with IBD, malignancy, infection (strep most common), or medications (OCPs). Patients often have a prodrome of fever, malaise and arthralgias. **Tx:** supportive, high dose aspirin 650 mg every 4 hours or NSAIDs
Characteristic rash of **Pityriasis**? **Treatment**?	**Herald patch** → "Christmas tree" distribution rash to trunk, ± pruritus **Tx**: self-limited, antihistamines; Rule out syphilis as cause

What is the **difference** between the **rashes** of **Pityriasis** and **Secondary Syphilis**?	**Syphilis** is **asymmetric** and involves **palms and soles**
What are the **appropriate precautions** for patients with **Shingles**?	If a patient is **immunocompromised** or possibly has **disseminated infection,** then **airborne + contact precautions** are required. If a patient is **immunocompetent** with **localized** zoster, then **standard precautions** can be followed.
What **rashes** (5) are associated with **palmar lesions**?	Syphilis (secondary) RMSF Scabies Erythema Multiforme Hand/foot/mouth
Which **rashes** are associated with **+ Nikolsky sign**?	SJS TEN SSSS Pemphigus Vulgaris
Which **rashes** (4) are associated with **vesicles/bullae**?	Bullous pemphigoid Pemphigus Vulgaris Necrotizing fasciitis Disseminated Gonorrhea
Which **rashes** (4) are associated with **petechiae/purpura**?	RMSF Meningococcemia DIC Endocarditis
Which **rashes** (3) are associated with **target lesions**?	Lyme disease Erythema Multiforme SJS
Signs and Symptoms, Treatment, Complications: Henoch-Schonlein Purpura (HSP)	**SSx:** typically age 4-12 years, recent URI, abdominal pain, arthralgia, and a rash (palpable purpura to buttocks and lower extremities, non-pruritic); Most commonly caused by IgA mediated vasculitis; **Tx:** supportive care. **Complications**: nephropathy, **intussusception**
Diagnosis, Treatment: Epidermoid cyst	Also known as sebaceous cyst. **Dx**: skin-colored lesion, often with central punctate area with white or yellowish waxy material. **Tx**: steroids, incision and drainage; excision. Follow up with dermatology

Musculoskeletal / Rheumatology

Bizz	Buzz
Review the **Salter-Harris classification** for pediatric fractures. Which category is most common?	"SALTR" describes the fracture in relationship to the epiphyseal plate. **I**: **S**lip; separation straight across the physis **II**: **A**bove; fx through the physis and metaphysis **III**: **L**ower; fx through the physis and growth plate **IV**: **T**hrough; fx through the metaphysis, physis, and epiphysis **V**: **ER**asure; crush injury to the physis More advanced fracture types are more likely to cause growth disturbance. **Salter Harris II** is the most common.
Cause, Diagnosis, Treatment: Torus or buckle fracture (pediatric)	**Cause:** incomplete fracture 2/2 impaction/axial load **Dx:** xray shows **buckling or bulging of the cortex** on one side of the bone without a clear fracture line; periosteum is intact; angulation may be present but is not required for diagnosis **Tx: splint** in functional position, outpatient **pediatrician** follow up
Cause, Diagnosis, Treatment: Greenstick fracture	**Cause:** incomplete fracture 2/2 impaction/axial load **Dx:** xray shows **fracture line on only one side of the bony cortex** with the opposite side bent but otherwise intact **Tx: splint**, pediatrician follow up (some sources say no follow up needed) Only manipulate if severely malaligned (<15° acceptable if <10 years old and <10° acceptable if >10 years old).
Definition, Diagnosis, Treatment: Toddler fracture	**Definition: spiral fx of distal tibia** in kids aged 9 months - 3 years who walk and fall (NOT a fracture pattern of abuse) **Dx**: xray of the tib/fib, may need oblique view if AP/Lat is negative but high suspicion (can also immobilize and f/u in 1 week for repeat imaging) **Tx**: **long leg splint** vs walking boot, next day **ortho f/u** for casting
What fracture patterns suggest **child abuse**?	Metaphyseal corner (**"Bucket handle"**) fx Rib fractures (**posterior rib fx** = pathognomonic) Fracture of sternum/scapula/spinous process **Long bone fx in nonambulatory infant** **Multiple fx in various stages of healing** Bilateral acute long bone fx Vertebral body fx without h/o high force trauma Digital fx in children <36 mo Severe skull fx in children <18 mo
What are the general sensory and motor functions of the **radial nerve**?	**Sensory:** dorsal/radial aspect of hand (**1st dorsal web space**) **Motor:** wrist and finger **extension**

What are the general sensory and motor functions of the **median nerve**?	**Sensory**: palm & palmar aspect of distal dorsal digits 1-3 **Motor: "tea drinking"** (pincer grasp, flexion at wrist & elbow, pronation)
What are the general sensory and motor functions for the **recurrent branch of the median nerve**?	**Sensory:** NONE (**pure motor nerve**) **Motor: "thumb OAF"** - opposition, adduction, flexion
What are the general sensory and motor functions of the **ulnar nerve**?	**Sensory:** ulnar aspect of palmar & dorsal digits 4-5 **Motor:** hand intrinsic muscles
What is **adhesive capsulitis**? How is it caused? How is it treated?	**Adhesions between joint capsule and humeral head** → stiffness and decreased range of motion **Causes:** injury or spontaneous **Tx:** Codman's exercises (pendulum swing with light hand weights), NSAIDs, intra-articular steroids, **NO SLING**
Cause, Signs & Symptoms, Diagnosis, Treatment: Rotator cuff injury	**Cause:** repetitive (**overuse**) movements, trauma **SSx:** shoulder pain, **cannot ABduct or externally rotate** **Dx:** xray (to rule out other injuries), outpatient MRI (ligamentous tears) **Tx: NSAIDs**, ortho referral for further care, do not place in a sling (increases the risk of developing adhesive capsulitis) *Note: rotator cuff includes SITS muscles (**S**upraspinatus, **I**nfraspinatus, **T**eres minor, **S**ubscapularis)
Diagnosis, Treatment: Clavicular fracture	Clavicular fracture is the **MC fracture in kids.** **Dx:** xray (middle ⅓ = MC location), CT only if additional injury is suspected Treatment depends on the location and severity. **Nondisplaced/minimally displaced:** supportive (sling, pain control, outpatient ortho f/u) **Skin tenting:** reduction to prevent open fx **Open fx:** admission, IV abx, and surgery
Cause, Management: Acromioclavicular joint separation	Occurs with direct blow (contact sports). **Dx**: XR: grades I-IV. **Tx**: **Mild to moderate:** sling, ortho f/u; **moderate to severe**:sling, ortho referral, surgery
What are the potential **complications** of anterior vs. posterior shoulder dislocations?	**Anterior:** injury to axillary nerve (check for sensation over deltoid); **Hill-Sachs lesion** (compression fx of posterolateral humeral head); **Bankart lesion (**tear in glenoid labrum) Hill-Sachs is the most common. **Inferior:** injury to axillary artery or brachial plexus **Others:** adhesive capsulitis (particularly with recurrent dislocations)
What circumstances increase the risk for **posterior shoulder dislocation**?	**Seizure or lightning strike** Contracting shoulder extensors will be stronger than the shoulder flexors, dislocating the shoulder posteriorly. Pt cannot externally rotate or abduct the arm. Often missed. If it presents late, DO NOT reduce. Call ortho.

What are the potential **complications** of humeral head and humeral shaft fractures?	**Head:** adhesive capsulitis (most common), avascular necrosis **Shaft:** spiral fracture → **radial nerve** injury → wrist drop, brachial artery injury, difficulty with wrist supination
Diagnosis, Treatment, Complications: Pediatric supracondylar fracture	**Dx: most common pediatric elbow fx**; xray shows abnormal anterior humeral line (should pass through middle of the capitellum), posterior fat pad (always abnormal), elevated anterior fat pad ("sail sign") **Tx:** admit any type 3 supracondylar fx (displaced anterior and posterior periosteum); posterior long arm splint for other supracondylar fx **Complications:** high risk for **brachial artery injury**, compartment syndrome/**Volkmann's contracture**
What is a **Volkmann ischemic contracture**? What fracture pattern is it commonly associated with?	Compartment syndrome of the arm → ischemic necrosis of the wrist and finger flexors in the forearm → muscles scar and contract → **wrist flexion contracture and claw-hand deformity** Commonly associated with **supracondylar fracture**.
Patient presents with elbow injury and no obvious findings on initial imaging. What **xray findings** might indicate an occult supracondylar or radial head fracture?	Anterior fat pad elevation called a "**sail sign**" (small anterior fat pad is a normal finding) **Posterior fat pad elevation** (always abnormal) Abnormal anterior humeral line (should intersect middle 1/3 of capitellum) Abnormal radiocapitellar line
What **fracture** is most commonly associated with a posterior hip dislocation?	**Acetabular fracture**
What are the potential **complications** of elbow dislocation?	2nd most common dislocated joint (shoulder = first) Posterior (ulna is posterior to humerus) > anterior **Complications**: **ulnar nerve injury** (most common), compartment syndrome, brachial artery injury (rare), median nerve injury Low threshold for CT angiography
Cause, Diagnosis, Treatment: Nursemaid's elbow	Found in children 1-3 years old. Caused by **axial traction** (e.g. parent pulls kid up by his arm) → **radial head displaced from the annular ligament** **Dx:** clinical; no XR needed **Tx:** immediate reduction with **hyperpronation and/or simultaneous supination and flexion**; monitor for normal use 30 min later

Define: Monteggia, Galeazzi, and Essex-Lopresti fracture	**Monteggia:** proximal ulnar fracture + radial head dislocation (look for radial nerve injury at radial head dislocation w/ wrist drop) **Galeazzi:** distal radial fracture + distal radioulnar joint disruption **Essex-Lopresti:** comminuted radial head crush fracture + distal radioulnar joint disruption ALL three require **open reduction and internal fixation (ORIF)**. Remember **"MUGgER"** (**M**onteggia with **U**lnar fracture, **G**aleazzi & **E**ssex with **R**adial fractures).
Diagnosis, Treatment: Nightstick fracture	**Dx: midshaft ulna fracture** 2/2 direct blow (e.g. while trying to protect oneself from being struck with a policeman's nightstick) **Tx:** r/o Monteggia fx, **posterior long arm splint**
What is the difference between a **Colles' fracture** and a **Smith's fracture**? Describe the most common **complications** and indicated **treatment** for both.	**Colles:** distal radius fracture with dorsal angulation usually 2/2 fall onto outstretched hand **Smith's:** distal radius fracture with volar (palmar) angulation, usually 2/2 fall onto back of hand **Complication**: BOTH with risk for **median nerve injury** (weak 'pincer grasp") **Tx (both):** closed or open **reduction**, **sugar tong splint**
Mechanism, Diagnosis, Treatment: Triquetral fracture	**Mechanism:** fall onto outstretched hand (**FOOSH**) → dorsal chip fracture of the triquetrum **Dx:** lateral hand xray **Tx: volar splint**, outpatient hand surgery f/u *Note: Triquetral fracture is the 2nd most common carpal bone fracture.
Mechanism, Signs & Symptoms, Diagnosis, Treatment, Complication: Scaphoid fracture	**Mechanism:** fall onto outstretched hand (**FOOSH**) **SSx: snuffbox tenderness** or pain with axial loading of thumb **Dx:** physical exam; xray may appear normal initially **Tx: thumb spica** and outpatient hand surgery f/u If there is no overt fx on xray, but suspicion remains high → **splint + repeat xray in 10-14 days** Complication: **avascular necrosis of the proximal segment**; nonunion ***Note: Most common carpal bone fracture**
Diagnosis, Treatment, Complication: Lunate fracture	**Dx:** focal tenderness of dorsal proximal hand and with axial load of 3rd digit; may have normal xray **Tx:** high clinical suspicion → place **sugar tong splint** + outpatient hand surgery f/u **Complication**: high risk of **avascular necrosis**
Diagnosis, Treatment: Scapholunate dislocation	**Dx:** >3 mm widening between scaphoid and lunate, "**Terry Thomas sign**," localized tenderness **Tx:** splint + hand surgery consultation (**usually requires surgical repair**)

Diagnosis, Treatment, Complications: Lunate dislocation	**Dx:** xray with "piece of pie sign" on AP view and "**spilled teacup**" (volar displacement of lunate) on lateral view **Tx:** splint, ortho consult for open reduction and internal fixation (ORIF) **Complications:** median nerve injury, avascular necrosis
Diagnosis, Treatment: Perilunate dislocation	**Dx: capitate is displaced dorsally** with normal lunate alignment over radius **Tx:** splint, immediate ortho consult for reduction
Diagnosis, Treatment: Boxer's fracture	**Dx:** xray with fx of **5th metacarpal** neck or shaft **Tx:** repair any rotational deformity, place in **ulnar splint**, give abx/washout if there is an associated lac/open fracture (do not close) *Note that metacarpal neck fractures require reduction with more than 30 degrees of angulation and shaft fractures require reduction with more than 20 degrees of angulation.
Identify the **site of injury** and resulting hand position in (1) mallet finger, (2) boutonniere deformity, (3) swan neck deformity, and (4) jersey finger.	**Mallet finger:** digital extensor tendon disruption ± avulsion fx, unable to extend DIP joint **Boutonniere deformity:** slip of central extensor tendon at PIP joint → PIP in flexion + DIP in hyperextension **Swan neck deformity:** PIP in hyperextension + DIP in flexion **Jersey finger:** (usually ring finger) flexor digitorum profundus avulsion 2/2 hyperextension during active flexion, unable to flex DIP
Signs & Symptoms, Diagnosis, Treatment: Gamekeeper's thumb	**Dx:** tear/sprain of **ulnar collateral ligament** **SSx:** weak pincer grasp, laxity with valgus stress **Tx: thumb spica splint**, hand surgery referral
What is a **Bennett fracture-dislocation**?	**Two-part intra-articular fracture** at the base of the **1st metacarpal** *Note: Requires surgical repair.
What is a **Rolando fracture**?	**Comminuted intra-articular fracture** at the base of the **1st metacarpal** *Note: Requires surgical repair.
Risk Factors, Diagnosis, Treatment: Carpal Tunnel Syndrome	**Risk factors:** obesity, female gender, hypothyroidism (NOT prolonged computer work) **SSx:** numbness/weakness first 1-3.5 digits, worse at night, improved with "shaking their hands out" **Dx:** median nerve compression testing (Durkan's; most sensitive test); Phalen's and Tinel's signs have poor sensitivity/specificity **Tx: wrist splint** at night, **NSAIDs**, hand surgery referral PRN *Note: Carpal tunnel is the **most common entrapment neuropathy of the wrist**, and occurs 2/2 compression of the median nerve in carpal tunnel.

What are **Kanavel's signs** for flexor tenosynovitis? What is the treatment for flexor tenosynovitis?	1. Tenderness along course of the flexor tendon 2. Fusiform ("**sausage digit**") or symmetrical swelling of the finger 3. **Pain with passive extension** 4. **Finger held in flexion**. Treatment is IV broad-spectrum antibiotics, hospital admission, and immediate hand surgery consultation for I&D in the OR.
Diagnosis, Treatment: Compartment syndrome	**Dx:** classic "6 Ps" are typically later findings; **pain out of proportion** (pain on passive stretch = earliest finding); paresthesias (loss of 2 point discrimination = most common exam finding); pallor; paralysis; pulselessness; poikilothermia Normal compartment pressure: 0-10; ischemic necrosis ≥30-40. **Delta pressure** (more reliable than direct pressure alone) = Diastolic BP - direct pressure; **≤30 consistent with acute compartment syndrome**. **Tx: fasciotomy**
Treatment: High-pressure injection injuriy	Hand **surgery** consultation for OR (even benign-appearing wounds have high likelihood of deep penetration)
What are the **contraindications** for finger reimplantation?	Mangled tissue, **>6 hr** elapsed since injury, fingertip amputation only
How should an **amputated digit** be transported?	Wrap in **saline-soaked gauze**, place in plastic bag, put bag in ice water. DO NOT put digit directly on ice - causes tissue injury.
List possible **red flag symptoms** for low back pain.	Trauma, **fever**, spinal surgery, focal **neuro deficits**, HIV/**immunosuppression**, weight loss, TB, cancer, age >55, symptoms >4 wks, **IVDU**, pain at rest or mostly in the evening, saddle anesthesia, constipation/**urinary retention**, urinary incontinence
Management: Low back pain (1) without and (2) with red flag symptoms	NO RED FLAGS: short course of pain control (**NSAIDs**); early return to work; **no imaging** or additional workup needed **+RED FLAGS: MRI**
Demographic, Signs & Symptoms, Diagnosis, Treatment, Associations: Ankylosing spondylitis	**Demographic:** age 30s-40s; male > female **SSx:** morning back pain/stiffness; **improved by motion** **Dx:** xray shows **"bamboo spine"** (fusion of vertebrae) **Tx:** physical therapy; NSAIDs **Associations: anterior uveitis** and irritable bowel; genetic link to **HLA-B27**
What finding is most **sensitive** for diagnosis of cauda equina syndrome?	**Urinary retention:** post-void residual (PVR) >50-100cc **Other SSx:** saddle anesthesia, sexual dysfunction, neuro deficits, bowel/bladder dysfunction, BILATERAL symptoms

Identify the **spinal cord level and nerve** associated with each reflex: Biceps, Brachioradialis, Triceps, Patellar, Achilles, Babinski	**Biceps**: C5, musculocutaneous nerve **Brachioradialis**: C6, radial nerve **Triceps**: C7, radial nerve **Patellar**: L3-4, femoral nerve **Achilles**: S1, tibial nerve **Babinski**: L4-5 and S1-S2, tibial nerve
Diagnosis, Complication, Treatment: Unstable pelvic fracture	**Dx:** xray shows "**open book**" fracture (complete separation of the pubic symphysis) or Malgaigne's fracture (two ipsilateral pelvic ring fractures with bilateral sacroiliac dislocation 2/2 vertical shear) **Complication:** may cause extensive blood loss, mostly posterior/retroperitoneal and venous **Tx: pelvic binder**, **angioembolization** or surgery, **blood transfusion** to temporize
What is the **key landmark** for application of a pelvic binder?	Wraps around the **greater trochanters** (often mistakenly placed higher)
Cause, Signs & Symptoms, Diagnosis, Treatment: Hip fractures	**MCC = ground level fall** **SSx:** high risk in elderly (esp. femoral neck), **intertrochanteric fx = most common** **Exam: ABducted + externally rotated + shortened (classic)** **Dx:** xray shows most; MRI if neg xray + high suspicion + unable to ambulate **Tx:** Ortho consult, open reduction and internal fixation (**ORIF**)
What is the most common type of **hip dislocation**? What associated injuries and sequelae should be anticipated?	MC = **posterior (80-90%)**; usually due to high-energy force (e.g. MVC). Posterior dislocation on exam: **hip flexed, ADducted, internally rotated & shortened** **Tx:** neurovascular compromise + obvious dislocation → reduction without delay or xray; neurovascularly intact → xray Complications: **delay in reduction >6 hrs → avascular necrosis**
What is the **timeline** for reduction of a dislocated hip? What risks are associated with delayed reduction?	Needs to be reduced **within 6 hours** (delayed reduction → avascular necrosis)
What structures are often injured in posterior and anterior **hip dislocations**?	**Posterior**: sciatic nerve injury or acetabular fx **Anterior**: femoral artery/vein/nerve injury
What **neurological findings** are most likely to present with a posterior hip dislocation?	**Sciatic nerve palsy** Peroneal branch is more likely to be injured than the tibial branch On exam: **foot drop** (weakness w/ ankle dorsiflexion and foot eversion) + decreased sensation along the entire posterior leg below the knee

What are the **Ottawa Knee Rules**?	Age >55 Isolated patellar tenderness Tenderness over fibular head Inability to flex knee 90° Inability to bear weight (4 steps) immediately after injury AND in the ED If patient meets **any** of these criteria → get **xray**
Presentation, Diagnosis, Treatment: Osgood-Schlatter syndrome	Presentation: **tibial tuberosity apophysitis** 2/2 trauma or overuse, occurs mainly in **preteens** (M>F) **Dx:** localized tenderness, no xray needed (but may show avulsion fx of the tibial tuberosity) **Tx:** rest, ice, compression, elevation (**RICE**)
Cause, Diagnosis, Treatment: Meniscal injury	Occurs 2/2 **rotational force**. **Dx:** joint line tender to palpation; feeling of **"clicking" and "locking"** with knee giving out ± knee effusion; +Apley Grind Test and **+McMurray's;** confirmed by outpatient MRI **Tx:** rest/ice/compression/elevation (**RICE**), NSAIDs, surgery (refractory sx)
Cause, Signs & Symptoms, Diagnosis, Treatment, Complication: Cruciate ligament injuries	Occurs when **pivoting** while running/cutting. **SSx: audible "pop,"** followed by knee instability, hemarthrosis; ACL tear = most common **Dx: +Lachman's test (most sensitive test)**, xray ± outpatient MRI **Tx:** non-weight bearing, ortho referral, leg immobilizer only if the joint is very unstable ACL tears are associated with **Segond fx** (avulsion at lateral tibial plateau; treated with immobilization).
Cause, Signs & Symptoms, Diagnosis, Treatment, Complications: Tibial plateau fx	Occurs with high force blow to tibia (e.g. MVC or pedestrian vs. auto). **SSx:** localized tenderness to palpation and swelling **Dx:** xray often negative, **get CT if high clinical suspicion** **Tx:** knee immobilizer, crutches (pt should be totally **non-weight bearing**), and ortho consult for open reduction and internal fixation **(ORIF)** Complications: **compartment syndrome**, popliteal artery injury
Signs & Symptoms, Diagnosis, Treatment, Complications: Knee dislocation	**SSx: 50% spontaneously relocate** prior to arrival; maintain high index of suspicion; check for bicruciate instability on exam; **most common = anterior dislocation** (tibia anterior to femur) **Dx: CTA = study of choice** **Tx:** knee immobilizer, ortho consult **Complications: popliteal artery injury**, common peroneal nerve injury (foot drop) *Note: Don't confuse with patella dislocation!
What **nerve injury** is often associated with proximal fibula and tibial plateau fractures?	**Deep peroneal nerve** Patient will be **unable to dorsiflex** and have **loss of sensation to 1st web space**.

What are the **Ottawa Ankle Rules**?	Unable to walk (4 steps) immediately after the injury AND in the ED Bony TTP over posterior medial malleolus or posterior lateral malleolus TTP of navicular or base of 5th metatarsal If patient meets **any** of these criteria → get **xray**
Which **ligament** is most commonly injured in an ankle sprain?	**Anterior talofibular** > calcaneofibular > posterior talofibular The lateral collateral ligament complex is made up by these three ligaments. The ligaments rupture in an anterior to posterior direction with spraining.
Diagnosis, Treatment: Maisonneuve fracture	**Mechanism:** ankle eversion **Dx:** xray with **medial malleolus fx** (or deltoid ligament injury) + **proximal fibular fracture** **Tx:** requires splint, non-weight bearing, and ortho referral for open reduction and internal fixation (ORIF)
Diagnosis, Treatment: Jones fracture (vs. pseudo-Jones fracture)	**Jones fracture: fx of metaphysis of the 5th metatarsal** (1.2-3 cm distal to proximal tuberosity) **Tx:** splint and non-weight bearing, usually requires **surgery** **Pseudo-Jones/dancer's fracture: due to avulsion at the base** of the 5th metatarsal **Tx:** splint and ortho follow-up, **nonsurgical**
Definition, Mechanism, Diagnosis, Treatment: Lisfranc fracture/dislocation	**Definition: unstable midfoot** due to disruption of the Lisfranc joint (arch of the foot) **Mechanism: high-energy shearing force** (e.g. falling from a horse with your foot in a stirrup) or with axial loading onto a hyper-plantar flexed foot **Dx:** xray (obtain AP/lateral/oblique films), **Fleck sign (avulsion fx of 2nd metatarsal = pathognomonic)**, consider stress view if high suspicion **Tx:** splint, non-weight bearing, and most require **surgery**
Association, Risk Factors, Signs & Symptoms, Diagnosis, Treatment: Achilles tendon rupture	**Association:** landing from jumping (e.g. in basketball) **Risk factors:** chronic steroids, **fluoroquinolones** **SSx:** audible pop over Achilles tendon, unable to plantarflex **Dx:** consider US for dx of partial tears, **+Thompson squeeze test** (most sensitive sign) **Tx: Splint in equinus** (plantar flexion), complete tears require surgery
Signs & Symptoms, Diagnosis, Treatment: Septic arthritis	**SSx:** acute joint pain (on passive ROM), erythema, warmth, swelling **Dx: arthrocentesis**; use Kocher criteria in kids (see Peds section); typically **>50k WBC's** **Tx: IV abx**, ortho consult with **surgical washout**

In a patient with septic arthritis, what are the expected findings on **synovial fluid analysis**?	Purulent/yellow/green synovial fluid **WBC >50k** **PMNs >75%** Glucose <25 Culture positive
What is the most common **location** of septic arthritis? What is the most common **cause**?	**Knee** = most common joint (50%) **Hematogenous spread** = most common **Bacterial** = most common cause Staph aureus = most common overall Neisseria gonorrhea = most common in young, sexually active adults <35
Cause, Signs & Symptoms, Diagnosis, Treatment: Osteomyelitis	**Children: hematogenous**, **monomicrobial** **Adults**: **contiguous, mono-/polymicrobial** ***S. Aureus*** = most common overall; increased risk of ***Salmonella*** **in sickle cell** **SSx:** local tenderness, warmth, erythema, swelling, systemic sx (fevers) **Dx: elevated ESR/CRP** (not specific), **bone biopsy** with bacterial culture (definitive dx), xray may show periosteal elevation or bony erosions, negative xray → can obtain MRI (more sensitive) **Tx:** IV abx, surgery consult (debridement)
Definition, Signs & Symptoms, Diagnosis, Treatment: Necrotizing fasciitis	**Definition:** rapidly progressing infxn of the fascia with necrosis of the subcutaneous tissue **Type 1: polymicrobial (most common)**, abdomen/perineum, DM2 = risk factor **Type 2: monomicrobial** (GAS = 2nd most common), extremities **SSx:** severe **pain out of proportion** to exam, **rapid progression**, **erythema** (MC finding), **crepitus**, dusky blue skin with **bullae/vesicles** **Dx: CLINICAL dx** (CT or xray may show subcutaneous emphysema) **Tx: broad spectrum IV abx** (including clindamycin for antitoxin effects) AND **surgical debridement** (definitive tx)
What is the most common **primary bone cancer**? How is it diagnosed?	**Multiple Myeloma** ("CRAB"): hyper**C**alcemia, **R**enal failure, **A**nemia, **B**one lesions/**B**ack pain **Dx:** abnormal **SPEP (M-spike)** & **UPEP (Bence-Jones protein)**, peripheral smear: **rouleaux** formation, cranial xray with "**punched out lesions**" **Complications: hypogammaglobulinemia** (leads to sepsis), **hyperviscosity syndrome** *Note: Most bone tumors are metastatic and located in the spine (prostate, breast, kidney, thyroid, skin).

Location, Signs & Symptoms, Diagnosis, Treatment: Osteosarcoma	Location: **metaphysis of long bones** (**distal femur** = most common site, tibia, humerus) Bimodal age distribution: teens & >65 years Associated with radiation for childhood cancer. **SSx:** persistent bone pain (**worse at night**) **Dx:** xray showing lytic lesion at metaphysis with **"sunburst" pattern** and/or **Codman's triangle** (elevation of periosteum at periphery of tumor); labs may show elevated Alk Phos, LDH, and ESR *Osteosarcoma is the **second most common primary bone cancer**.
What features suggest **Ewing sarcoma**?	**Painless** mass in **shaft of femur** Occurs in **adolescence** (M>F) Xray showing **"onion peel"** pattern
Describe the **crystals** associated with gout and pseudogout.	**Gout:** negatively birefringent, needle-like crystals (urate) **Pseudogout:** positively birefringent, rhomboid crystals (calcium pyrophosphate)
Signs & Symptoms, Diagnosis, Treatment: Polymyositis	Inflammation of striated muscle **SSx: proximal** limb and neck muscle **weakness**; similar to dermatomyositis but NO rash; strong association with **malignancy** **Dx: elevated ESR/CRP**, CPK, and aldolase **Tx:** high dose steroids, methotrexate
Signs & Symptoms, Diagnosis, Treatment: Dermatomyositis	Inflammation of striated muscle **SSx: proximal** limb and neck muscle **weakness**, **+heliotrope rash** around the eyes; strong association with **malignancy** **Dx: elevated ESR/CRP** and CPK **Tx:** methotrexate
Signs & Symptoms, Association, Diagnosis, Treatment: Polymyalgia rheumatica	**SSx:** bilateral, symmetric proximal (**"cape-like" distribution**) muscle weakness, **stiffness worse in AM** **Association:** temporal arteritis/**giant cell arteritis** (GCA) **Dx:** elevated ESR, rheum consultation **Tx: steroids**
Definition, Association, Signs & Symptoms, Diagnosis, Treatment: Reactive arthritis (formerly Reiter's Syndrome)	**Definition:** seronegative arthritis occurring after an infection (classically **chlamydia**) Associated with **HLA-B27**. **SSx:** conjunctivitis, urethritis, asymmetric arthritis **("can't see, can't pee, can't climb a tree"**) **Tx:** NSAIDs, physical therapy, treat underlying infection

Signs & Symptoms, Diagnosis, Treatment: Rheumatoid arthritis	**SSx: polyarticular, symmetric, deforming arthritis**; classically affecting the hands (**ulnar deviation of fingers**, Boutonniere & swan neck deformities) but **sparing the DIP joint** **Dx: elevated rheumatoid factor** (70-80%, but also present in 5-10% of healthy population) **or anti-CCP**, elevated ESR/CRP, xray showing bony destruction **Tx:** NSAIDs, **disease-modifying anti-rheumatic drugs** (DMARDs), steroids **Note: asscociated with **atlantoaxial joint instability**: DO NOT hyperextend neck with intubation**
Signs & Symptoms, Diagnosis, Treatment: Juvenile idiopathic arthritis (JIA)	**Systemic JIA** (Still's disease): SSx: **daily fever**, myalgias, polyarthritis, **"salmon-pink" rash**, anemia, thrombocytosis Dx: ANA neg, RF neg Tx: NSAIDs, steroids, methotrexate **Polyarticular JIA:** SSx: symmetric chronic arthritis, ≥5 joints, mild systemic sx, uveitis (rare) Tx: NSAIDs, steroids, methotrexate **Pauciarticular JIA:** SSx: chronic arthritis in 1-4 joints, **+uveitis** Dx: ANA pos, RF neg, ESR normal Tx: NSAIDs, steroids, methotrexate
Signs & Symptoms, Diagnosis, Treatment: Psoriatic arthritis	**SSx:** symmetric polyarthritis, **"sausage digits"** (dactylitis), nail pitting (skin lesions usually precede joint disease) **Dx:** anemia, RF usually neg, ANA pos, xray with erosion AND new bone formation, "pencil in cup" deformities **Tx:** NSAIDs, DMARDs, **NO STEROIDS (causes pustular psoriasis)**
Definition, Signs & Symptoms, Diagnosis, Treatment: Wegener's granulomatosis (granulomatosis with polyangiitis)	**Definition: medium vessel vasculitis** with **upper & lower respiratory tract** involvement + **renal failure** **SSx:** sinusitis, epistaxis, hemoptysis (pulmonary infiltrates), nephritis (hematuria), cutaneous nodules, palpable purpura **Dx: +c-ANCA** **Tx:** steroids, DMARDs
Definition, Signs & Symptoms, Diagnosis, Treatment: Goodpasture's syndrome	**Definition: small vessel vasculitis** **SSx:** cough/dyspnea, **hemoptysis** from alveolar hemorrhage, **glomerulonephritis**, hematuria **Dx: anti-basement membrane antibodies** **Tx**: steroids, DMARDs, plasmapheresis
Definition, Signs & Symptoms, Diagnosis, Treatment: Churg-Strauss syndrome	**Definition:** medium vessel vasculitis = **vasculitis + eosinophilia + asthma** **SSx:** bronchospasm, sinusitis, possible cardiac + GI symptoms **Dx:** peripheral eosinophilia **Tx:** steroids, DMARDs

Definition, Associations, Signs & Symptoms, Diagnosis, Treatment: Polyarteritis nodosa	**Definition: medium-vessel vasculitis** with multiorgan involvement but **spares the lungs** **Associations: chronic HBV**, intra-renal aneurysm, age 40-60s, M>F **SSx**: skin ulcers, nephritis, **mesenteric ischemia,** lacy rash (**livedo reticularis**) **Dx**: ESR/CRP elevation, **ANCA+** **Tx**: high-dose steroids, DMARD
Definition, Signs & Symptoms, Diagnosis, Treatment: Systemic lupus erythematosus	**Definition:** autoimmune chronic inflammatory disease with multiorgan involvement, high risk of thrombosis (ACS, PE) On test, patient will be an **African-American female**. Can be **drug-induced** ('HIPPS'): **H**ydralazine, **I**NH, **P**rocainamide, **P**henytoin, **S**ulfonamides **SSx (≥4):** classic **"butterfly" malar rash**, or discoid rash, photosensitivity, oral ulcers, arthritis, renal disease (**nephritis**), encephalopathy (seizures or psychosis), serositis (pericarditis), cytopenia (any cell line) **Dx: ANA+ (sensitive)**, **anti-dsDNA+ (specific)**, anti-Smith, antiphospholipid antibody **Tx:** NSAIDs, steroids, DMARDs
Signs & Symptoms, Cause, Treatment: Scleroderma (systemic sclerosis)	**SSx:** fatigue, stiff joints, loss of strength, pain, sleep disturbances, **CREST syndrome** (**C**alcinosis, **R**aynaud's syndrome, **E**sophageal dysmotility, **S**clerodactyly, **T**elangiectasias), renal failure (most common cause of death) presenting with HTN **Cause:** collagen deposition in skin + other organs **Tx: supportive**, rewarm digits, calcium channel blockers
Definition, Signs & Symptoms, Diagnosis, Treatment: Sjögren syndrome	**Definition: autoimmune** chronic inflammation of **salivary & lacrimal glands** **SSx:** dry eyes and **xerostomia** (dry mouth) **Dx: Anti-Ro & Anti-La antibodies**, RF+, ANA+, Schirmer's test (tests tear production) **Tx:** lubricants, pilocarpine, DMARDs
Definition, Signs & Symptoms, Diagnosis: Rhabdomyolysis	**Definition: acute necrosis of skeletal muscle** fibers & leakage of cellular contents into the circulation **Causes:** trauma, heat, alcohol/drugs, exercise **SSx:** myalgias, stiffness, weakness, malaise, and low-grade fever **Dx: elevated CK** (>5x upper limit normal), **UA (+blood, but NO RBCs)**, electrolyte abnormalities (hypocalcemia = most common, **hyperK**, hyperPhos) **Tx:** aggressive **rehydration** targeted to UOP goals, +/- bicarb infusion, +/- hemodialysis *Note: get an ECG on all patients!

Treatment: Rhabdomyolysis	**IVF with UOP 3cc/kg/hr**, ± bicarb gtt to alkalinize urine (controversial & may not be helpful) Goal is to prevent renal failure (d/t ATN). Relative endpoint is CK <1000 (although the initial CK level does not correlate with the likelihood of renal failure).
What feature of **rheumatoid arthritis** can complicate potential intubations?	**Atlantoaxial joint instability** (don't hyperextend with intubation)
Diagnosis: Non-caseating granulomas in multiple organs	**Sarcoidosis** (commonly eyes and chest, skin lesions)
What characteristic **laboratory abnormalities** may be found in a patient with sarcoidosis?	1. **Elevated ACE levels** 2. Decreased PTH 3. Hypercalcemia/**hypercalciuria**
To perform **arthrocentesis**, why is the extensor surface most commonly used?	Extensor surfaces **avoid neurovascular structures** that typically overlie the flexor aspect of joints
On fluid analysis, what **white blood cell count** indicates (1) septic joint and (2) septic bursitis?	1) Septic joint: **>50,000** 2) Septic bursitis: **>10,000**
What is the common **rotator cuff injury**?	**Supraspinatus** (responsible for first 30 degrees of abduction)
What is the most common **adult wrist fracture**?	**Colles Fracture**
Which additional **injury** is often associated with Colles fracture?	**Ulnar styloid fracture** (present in 60-70% of cases)
Which **nerve** is most commonly injured in Colles fracture?	**Median nerve**
Overuse of which **muscle group** is responsible for lateral epicondylitis (tennis elbow)?	**Extensor muscles** most commonly (extensor carpi radialis brevis)
Which lower extremity **fracture** is most commonly associated with compartment syndrome?	**Proximal tibial fracture**

Immunology

Bizz	Buzz
What is the difference between **anaphylaxis** and **anaphylactoid** reactions?	**Anaphylaxis**: IgE mediated **Anaphylactoid:** histamine release independent of IgE Both receive the **same treatment.**
Presentation, Treatment: Anaphylaxis	**Presentation: 2+ organ system involvement** (e.g., bronchospasm, hypotension, urticaria, GI sx) Usually occurs **within 60** min of exposure. **Tx: ABCs** (intubate PRN), IV, supplemental O2, cardiac monitor, **Epinephrine (1:1000) 0.3 mg IM** (not subQ), steroids, H1/H2 blockers **Refractory Tx:** epi drip, glucagon (pt on beta blockers), vasopressors
What medication should be given for a **patient on beta blockers** who develops **anaphylaxis**?	**Glucagon** (patients on beta blockers may not respond to epi)
Mechanism: Angioedema	**Hereditary:** deficiency or dysfunction of **C1-esterase inhibitor** **Drug-induced:** ACE-I/ARB, ↑ **bradykinin**
Signs & Symptoms, Treatment: Angioedema	**SSx:** painless, **non-pruritic, non-pitting edema** of skin (NO rash) May affect abdominal organs & upper airway. **Tx: supportive**, intubate prn, give standard anaphylaxis Tx (unlikely to work), **FFP (contains C1 esterase)**
Mechanism, Example: Type I-IV hypersensitivity reactions	**I**: **IgE-mediated**, requires 2 separate exposures; e.g. **anaphylaxis/urticaria** **II**: cytotoxic antibody (**IgG & IgM-mediated**); e.g. **hemolytic transfusion reaction** **III**: **IgG-immune complex** deposition; e.g. **serum sickness** & vasculitis **IV**: **T-cell mediated** (no antibodies), **delayed**; e.g. **Stevens-Johnson syndrome**, TB skin test
Diagnosis: Serum sickness	**Dx:** clinical, ↓ **C3/C4** **Type III rxn**; classically occurs after meds (PCN, sulfas)
Signs & Symptoms, Treatment: Serum sickness	**SSx: fever, rash** (fingers/toes → morbilliform), arthralgias **Tx: supportive care**
Management: s/p transplant + sick	Assume **infection** AND **rejection** (they look the same); immune response to infection may be blunted by anti-rejection meds. **Cultures** (blood, urine, sputum, +/- CSF), broad spectrum **abx**
Signs & Symptoms, Treatment: Graft versus host disease	Acute is <100 days since transplant **SSx: fever**, **rash** (most common), hypoxemia, multi-organ failure **Tx: steroids**, empiric **antibiotics**; avoid ASA and NSAIDs

What is the **best prognostic marker** for graft function after **renal transplant**?	**Creatinine** - must calculate GFR Also important: **renal US with doppler** (remember most transplanted kidneys are in the pelvis)
What are the **most likely** sources of **infection** in transplant patients in the following periods post-transplant: <1mo, 1-6mos, 6+mos?	**<u><1 mo</u>:** infection related to procedure and hospitalization such as wound infections (**Strep, Staph/MRSA**, *Pseudomonas*) **<u>1-6 mos</u>:** viruses (**CMV**, EBV) **<u>>6 mos</u>:** chronic viral infections (CMV, EBV, HSV, VZV, Hep B and C) and community acquired infections
What is the **timeline** for hyperacute vs. acute vs. chronic **rejection after transplant**?	**<u>Hyperacute</u>:** minutes to hours after transplant, 2/2 preformed antibodies causing irreversible graft destruction (esp. ABO mismatch) **<u>Acute</u>:** 1-2 wks, humoral/T-cell mediated **<u>Chronic</u>**: months to years
Diagnosis, Treatment: Pruritus and erythematous rash while receiving Vancomycin	**Vancomycin Flushing Syndrome** (previously Red Man Syndrome), **anaphylactoid** reaction **Tx: stop infusion**; **diphenhydramine**; may restart if sx resolve (to r/o anaphylaxis) at a slower rate
Signs & Symptoms, Diagnosis, Treatment: Systemic Lupus Erythematosus (SLE)	**SSx: arthritis**, **malar rash** ("butterfly rash"), fever, lymphadenopathy, weight loss, general malaise **Dx: +ANA** (sensitive)**, +anti-dsDNA Ab** or **anti-smith Ab** (specific), anti-histone Ab, thrombocytopenia On boards, patient is likely to be an African-American female. **Tx:** NSAIDs, **steroids**, **immunosuppressants**, hydroxychloroquine
What drugs/drug classes are commonly implicated in **Drug-induced Systemic Lupus Erythematosus**?	**Hydralazine**, **INH**, **Procainamide**, Phenytoin, Sulfonamides (HIPPS)
Diagnosis, Treatment: Elderly woman with monocular vision loss, unilateral HA, jaw claudication, tender temple	**Temporal Arteritis (Giant Cell Arteritis)**; associated with polymyalgia rheumatica (PMR) **Dx: ESR > 50**, temporal artery biopsy **Tx: high-dose IV steroids** ASAP (don't wait for biopsy results).
Common lab findings of **sarcoidosis**	↑↑ **ACE levels**, ↑ Calcitriol production (1, 25-dihydroxyvitamin D, active metabolite of Vitamin D), **Hypercalcemia** (MCC of acute renal failure in sarcoidosis), Hypercalciuria, ↓ PTH levels
Common presentation of **renal transplant rejection**	↑ **Cr,** tenderness around graft (likely in pelvis), ↓ **urine** output
Common presentation of **lung transplant rejection**	**Cough**, chest tightness
Common presentation of **heart transplant rejection**	**Fatigue**, decompensated heart failure, unlikely to have angina/chest pain
Common presentation of **liver transplant rejection**	Fever, **abnormal LFTs**, RUQ pain, **jaundice**
Treatment: Transplant rejection	**Steroids**

Common presentation of **Takayasu's arteritis**	**Asian** predominance, decreased/**asymmetric pulses**, aortic involvement
Infection associated with Polyarteritis Nodosa	**HBV**
Common presentation of **Buerger's disease**	**Claudication** of hands/feet, arterial ulcers Population: **Smokers**
Common presentation of **Granulomatosis with polyangiitis** (GPA)	**Upper** (otitis media, sinusitis, mucosal ulceration, epistaxis) & **lower respiratory** sx (cough, dyspnea, hemoptysis) + **renal** (renal failure, GN), **+c-anca**
Common presentation of **Microscopic polyangiitis**	**Lower respiratory** sx and **renal** dysfunction - similar to GPA but without nasopharyngeal involvement, **+p-ANCA**
Common presentation of **Churg-Strauss syndrome**	**Vasculitis + eosinophilia + asthma** AKA esinophilic granulomatosis with polyangiitis (EGPA), **+IgE**
Common associations with **Cryoglobulinemia**	**HCV**, malaise, skin lesions, arthralgias
Common presentation of **Behçet's disease**	Oral and **genital ulcers**, **pathergy** (hyperreactivity to needle sticks)
What mediastinal mass is associated with **Myasthenia Gravis**?	**Thymoma**
In a **myasthenic crisis**, what test is important to measure to determine severity?	**Forced vital capacity** and/or negative inspiratory force

Environmental

Bizz	Buzz
Signs and Symptoms, Treatment: chilblains (pernio) vs **trench foot** (immersion foot)	Both are NON-freezing cold injuries. **Chilblains:** inflammatory lesions resulting from exposure to **DRY and cold** **SSx**: red/blue edematous plaques with itchy, burning pain **Tx**: warming, drying, topical steroids **Trench foot:** nerve and tissue injury resulting from repetitive exposure to **WET and cold** temperatures→ vasoconstriction → ischemia/gangrene **Tx**: warming, drying, prevention with dry footwear
Diagnosis, Treatment: frostnip vs. **frostbite**	Both are FREEZING cold injuries. **Frostnip:** no ice formation or tissue loss **Tx**: rewarming **Frostbite:** most common freezing injury. Intracellular ice forms and causes tissue loss (can't initially distinguish the from frostnip). **Tx**: rewarming in warm water immersion in a circulating bath (37°C - 39°C), NO DRY HEAT EVER, pain control, Tdap as needed, delayed debridement **Blister treatment:** debride clear blisters, leave hemorrhagic blisters (simple wound care).
What are the **phases of frostbite**? How is **severity graded**?	**Phase I**: vasoconstriction/ice formation **Phase II**: reperfusion of warmed tissues → edema/blisters & dry gangrene Severity: graded by tissue death **Grade I**: epidermis; erythema & edema; minimal pain with rewarming **Grade II**: epidermis/dermis; hard edema + clear blisters; mild to moderate pain with rewarming **Grade III**: hypodermis; hemorrhagic blisters, pale grey extremities; severe pain with rewarming **Grade IV:** skin/muscle/tendon/bone; insensate, black/grey painless during rewarming
Distinguish the **stages of hypothermia** by the **temperature ranges and symptoms** observed.	**Mild (32-35° C)**: amnesia, dysarthria, shivering **Moderate (28-32° C)**: stupor, dysrhythmias, AMS, NO shivering **Severe (22-28° C):** dysrhythmias (susceptible to VF), loss of reflexes, pulmonary edema, cold diuresis, obtunded **Profound (9-20° C)**: flat EEG, asystole
Review **common physiologic changes** in **hypothermia.**	Hyperglycemia (don't treat initially), functional coagulopathy (clotting factors stop working), irritable myocardium, OxyHb curve shifted to left (↑ O2 affinity + ↓O2 delivery)

Review **appropriate treatment** of **severe hypothermia**.	**Temp > 30° C and hemodynamically stable**: rewarm passively (warm room, warm/dry clothes, insulating blanket) **Temp < 30° C or hemodynamically unstable**: active rewarming (Bair Hugger, hot packs, warm O2/IVF, bladder/stomach/peritoneal/chest tube lavage; ECMO is most effective) **Very unstable**: ABCs: CPR/intubation, one round of epinephrine/defibrillation while cold, rewarm to at least 32° C during arrest - "Not dead until they're warm and dead"
Pathophysiology and **prevention**: **altitude sickness**	Unclear but likely related to hypoxia causing pulmonary vasoconstriction & pulmonary hypertension → pulmonary edema; cerebral vasodilation → headaches/acute mountain sickness & ultimately altered mental status/cerebral edema. Acclimatization causes hyperventilation → respiratory alkalosis + bicarbonate diuresis. **Prevention:** acetazolamide causes bicarbonate diuresis & metabolic acidosis → triggers hyperventilation + speeding acclimatization. Note: young and healthy people are NOT protected from altitude sickness (and in fact are more likely to get it).
Signs and Symptoms, Treatment: acute mountain sickness	Most common high altitude illness. Occurs when: > 2000 meters (6500 feet). **SSx**: headache, nausea/vomiting, anorexia, insomnia **Tx**: **stop ascent**, supportive care (fluids, analgesia, antiemetics), acetazolamide/steroids, descent if possible
Signs and Symptoms, Diagnosios, Treatment: high altitude pulmonary edema (HAPE)	Most common lethal altitude illness. Occurs when: > 3000 meters (9500 feet). **SSx:** initial (2-4 days at new altitude): cough, dyspnea on exertion. Progresses to **dyspnea at rest** (classic), pink-frothy sputum, ↑HR, ↑RR, fever, hypoxia **Dx**: CXR with patchy alveolar infiltrates (ARDS-like) **Tx: Immediate descent**, supplemental oxygen, nifedipine or tadalafil (for pulmonary hypertension), portable hyperbaric chamber **Acetazolamide is NOT helpful in acute illness**
Diagnosis, Treatment: high altitude cerebral edema (HACE)	Most severe altitude sickness but uncommon. Occurs when: > 4500 meters (14000 feet). **SSx: ataxia** (early and most sensitive finding), encephalopathy, severe lassitude, altered mental status, seizure **Tx** : requires immediate treatment, **descent = definitive** (best when patient is still ambulatory), supplemental O2, steroids (rescue treatment), portable hyperbaric chamber (e.g. Gamow bag)

What causes **barotrauma** (diving) related illness?	Illness secondary to descent/ascent. Explained by Boyle's Law (gas volume = 1/pressure). Volume change is greater closer to surface (rapid change of 30 feet near surface worse than deeper down).
Review injuries related to **descent (localized "squeeze")** and appropriate **treatment.**	**Barotitis Externa:** edema and hemorrhage to external auditory canal secondary to blockage Tx: cortisporin, dry ear precautions **Barotitis Media:** most common diving related disorder SSx: pain, vertigo secondary to TM rupture Tx: decongestants, antibiotics, dry ear precautions **Barotitis Interna:** rupture/bleeding of round window SSx: **decreased hearing**, vertigo, nystagmus Tx: ENT consult/evaluation **Sinus squeeze:** frontal sinus is most commonly affected. Sinuses = second most common cause "squeeze" injuries. SSx: edema, pain, epistaxis Tx: decongestants **Mask squeeze:** petechiae and subcutaneous hemorrhages
Review injuries related to **ascent (localized "reverse squeeze")** and appropriate **treatment.**	**Barodontalgia**: air in dental cavity/filling expands with ascent and causes pain, tooth may fall out. **GI barotrauma:** excess intraluminal gas causes burping/flatus. **Pulmonary Overpressurization Syndrome ("POPS"):** pulmonary alveolar rupture → pneumomediastinum, ± pneumothorax SSx: crepitus, SOB, chest pain Tx: supplemental O2, supportive (needle decompression as needed) **Arterial Gas Embolism** ("AGE"): rupture of air or nitrogen into pulmonary vein + left heart → enter circulation → systemic emboli SSx: **LOC on ascent OR within 10 minutes of surfacing**; can cause ACS, CVA, etc Tx: 100% O2, supine positioning, **hyperbaric O2 therapy** *Note: POPS & AGE are caused by **ascending without exhaling**
What causes **dissolved gas (diving)** related illness?	Illnesses related to gas in tissue. Explained by Henry's law (↑ pressure → ↑ gas pushed into solution).
Review **illnesses related to dissolved gas** while diving and **appropriate treatment.**	**Nitrogen narcosis:** "rapture of the deep" (> 30 meters/100 feet). Breathing nitrogen at high partial pressures leads to ↑ nitrogen in CNS with anesthetic. SSx: acts drunk & dumb, may drown due to confusion/behavior **O2 toxicity**: ↑ pO2 with depth causes toxicity, usually with deep diving or using Nitrox SSx: muscle spasm, nausea, vision changes, **seizure** Tx: ascent or can prevent by decreasing %O2 in tank

Describe the **two types of decompression sickness** and their **treatment.**	**Decompression sickness (DCS):** results from nitrogen dissolved in tissue under pressure precipitating out of solution (joints, lungs vessels) and forming bubbles during decompression. Risk factors: depth of dive, rapidity of ascent, multiple dives, air flight soon after dive. **Type I**: musculoskeletal symptoms (most common: arthralgia/myalgias; most common affected shoulders and elbows ("The Bends"), cutis marmorata rash due to lymphatic obstruction **Type II**: pulmonary: dyspnea, chest pain, cough ("The Chokes"); neuro: vertigo, tinnitus, ataxia ("The Staggers"); spinal cord: paralysis, paresthesias; derm: pruritus, burning ("Skin Bends") **Tx**: supportive (IVF, O2, ASA), hyperbaric O2 (must do this quickly) **Prevention**: slow ascent with frequent stops (Navy dive tables)
What is the **key to diagnosis** of **arterial gas embolism** vs **decompression sickness**?	**Timing** - **arterial gas embolism symptoms** occur within **minutes** of surfacing, **decompression sickness** within **hours.**
Diagnosois, Treatment: heat syncope	**Dx:** standing in heat with peripheral pooling due to vasodilation and decreased preload causes syncope. **Tx:** passive cooling, fluids
Diagnosis, Treatment: heat cramps	**Dx:** muscle spasms due to dehydration and electrolyte depletion **Tx:** rest, passive cooling, fluid replacement, salt replacement
Diagnosois, Treatment: heat exhaustion	**Dx:** flu-like symptoms. **No CNS changes**. Core temp usually < 104° F. **Tx**: passive cooling, rest, IVF, replete electrolytes.

Signs and Symptoms, Diagnosis, Treatment: heat stroke. Discuss **classic** vs **exertional** types.	Due to failure of thermoregulatory mechanisms, mortality 30-80%. **SSx: CNS dysfunction** (AMS, seizure, ataxia) + temp usually > 104° F. Labs: LFTs universally abnormal, renal failure, DIC, rhabdomyolysis, ATN, pulm edema Types: **"Classic"**: nonexertional, minor dehydration, higher mortality, due to high ambient temperature and poor thermoregulatory function, usually in elderly **SSx**: dry skin, AMS "**Exertional**": young athletes strenuous exercise in hot environment, higher morbidity **SSx**: sweaty, profound dehydration, hypoglycemia **Tx: rapid evaporative cooling is BEST** (spray lukewarm water on body and use fans to help evaporate - cold water can cause shivering - prevent with low-dose benzodiazepiness or thorazine), ice packs, cold water GI lavage if intubated, IVF (small if "classic," more if "exertional"), AVOID pressors, **STOP COOLING at 39° C to avoid hypothermia oveshoot** *Note: aspirin & tylenol do NOT help - the problem is hyperthermia, not fever.
When treating **heat stroke**, at what **temperature** do you **stop active cooling measures**?	**39° C** to avoid hypothermia overshoot
What are the **key differences** between **heat exhaustion** and **heat stroke**?	**Heat exhaustion:** temperature < 104° F, flu-like symptoms, NO neurologic symptoms **Heat stroke:** temperature > 104° F with neurologic symptoms
Describe how to **differentiate** and **treat** the **different degrees of thermal burn injury.**	**1st degree:** superficial, epidermis SSx: sunburn, redness, blanching, pain, no blisters (does NOT count towards TBSA) Tx: NSAIDs **2nd degree:** partial thickness, upper dermis SSx: blistering with pain, intact sensation Tx: NSAIDs, topical antibiotics **3rd degree:** full thickness, hypodermis; charred insensate, eschar formation Tx: skin grafting **4th degree:** deep tissue, muscle/tendon/bone; painless Tx: skin grafting
Review how to use **Rule of 9's (**in adults) to calculate **TBSA** for burns.	9%: head, each arm 18%: entire leg, front of torso, back of torso 1% adult palm, child's entire hand, perineum **Only counts 2nd-4th degree burns**

Review **appropriate fluid resuscitation** in **thermal burns** using the **Parkland Formula.**	Resuscitation volume = **4 mL/kg x TBSA% x weight (kg)** Tx: LR, 50% in first 8 hours since time of burn, 50% over next 16 hours **UOP goal 0.5-1 mL/kg/hr** Children: resuscitation volume above + maintenance IVF; dextrose containing fluids for age < 5 **Note:** the Parkland Formula is HIGHLY tested, but Burn Surgeons now favor Brooke Formula for adults, and in particular, using UOP to guide fluid resuscitation.
Review **appropriate fluid resuscitation** in **thermal burns** using the **Brooke Formula.**	Resuscitation volume = **2 mL/kg x TBSA% x weight (kg)** Tx: LR, 50% in first 8 hours since time of burn, 50% over next 16 hours **UOP goal 0.5-1 mL/kg/hr**
Signs and Symptoms, Treatment: Inhalation injury	Higher risk if enclosed space; inhaled toxins cause edema & loss of surfactant. **SSx:** cough, stridor, hypoxia, carbonaceous sputum but symptoms are often delayed **Tx**: intubate early due to anticipated airway edema. Also consider cyanide and carbon monoxide exposure, traumatic Injuries, rhabdomyolysis (esp. with electrical burns or 4th degree thermal burns, DIC)
Review **key components** of **treatment** of **thermal burns.**	Intubate early if needed (e.g., inhalational injury), IVF per Parkland formula, check for associated traumatic injuries, update tetanus, keep warm, and provide wound care; no need for prophylactic antibiotics.
Appropriate **management** of **restrictive full thickness burns** (respiratory compromise or decreased peripheral perfusion)?	Immediate **escharotomy.**
What are **indications** for **referral to a burn center**?	2nd degree/partial thickness burns > 10% TBSA; ANY 3rd/4th degree/full thickness burn; Burns involving hands, feet, genitals/perineum, face, major joints; Electrical/chemical/inhalational burns; all circumferential burns; patients with significant comorbidities.
What is the **appropriate treatment** for **tar burns**?	Cool tar with cold water to harden it and limit tissue damage. Remove with emulsifier (oils, butter, mayonnaise, neosporin, mineral oil). Needs to return to rinse in 24 hours, **do not peel off - this worsens damage.**
Review the **key differences** between **high** and **low voltage electrical injuries.**	Voltage = Current x Resistance. Household circuits are low voltage (110 V) but more accessible; high voltage/industrial (1000 V) is more dangerous. Electricity will travel the path of least resistance (preference for nerves, blood vessels, wet skin). Damage is therefore usually deep with little evidence of surface damage. Most damage is secondary to heat produced by resistance (bone, tendon).

Review the key differences between **alternating current (AC)** and **direct current (DC) electrical injuries.**	**AC:** more lethal; more extensive - 1,000-10,000 volts; back-and-forth current; electrical outlets - Symptoms include: sustained contractions (tetany): flexor > extensor → draws person to source, posterior shoulder dislocation; V Fib; burns - Myoglobinuria/fasciotomy: common **DC**: - 10 million - 2 billion volts; single direction; batteries/lightning - Single powerful muscle spasm with blow back → traumatic fracture as thrown from source; asystole (acts like defibrillator) - Myoglobinuria/fasciotomy: rare
Review **primary clinical concerns** with **electrical injuries.**	Arrhythmia/asystole, deep burns, rhabdomyolysis, associated trauma, vascular spasm and thrombosis, AMS/seizure, and delayed peripheral neuropathies.
Review **appropriate management** of **electrical injuries.**	**Low voltage:** Asymptomatic → home without testing Mild symptoms → cards monitor, ECG and UA (rule out rhabdomyolysis) → d/c if normal. **High voltage:** ALL patients: labs, UA, CPK, CT Head if AMS, tetanus for burns, admit.
Review **clinical concerns** and **appropriate treatment** for **pediatric commissure burns of the mouth.**	Association: kid chews on cord and gets burns at corner(s) of mouth. **Concern for delayed bleeding of labial artery** (day 5). Safe for discharge if no LOC, no other injury, normal ECG, tolerating PO and reliable parents - **instruct parents to hold pressure and return if delayed bleed occurs**. Patient will need outpatient follow up with plastics/OMFS for wound check and further care.
Review the general **pathophysiology** and **signs/symptoms** of **lightning injuries.**	Large DC voltage → asystole + apnea. Other signs and symptoms: steam burns, TM rupture (classic), superficial fern-shaped/branching burns (Lichtenberg figures), associated trauma, delayed cataracts.
How does **disaster triage** differ in **lightning strikes**?	Patients that are **apneic** and **pulseless** after a lightning strike are **treated FIRST** because they can survive with rescue breathing (otherwise black tagged in MCI triage).
Diagnosis, Treatment: leg numbness/weakness and cyanosis after lightning strike	**Dx: Keraunoparalysis**: current goes up one leg and down the other causing vasospasm and neuroparalysis **Tx**: spontaneously resolves after 6hr
What **skin finding** is pathognomonic for **lightening injury**?	**Lichtenberg figure:** superficial burn or feather pattern from "electrical shower"; usually resolves within 6 hours.

What is the **usual cause of death** in **submersion** injury?	Breath holding → involuntary gasp → aspiration / laryngospasm / loss of conscioussness → active aspiration of fluid → loss of surfactant / hypoxia / ARDS → death. Also causes airway obstruction and metabolic acidosis (most common abnormality), delayed pneumonia. Consider associated trauma.
What is the **mammalian diving reflex**?	More common in children. Sudden submersion in cold water causes bradycardia, blood shunting to CNS, and slowed metabolism. ***This is why infants with SVT respond to ice bags to the face***
What is the **appropriate treatment** for **submersion/near drowning**?	**Asymptomatic:** monitor for 4-6 hours then likely discharge home **Mild symptoms:** normal SpO2 & CXR → home after 4-6 hour observation **Moderate symptoms:** hypoxia or abnormal CXR → admit for observation **Apneic, unconscious, severe respiratory distress:** apply BiPAP or intubate, consider ECMO, warm → admit to ICU
What is the difference in affect on the body between **alpha**, **beta** and **gamma rays**?	α- & β-particles = subatomic particles emitted during radioactive decay **α-particles:** larger, do not penetrate clothing or skin, dangerous if inhaled or ingested **β-particles**: smaller, can penetrate superficial skin layers **Gamma rays:** high energy electromagnetic radiation, dangerous in any form of exposure because they can penetrate tissues very deeply
What **body systems** are affected by **whole-body radiation exposure** at different levels?	**Hematopoietic syndrome:** > 2 Gy, first to show injury, most sensitive organ system **SSx:** pancytopenia (**lymphopenia first**) & infection; onset < 2 days **GI syndrome**: 2nd most sensitive system, > 6 Gy **SSx**: nausea, vomiting, diarrhea, GI bleed; onset hours **CV/CNS syndrome**: >10Gy **SSx**: dizziness, LOC, ataxia, coma, cerebral edema, CV failure
Which **lab test** is **most prognostic** in patient's with **acute radiation syndrome**?	**Absolute Lymphocyte Count at 48 hrs** is key to prognosis > 1500 indicates good prognosis < 1500 indicates significant exposure < 300 is expected to be lethal
Which **medication** can be **taken before inhaled/ingested radioactive iodine** to prevent thyroid cancer?	Potassium iodide.
What is the **correct approach** to **decontamination** of patient exposed to **radiation**?	Remove clothing (90%), wash with soap/water, don't abrade skin.

Which **bacteria** cause **infection** in **human, dog, and cat bites** and what is the **correct antibiotic therapy**?	**Human:** *Eikenella corrodens* (Think HACEK bacteria); **Dog & cat:** *Pasteurella multocida*. **Tx**: amoxicillin-clavulanate or ampicillin-sulbactam; 2nd line: doxycycline. Dog bites cause crush injuries; cat bites cause puncture wounds (caution near joints), but have equal rates of infection.
Which **infection** is **most concerning a**fter a **primate bite**? What are the **symptoms** and **treatment**?	Primates carry herpes simiae ("B virus"). Fatal in humans if not treated early. **SSx:** paresthesias (early) followed by vesicular rash and encephalitis **Tx**: IV acyclovir
Appropriate **management** of **dog bites**?	Thorough **irrigation** and **decontamination**. Rule out retained FB and underlying fracture. Consider closure for bites to the face within 6 hours of injury. No closure if crush wound or wound on the hands/feet. May consider closing large gaping wounds outside the face with loose sutures. Antibiotics: augmentin or doxycycline. Tetanus update.
Which **type of arthropod bites/stings** are most concerning?	**Hymenoptera** (bees, wasps, hornets, ants): venom contains histamine and proteins potentially leading to anaphylaxis.
Review the following sting reactions: **local**, **toxic**, **anaphylactic**, **delayed.**	**Local:** redness, swelling, pain (e.g. typical bee sting) **Toxic:** > 10 stings (killer bees, fire ants), syncope, headache, nausea/vomiting; can resemble anaphylaxis but WITHOUT generalized hives/edema or bronchospasm **Anaphylaxis:** onset within minutes, includes bronchospasm, hypotension, urticarial rash **Delayed**: like serum sickness with arthralgias, fever, malaise, occurring 1-2 weeks later
What is the **appropriate treatment** for **Hymenoptera stings**?	Remove stinger (with tweezers - all venom is already injected), wound care, diphenhydramine, NSAIDs, steroids, and epinephrine (0.3-0.5 mg 1:1000 IM) for anaphylaxis or systemic symptoms. Infection is uncommon so empiric antibiotics are not necessary (though initially stings may look infected).
Signs and Symptoms, Treatment: brown recluse bites	**Brown recluse (***Loxosceles*): "violin" on back, warm/dry places in southern American Midwest; they tend not to be aggressive (hence the name) **SSx:** painless bite, venom is cytotoxic → local tissue destruction (necrotic ulcer is classic), rarely hemeatologic abnormalities (hemolysis, DIC) **Tx**: supportive (wound care), tetanus, NO antivenin

Signs and Symptoms, Treatment: black widow bites	**Black widow** (Latrodectus): yellow/red "hourglass" on belly, warm/dry places across the US; they tend to be more aggressive **SSx**: painful bite, venom is neurotoxic → ACh + NE release → painful muscle cramping (can mimic acute abdomen), CNS excitation, sweating **Tx**: supportive (opioids, benzos), antivenin only for severe pain (risk of anaphylaxis)
Signs and Symptoms, Treatment: scorpion stings	**Bark scorpion** (*Centruroides*): most venomous, resides mostly in Arizona. Small scorpions are worse, stings usually occur at night. Venom is neurotoxic (ACh + NE release). **SSx:** local sx (**heightened sensitivity to touch** = pathognomonic), sympathomimetic symptoms (hypertension, tachy, hypersalivation, bronchoconstriction), CNS symptoms (roving eye movements, bulbar neuropathies), somatic effects (fasciculations, muscle spasm) **Tx**: supportive (opioids, benzodiazepines), intubate as needed, atropine for secretions, antivenom as needed. Most likely fatal in children.
Distinguish **signs and symptoms** of **Crotalid** vs. **Elapid snake bites.**	***Crotalidae*** ("pit vipers" = rattlesnakes, copperheads, cottonmouths): most US envenomations, ~25% are dry bites. Venom types: cytotoxic & hemolytic. **SSx**: local: painful, edema/erythema/bullae, compartment syndrome; systemic: paresthesias, metallic taste; hemeatologic - coagulopathy, DIC, thrombocytopenia ***Elapidae*** (coral snakes, sea snakes): "Red on yellow, kill a fellow" is true in US only. Snake must hang on and "chew" to inject venom but you don't usually see bite marks. Venom type: neurotoxic (inhibits ACh receptors). **SSx**: broadly think neuro symptoms: bulbar palsies, respiratory paralysis.
Distinguish **treatment** of **Crotalid** vs **Elapid snake bites.**	**Crotalid Rx**: local wound care, supportive care, frequent coag checks, update tetanus, consider antivenom for moderate to severe envenomations (CroFab- from sheep, allergic reactions not common). **Elapidae Rx:** admit ALL for monitoring of delayed neuro symptoms, antivenin for eastern coral snakes, intubate and give supportive care as needed.
Diagnosis, Treatment: Crotalid compartment syndrome	Rare. Only occurs with bite into deep compartment, causing classic "5 Ps" **Tx:** antivenin and more antivenin, NOT surgery (unless progressive despite antivenin)
What is the **correct advice** for **initial first aid** (prior to ED) **for snake bites**?	**Get away from snake** (don't try to catch it), **immobilize extremity**, compression (air splint or elastic bandage). **NO tourniquet** unless it is possibly a coral snake bite with neurotoxic venom. Do not try to suck the venom out of the wound.

When should **CroFab** be given and **what is the appropriate administration?**	Severe symptoms after suspected Crotalid bite. CroFab causes less anaphylaxis than previous versions. Dosing is based on amount of venom, not patient weight. Typically 4-6 vials (slow over 10 minutes to monitor for anaphylaxis then give the rest over 1 hour), titrate doses to arrest of symptoms (mark skin, repeat labs), monitor for possible rebound.
Signs and Symptoms, Treatment: infection by marine microorganisms including *Erysipelothrix*, *Mycobacterium marinum* and *Vibrio vulnificus*	***Erysipelothrix*:** Gram positive rod in saltwater **SSx**: "erysipeloid" cellulitis **Tx**: ciproflocacin or penicillin/cephalosporin ***M. marinum*:** acid-fast bacillus in salt water **SSx**: "fish tank granuloma" nodules/papules in areas exposed to water weeks after cleaning a fish tank **Tx**: clarithromycin + ethambutol (TB meds) ***V. vulnificus*:** Gram negative rod in saltwater, ingestion of oysters or exposure to salt water **SSx**: hemorrhagic bullae, necrotizing fasciitis, primary septicemia (e.g. cirrhotic patient eats raw shellfish) **Tx**: ceftriaxone + doxycycline
Treatment: jellyfish envenomations (stings)	*Cnidaria*: sea anemones, fire coral, jellyfish, box jellyfish, portuguese man-of-war. Contain nematocysts: venom causes localized pain (most common symptoms), erythema, pruritus, arrhythmia (systemic). **Tx**: deactivating with **HOT SALTWATER** (not freshwater), topical lidocaine, scrape off nematocysts, give antivenom if box jellyfish.
What is the appropriate **treatment** of **marine vertebrate wounds** (e.g. stingrays, lionfish, stonefish)?	Provide local wound care, give antibiotics (cephalexin/doxycycline), rule out retained foreign body, HOT water immersion (>113° F (45° C) deactivates heat labile toxin), no acetic acid; do NOT close wounds.
Signs and Symptoms, Treatment: ciguatera vs. scombroid	**Ciguatera**: eating eel, barracuda, amberjack, snapper; **SSx**: vomiting, diarrhea, paresthesias, ataxia, hot/cold temperature reversal; **Tx**: supportive, anti-emitics, atropine (for bradycardia), mannitol if severe neuro sympoms **Scombroid**: improperly stored fish (Tuna, mahi-mahi, mackerel), peppery taste, histamine-mediated reaction; **SSx**: within one hour of ingestion, flushing, urticaria, palpitations, dizziness, headache; **Tx:** antihistamines, consider epinephrine/albuterol if respiratory difficulty
What are **medication options** for treating **neurologic symptoms** of **ciguatera** poisoning?	Amitryptiline and gabapentin
How do **Tarantula bites** present?	Mostly pain with very little swelling at the bite site. They have “urticating hairs” which can cause localized allergic reactions.

Psychiatry & Behavioral

Bizz	Buzz
Define **Axis 1-5** (these are not present in DSM-5, but may still be tested)	**Axis 1:** psychiatric disorders. **Axis 2:** personality disorders and intellectual disability. **Axis 3:** medical conditions such as Alzheimer's. **Axis 4:** environmental and psychosocial factors such as homelessness which result in mental health disorders. **Axis 5:** global assessment of functioning
What is the difference between **substance addiction** and **dependency**?	**Addiction**: compulsion to use substances despite adverse consequences (e.g. car crash, arrested, fired). **Dependency**: difficulty functioning without the substance, may have tolerance, withdrawal, and social retreat.
What are the key differences between **anorexia nervosa** and **bulimia nervosa**?	**Anorexia nervosa:** restriciton of calorie intake relative to needs, intense fear of weight gain, and calorie restriction rather than purging. Associated with successful suicide, bradycardia (**dysrhythmia = MCC death**), 50% good outcome. **Bulimia nervosa:** binge eating with purging cycle, often normal weight, purging type vs non-purging type, more likely to attempt suicide (usually not successful), overall better prognosis.
What are some potential **side effects** of **frequent purging**?	**Russell's sign** (lesions on knuckles from sticking fingers in throat to activate gag reflex, may swallow toothbrush for same reason), oral lacerations, **Mallory-Weiss tears**, poor dentition secondary to stomach acid exposure.
What are the classic electrolyte abnormalities associated with **eating disorders**?	Starvation ketosis, **metabolic alkalosis**, ↓ Na/Cl/K/Mag/Phos
What is the appropriate **treatment** for **Anorexia vs Bulimia**?	**Anorexia:** IVF, electrolyte repletion, admit for refeeding, avoid TPN **Bulimia:** CBT + SSRI. (Bupropion is contraindicated as it lowers the seizure threshold)
What SSx typically distinguish **psychiatric and medical (organic) causes of psychosis**?	**Psychiatric:** auditory hallucinations, flat affect, intact orientation, symptoms are continuous, younger patient, gradual onset, negative symptoms **Medical:** visual hallucinations, labile affect, ± disoriented, symptoms wax and wane, older patient, abrupt onset
What are the classic **positive** and **negative** symptoms of **schizophrenia**?	**Positive:** hallucinations, delusions, disorganized speech, catatonia **Negative:** blunted/flat affect, poverty of speech, anhedonia, social withdrawal
Signs & Symptoms,Treatement: Bipolar disorder	**SSx:** Mania (or hypomania) + depression, often comorbid with SI and substance abuse. Disorder is thought to have heavy genetic component with environmental influences. **Tx:** mood stabilizers (e.g. lithium, valproate) and antipsychotics (if psychotic features are present)
What distinguishes **mania** from **hypomania**?	**Mania**: at least 1 week **Hypomania**: 4 consecutive days

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What are the **criteria** for diagnosis of **depression**?	**Depressed mood for 2 weeks** + **4 of "SAD CAGES"** (changes in **S**leep, changes in **A**ppetite, **D**epressed mood, poor **C**oncentration, decreased **A**ctivity, feelings of **G**uilt/worthlessness, decreased **E**nergy, **S**uicidal ideation)
What are significant **risk factors** for **completed suicide**?	**"SAD PERSONS"**: **S**ex (male), **A**ge (<19 or >45), **D**epression (or hopelessness), **P**revious attempt (**most concerning risk factor**), **E**xcessive alcohol or drug use, **R**ational thinking loss (e.g. 2/2 psych dx, dementia, etc.), **S**eparated (divorced or widowed), **O**rganized (or serious) attempt, **N**o social support, **S**tated future attempt Protective: marriage, pregnancy
Do **no self harm contracts** work?	No
What is the most common **method** of **attempted** and **completed suicides**?	**Attempted**: girls/women, drug ingestions (MC: antidepressants) **Completed**: boys/men, firearms. **Note**: check **acetaminophen level** on all overdose/SI patients
What distinguishes **malingering**, **factitious disorder**, and **somatoform disorder**?	Diagnosis is based on intention and objective. **Malingering: Intentional** symptoms + **gainful incentive** (e.g. drugs, money, bed) **Factitious disorder: Intentional** symptoms + **"sick role" incentive** (e.g. Munchausen syndrome) **Somatoform: Unintentional** symptoms + no incentive.
Diagnosis: Kid with unusual presentation of disease, biological mom happy with abnormal results	**Factitious disorder imposed on another** (Formerly Munchausen by proxy)
How is **Generalized Anxiety Disorder** characterized?	Frequent and prolonged periods of **worry** and **anxiousness** (**> 6 months**)
How is **Panic Disorder** characterized?	**Sudden, brief episodes of intense fear** that are associated with **somatic complaints** including nausea, vomiting, diaphoresis, tremor and paresthesias. Make sure to exclude medical causes (e.g. hyperthyroidism, PE, MI).
What is **agoraphobia**?	Specific **fear** of **open/public place**.
What is a **specific phobia**?	Clinically significant **anxiety** or **worry** that develops in response to a **specific situation** or **object leading to avoidance behavior**

What distinguishes the anxiety-related symptoms of **PTSD**, **OCD**, **GAD**, **panic disorder**, **agoraphobia**, **social phobia**, and **specific phobia**? What is the **treatment** for all?	**PTSD:** long-lasting **anxiety response following a traumatic/catastrophic event**; SSx: **sx > 1 month**, flashbacks, hypervigilance, insomnia, poor concentration, irritable with angry outbursts. **OCD:** recurrent thoughts, images or urges (**obsessions**) and repetitive acts (**compulsions**). **GAD**: extreme multifaceted and **uncontrollable worrying** most days for **> 6 months**. **Panic disorder**: **frequent panic attacks**, at least some of which are not triggered. **Agoraphobia: panic attacks** triggered by being in (or the expectation of being in) **situations that are difficult to escape** (e.g. crowds). **Social phobia**: **panic attacks** or excessive fear triggered by anticipating or being in **situations of social scrutiny**. **Specific phobia: panic attack** + **specific fear** (e.g. snakes, spiders, enclosed spaces). Tx: **cognitive behavioral therapy (CBT) and SSRI**; **Benzos** can help **abort** panic attacks.
Patient with a **panic attack hyperventilates and syncopizes**. What **lab value** and resultant physiologic response is associated with this phenomenon?	**Hypocarbia** → **respiratory alkalosis** → **cerebral vasoconstriction.** The **alkalosis** also causes **increased serum calcium binding** → decreased serum calcium → **tetany**
What is the difference between **delirium** and **dementia**?	**Delirium:** secondary to medical problem/drugs/tox; **rapid onset**, **symptoms fluctuate**, last hours to weeks, impaired attention/alertness/orientation, sleep-wake cycle disrupted, agitated, incoherent speech, +delusions/hallucinations. **Dementia:** gradual onset, **slow decline**, lasts months to years, attention intact (early in disease), sleep-wake normal, normal alertness, orientation intact (early in disease), behavior normal, word-finding problems, perceptions intact (early in disease)
Diagnosis: Patient suddenly unable to recall where he lives, but has no other neurological signs and symptoms?	**Transient global amnesia.** Temporary disruption of short-term memory loss. NOT an infarct (no sensory/motor deficits). **SSx:** sudden onset, patient often repeats questions. Workup negative **Tx:** self-resolves without intervention
Signs & Symptoms, Treatment: Delirium tremens	**SSx:** Severe ETOH withdrawal sx + autonomic instability + hallucinations + delirium + seizures. Peaks 2-5 days (~72 hours) after EtOH cessation **Tx:** Benzos, phenobarbital

What **prophylaxis** should be offered to patients after **sexual assault**?	**Emergency contraception** (e.g. Plan B) **STD prophylaxis** (don't test due to legal implications for patient), treat empirically with antibiotics for Gonorrhea/Chlamydia/Trichomonas **HBV vaccine** **HIV post-exposure prophylaxis** (do not give HIV PEP or Plan B after 3 days because ineffective)
Five clinical features of **psychosis**	1. Delusions 2. Disorganized thinking 3. Hallucinations 4. Negative symptoms 5. Grossly disorganized or abnormal motor behavior
Distinguish **flight of ideas** and **disorganized thinking**	**Flight of ideas**: seen in **mania**. They frequently shift from one topic to another with continuous, accelerated speech pattern **Disorganized thinking**: seen in **psychosis**. Inferred from speech, answers are loosely related or unrelated, switches from one topic to the other, word salad (disorganized and incomprehensible speech)
What is the difference between **paranoid**, **schizoid**, and **schizotypal** personality disorders? (**Cluster A**: **"weird"**, odd, and eccentric)	**Paranoid:** suspicious of others **Schizoid:** social detachment with restricted emotions (isolated, think hermit) **Schizotypal:** social detachment with eccentric behavior (e.g. magical thinking)
What is the difference between **histrionic**, **narcissistic**, **borderline**, and **antisocial personality disorders**? (**Cluster B**: **"wild"**, dramatic, emotional, erratic)	**Histrionic**: excessive emotional lability & attention-seeking behaviors. Often sexually provocative. **Narcissistic:** grandiose, constant need for admiration, lacks empathy **Borderline:** unstable relationships, labile affect/mood, poor self-image, impulsive, demonstrates **splitting** (quickly regards others as the "worst" or "best" person ever) **Antisocial:** disregard for rights of others, frequent lying/cheating/stealing (associated with malingering)
What is the difference between **avoidant**, **dependent**, and **obsessive-compulsive personality disorders**? (Cluster C: **"worried"**, anxious or fearful)	**Avoidant:** social withdrawal (awkward/uncomfortable in social situations), constantly feels inadequate, hypersensitive to criticism (Key: avoidaint **wants social interaction** but is afraid due to fear of embarassment) **Dependent:** indecisive (and needs others to make decisions), lacks self confidence, submissive **Obsessive-compulsive:** perfectionism/order valued over flexibility/efficiency **Passive-aggressive:** forceful, stubborn, dependent on others

What is the difference between **somatization**, **hypochondriasis**, **conversion disorder**? (psychosomatic disorders, all unintentional)	**Somatization:** physical complaints unexplained by medical workup, multiple different symptoms of multiple different systems (GI, GU, neuro) with unexplained cause, often affects life **Hypochondriasis (Illness Anxiety Disorder):** preoccupation with and fear of disease, conviction one is sick, symptoms out of proportion to clinical findings, often displays "doctor shopping" **Conversion disorder:** SUDDEN unexplained neuro symptoms (e.g. blindness, paralysis), often but not always in response to an emotional stressor. **MUST rule out organic disease in all before making these diagnoses.**
What is the **most common personality disorder**?	**Borderline** (Cluster B)
Diagnosis: Patient with wide variety of complaints, complicated medical history, no clear cause of symptoms	**Somatization disorder**
Diagnosis: Patient intentionally fakes symptoms (e.g. seizure with quick return to baseline and normal lactate) with goal of hospital admission and workup	**Malingering**; often present over the weekend or after hours
Diagnosis: Sudden paralysis after an emotionally charged event	**Conversion disorder**
Diagnosis, Signs & Symptoms, Treatment: Drug ingestion + violent behavior with superhuman strength	**Dx:** PCP ingestion (dissociative agent) **SSx:** sympathomimetic effects, bizarre & violent behavior, perceptions of superhuman strength; ± horizontal, vertical or rotatory nystagmus **Tx:** supportive care, sedate/restrain to ensure safety (benzos, AVOID Haldol), monitor for rhabdo and seizures
What criteria are required for a new diagnosis of **schizophrenia**?	2+ of the following: delusions, hallucinations disorganized speech or behavior, negative symptoms AND ≥ 6 months Rule out mood disorder and drug abuse.
What is the difference between a **brief psychotic disorder**, **schizophreniform disorder**, **schizophrenia**, and **schizoaffective disorder**?	**Brief psychotic disorder:** psychotic features < 1 month **Schizophreniform:** psychotic features for 1-6 months **Schizophrenia:** psychotic features > 6 months **Schizoaffective:** psychotic features + mania or depression
What is the appropriate treatment of an elderly patient presenting with signs of **elder abuse** who wants to return home?	If they have decision-making capacity they can be discharged, but **adult protective services** should be notified (in most states MDs are mandatory reporters).
Review the timeline for the following symptoms of **alcohol withdrawal**: tremor, hallucinations, seizure, delirium tremens	Tremor (6-12 hrs) Hallucinations & seizures (12-48 hrs) DTs (>48hrs)
What are the **five stages of grief**? At what point does grief become pathological grief?	Denial → Anger → Bargaining → Depression → Acceptance Pathological grief reaction if lasting **> 6 months** + causes severe functional impairment, suicidal ideation, psychotic symptoms

What are the features of **frontotemporal neurocognitive disorde**r?	Characterized by disruptive behavioral changes: **hyperorality**, wondering, and generally **disinhibited**. Characterized by a **rapid** decline.
What are the features of **lewy body dementia**?	Age: mid-70s. Executive functions and attention are affected. **Visual hallucination** and **REM** sleep behavior disorder. Parkinsonian motor symptoms.
What are some features of **prion diseases**?	Any age. Neurocognitive deficits + motor abnormalities (Ataxia, myoclonus, dystonia, chorea). Examples: Mad cow disease, kuru, Creutzfeldt-Jakob Dx. No treatments available.

Miscellaneous Topics

Bizz	Buzz
What is the **difference** between an Emergency Medical Responder, Emergency Medical Technician, Advanced EMT and Paramedic?	**EMR**: immediate life-saving care (e.g. hemorrhage control, **CPR**, AED use) **EMT**: emergency care (e.g. **BLS**, O2, pt's own meds, patient transport) **Advanced EMT:** add limited advanced life support (e.g. ***IV ACCESS***, some meds, airway management, ECGs, IVF) **Paramedic**: licensed, advanced care (e.g. **ACLS** meds, advanced airway, defib/pacing, needle decompression)
What is the **difference** between Off-line and On-line medical control for EMS providers?	**Off-line/Indirect**: developed protocols and standing orders for specific situations, training and education, quality review **On-line/Direct**: direct orders **while in field** (on scene or over radio), direct observations
When can a patient refuse care/transport by EMS?	Any adult patient who is **conscious and competent** can refuse care. Must be well documented; if pt is deemed incompetent, they can NOT refuse care and should be transported even if against their will/requiring restraint or police
What **legal guidelines** exist for on-scene physicians?	Must provide **proof of identity** or medical licensure to provide patient care; On-scene MD may officially assume medical control from on-line MD but **must accept legal responsibility** and transport patient to the hospital
What is the difference between **Helicopter (rotary-wing)** and **Plane (fixed-wing)** transport programs?	**Rotary:** limited by weather, less safe, expensive but access to more locations **Fixed:** less limited by weather but more limited by location (near airport)
What defines a medical disaster?	When the needs of a community (due to natural or man-made disasters) **overwhelm the ability of the local healthcare system** to manage them under normal operating procedures
What defines a Level I, Level II and Level III **medical disaster**?	**I**: local resources sufficient **II**: requires resources from adjacent communities **III**: requires state or federal resources (declared by governor or president)
What is an **Incident Command System** and what are the general responsibilities of the following parts: Operations, Planning, Logistics, Finance?	Standardized but flexible template for local disaster operations **Operations:** field work including search and rescue, treat and transportation, triage (this is where the physicians typically are) **Planning:** collects data, communicates and coordinates plans **Logistics:** facilities, supplies, equipment, food, people **Finance:** manages money, payment

What are the categories of primary triage using the Simple Triage and Rapid Treatment (**START) protocol**?	Used in **mass-casualty** events to perform a quick assessment of **respiration, perfusion, and mental status** (RPM). Color coded system, divide injured people into groups: **BLACK**: deceased, hopelessly injured (no pulse and no breathing despite repositioning airway), no resuscitation **RED**: immediate priority - requires treatment/stabilization for survival (abnormal respirations/perfusion/mental status) **YELLOW:** delayed priority - seriously injured but delayed treatment ok without loss of life or limb (stable respirations/perfusion/mental status) **GREEN:** minor priority, walking wounded.
What are the only two **interventions** performed under **START triage**?	Airway repositioning, hemorrhage control
What is the exception to the typical Primary Triage "BLACK" (hopelessly injured, no resuscitation) rule?	**Lightning strikes/electrical injuries**; pulseless or apneic patients may be more easily resuscitated with immediate ACLS; "Reverse Triage"
What is the **most common problem** in any disaster?	Poor Communication
What are the key **components** of the Emergency Medical Treatment and Active Labor Act (**EMTALA**, part of COBRA)?	Patients presenting to ED by EMS require a medical screening exam to identify and stabilize life-threatening conditions; once ambulance on hospital property the **hospital is obligated to eval the patient**; if the facility cannot provide care to stabilize or treat an identified emergent condition, the patient must be transferred to a facility that can (transferred under safe/stable conditions); hospital must declare "diversion" if unable to screen patients (internal disaster); Pts must be identified as stable or unstable by an physician
What rules exist under EMTALA for transferring a patient from the ED to another facility?	Must transfer patient to facility **able to handle unstable condition** (if current hospital unable), there must be a documented **medical benefit to transfer**, patients may request transfer and sign informed consent, transfer must be made with appropriate personnel and equipment
How does EMTALA apply to pregnant women in labor?	They may be transferred to another facility after a medical screening exam as long as 1) you can demonstrate that they require a **higher level of care** at another facility (i.e. OB care that your hospital doesn't have) 2) The patient has been **medically stabilized** 3) **Labor is not imminent** (e.g. fully dilated, close contractions). Always transport with **fetal monitoring**. Consider transport times when making decisions (labor may not seem imminent now, but that may change if there's a 4 hour transport time)
What are federal guidelines defined by the Joint Commission regarding **language translation in the ED**?	ED **must** provide language assistance to non-English speaking patients; family members should not be used as interpreters

What is the difference between Expressed, Implied and Informed Consent?	**Expressed:** verbal or written willingness to be treated, covers "usual" care **Implied**: action implies willingness **Informed:** patient informed of risks/benefits/ alternatives before given verbal or written consent
What is a potential **legal outcome** of failure to secure **informed consent** for an invasive procedure?	Court may find physician guilty of **battery** (unconsented intentional touching) or **false imprisonment** (unlawful detention or restraint of an individual's personal liberty or freedom); under these it is not necessary to prove negligence (as typical for malpractice), only intent
How should **informed consent** be **documented** in the medical chart?	Signed form in the chart is important, but documentation of discussion in the note may be of equal or greater use
How is implied consent used in emergent conditions with an **unconscious patient**?	Physician has consent to carry out procedures **reasonably required to stabilize** the patient's condition until consent can be obtained
How does consent apply to **minors or mentally incompetent** persons?	These patients are **unable to provide consent** (guardian must provide consent), but under EMTALA, physician can **stabilize emergent conditions** without guardian consent
For what conditions can minors consent to **without** guardian permission?	Treatment of **STDs**, **mental health, drug abuse**, **pregnancy care**, possibly **pregnancy prevention**
What variables define a **"mentally incompetent"** patient?	Intoxicated (alcohol or drugs), psychotic, confused, disoriented or unconscious
When can parents **NOT refuse** care for their child?	**They cannot forbid life-saving treatment** (this includes religious freedom arguments); if parents withhold consent under such circumstances the physician can take temporary protective custody of the child (common boards scenarios: blood transfusion despite religious objection, treatment of dangerous conditions despite parental disagreement, i.e. meningitis)
When can **involuntarily hold** be placed on patients with mental illness?	If they are deemed to be a **threat to themselves or others** (i.e. suicidality, homicidality, manic behavior, decompensated psychosis)
What 4 elements are required in a malpractice suit to **prove negligence/liability**?	1) **Duty to the Patient** 2) **Breach of Duty** 3) **Injury caused by the breach** 4) **Resulting Damaged**: tangible injury occurred
For what patients are physicians **mandatory reporters** for abuse?	Children/Minors and Elders (>60) (true in most states)
True or False: Emergency physicians should inform patients about all medical errors	TRUE
What do half of lawsuits in Emergency Medicine involve?	Discharge Instructions
What is the difference between the following types of **lab errors**: preanalytic, analytic, postanalytic?	**Pre**: occur during specimen collection and prior to processing (Most common) **Analytic:** processing/machine error **Post**: after results complete, incorrect reporting or interpretation

What **factors** specific to emergency medicine hinder **physician wellness**?	Shift work, 12 hour shifts, night shifts, diversity of practice environment - all contribute to burnout
Which **federal agency** provides oversight to EMS systems?	The National Highway Safety and Traffic Administration under the Department of Transportation
What is the difference between Sensitivity and Specificity?	**Sensitivity:** a test's ability to designate an individual with disease as positive. **Specificity:** a test's ability to designate an individual without disease as negative.
What type of test (high sensitivity or high specificity) is best for **Screening/Ruling Out disease** verses Confirming disease?	**High sensitivity** tests are best for **Screening/Ruling Out** disease (low False Neg rate). **High specificity** tests are best for **Confirming disease** (low False Pos rate). Mnemonic: SP-IN, SN-OUT
What is the difference between Positive Predictive Value (PPV) and Negative Predictive Value (NPV)?	**PPV:** proportion of people with +Test who also have +Disease (True Pos / TP + False Pos) **NPV:** proportion of people with -Test who also have -Disease (True Neg / TN + False Neg)
How is Number Needed to Treat defined?	The number of patients in a population that need to be treated in order to make **one good outcome**. (NNT = 1/ARR)
What are exceptions to confidentiality rules?	Public safety threats, mandated reporting, and minors or mentally disabled
Can police require that you disclose medical information about an arrested patient?	No
When is review (confirmation of cause of death) by a **Medical Examiner** required?	Accidental deaths, death is sudden/unexpected, where law may have been broken (i.e. violence), children
What is the difference between Primary, Secondary and Tertiary Prevention?	**Primary**: targets at risk and prevents problem, includes vaccines, education, water treatment **Secondary:** detect disease early to prevent progression, includes pap smear, colonoscopy, mammography, etc. **Tertiary**: limits progress of known disease, includes risk factor modification, strict glucose control for DM, post MI meds
What is necessary to document on a patient who leaves **Against Medical Advice**?	Patient had **decision making capacity** (understands the consequences of accepting or refusing treatment) and was **educated about the risks** of refusing treatment. Note a patient leaving AMA should still be provided appropriate outpatient treatment (antibiotics, etc), discharge instructions, return and follow-up instructions
According to HIPPA, under what scenarios can a patients **protected health information be shared** without explicit consent?	Another medical provider with direct patient care responsibilities or patient's insurance for billing purposes
What patients are appropriate for disposition to an ED Observation Unit?	Unclear diagnosis in the ED and require a limited amount of further evaluation (workup typically protocolized and completed within 24 hours)
How do you calculate a Positive Likelihood Ratio?	positive LR = Sensitivity/(1 – specificity)

What are the 4 main principles of medical ethics? How are they defined?	1) **Autonomy** - recognizing the patient's values and right to make their own decisions 2) **Beneficence** - act in the patient's best interest, balance the benefits of treatment with the risks/costs 3) **Nonmaleficence** - do no harm 4) **Justice** - treat patients fairly, evenly distribute the benefits and burdens of care across society, strive for equality in access and outcomes

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