



Cardiology

Bizz	Buzz
What underlying pathologic process distinguishes myocardial infarction from angina/unstable angina?	atherosclerotic plaque rupture -> exposed endothelium -> clot attaches -> reduced blood flow; if cell death occurs (usually due to complete vascular obstruction) then positive trop and MI; if no cell death occurs then negative trop and angina/unstable angina
What is the difference between transmural and non-transmural infarction?	Transmural: usually STEMI, large vessel affected, benefit from thrombolytics/PCI; Not 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, hemodynamic changes with pain
Acute chest pain at night, EKG with STEMI, all symptoms and EKG changes resolve with nitro?	Prinzmetal's Angina (coronary spasm, most do not have CAD; treat with CCBs)
What are early to late EKG changes with ACS?	Hyperacute T's and Giant R (very early and transient), STE, STD (ischemia or reciprocal), TW inversion, Q waves (1 square wide, 1/3 height QRS)
Biphasic T-wave in V2/V3	Wellen's Syndrome: biphasic (type A) or deeply inverted, symmetric (type B) TW in septal leads = early signal of proximal LAD lesion
Chest Pain with STE V1-V4 with STD II, III, aVL	Anterior MI 2/2 LAD occlusion, may affect large territory of LV, septum and conduction system (high grade blocks, wide complex bradycardias), commonly have shock, possible ruptures
Chest Pain with STE I, aVL, V5, V6 with STD V1	Lateral MI 2/2 LAD vs L circ occlusion, may affect LV
Chest Pain with STE II, III, aVF with STD V1-V4	Inferior MI 2/2 occlusion of Posterior Descending (RCA > L circ), may affect AV node (usually transient narrow complex bradycardias), may cause papillary muscle rupture
Chest Pain with STE III > II and V1 > V2	Right Ventricular MI, should get R-sided leads, 2/2 proximal RCA lesion, associated with Inferior MI
Chest Pain with STD V1-3	Posterior MI, get posterior leads to dx (req only 0.5 mm elevation for STEMI dx), 2/2 occlusion of Posterior Descending (RCA > L circ)
How can you detect MI in patients with paced rhythm or old LBBB	Sgarbossa Criteria: STE >1mm with concordant (same direction) QRS, concordant STD >1mm V1-V3, STE >5mm with discordant (opposite direction) QRS (modified Sgarbossa changes this last rule to discordant STE >25% preceding S wave)
What is unique about the management of Inferior MIs?	With Inferior MI, always consider RV involvement and get right-sided EKG leads
What is unique about the management 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 (<24hr) of MI?	arrhythmia, shock 2/2 pump failure or valve dysfunction
What are potential late complications (>24hr) of MI?	thromboembolism, myocardial rupture, valve rupture, CHF, pericarditis
Pleuritic chest pain 4wks after MI?	Dressler's syndrome: autoimmune pericarditis, typically 2-6wks s/p MI
What artery typically supplies the SA node and AV node?	SA- RCA 60%, LCirc 40%; AV- RCA 90%, LCirc 10%; concern for bradycardias if Inferior MI
Cardiac Tamponade after MI	Myocardial wall rupture, give IVF and dispo to OR



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What EKG finding is classic in Cardiac Tamponade?	Electrical Alternans
Shock + new murmur after recent MI	Papillary muscle rupture, Tx to reduce afterload and dispo to OR; same treatment if septal wall rupture
What potential treatments for AMI 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 better for treatment of STEMI, thrombolytics or PCI?	PCI is better. Thrombolytics should only be considered if PCI is not available at center within 90min or after transfer within 120min
What EKG changes are included under indications for thrombolysis?	STEMI (STE >2mm for men, >1.5mm for women in V2-3, STE >1mm in 2+ other leads), STD V1-3 (posterior MI), old LBBB + Sgarbossa
What are absolute contraindications for thrombolysis?	Any previous brain bleed or known mass, ischemic stroke or closed head injury within 3mo, known bleeding disorder, current active bleeding, major surgery in the last 2 months, BP > 180/110 *after treatment, suspected aortic dissection
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 EKG changes may occur with reperfusion?	Accelerated idioventricular rhythm, NSVT, PVCs; these should be transient, are overall benign and do not require additional treatment
What is the appropriate treatment of ST elevation after cocaine use?	First treat with benzos, aspirin, nitrates, calcium channel blockers or phentolamine for HTN; thrombolysis only if ST does not return to baseline after these treatments
What is the appropriate treatment for HTN after cocaine use?	Calcium channel blockers or phentolamine; NO 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?	Mitral is most common native valve to be infected (Staph aureus is most common pathogen but viridans strep if s/p tooth extraction); Tricuspid is most common with IV drug use (Staph aureus)
Describe the classic physical exam findings in Infective Endocarditis?	Osler Nodes (painful nodules on fingertips), Janeway Lesions (nontender hemorrhagic lesions on palms), Roth Spots (retinal hemorrhages), Splinter hemorrhages (linear on nails), Petechiae, New Murmur
What is the appropriate management and treatment of a patient with suspected Infective Endocarditis?	Blood cultures x 3 (different locations), Echo (transesophageal best), broad spectrum antibiotics to cover staph/strep/gram negatives (Vanco + pcn + Gent)
When should a patient receive antibiotic prophylaxis for Infective Endocarditis prior to a procedure?	Artificial or damaged valve prior to any invasive procedure (classically dental); give amoxicillin for dental procedures



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What left sided murmurs are systolic?	Aortic stenosis and mitral regurg
What left sided murmurs are diastolic?	Aortic insufficiency and mitral stenosis
Syncope + systolic murmur radiating to neck	Aortic Stenosis, syncope is poor prognostic sign, requires surgical consult; causes L heart strain
Chest pain with new diastolic murmur	Aortic dissection causing aortic insufficiency, may have "water-hammer" pulse
Pregnant women with sudden cardiovascular collapse during labor	Mitral Stenosis, high output during labor causes LA enlargement, AFib and arrhythmia
Treatment for decompensating patient with diastolic murmur, opening snap	Cardiovert, suspect mitral stenosis and AFib
MI followed by hypotension and new murmur	Mitral Regurgitation 2/2 ruptured cordae tendineae/papillary muscle; Tx decrease afterload and cardiac surgery
What are the most likely causes and signs/symptoms of Right and Left sided Heart Failure?	Right: MC 2/2 L-sided failure, lung disease, PE, symptoms include JVD, peripheral edema, hepatic congestion; Left: 2/2 ischemia, valves, HTN, symptoms include 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 for treatment of decompensated heart failure?	Decrease LVEDV to improve SV and CO (Starling curve); Reduce preload with nitroglycerin and diuretics (Lasix; *caution if diastolic failure), BiPAP; consider afterload reduction (nitroprusside); give inotropes for shock
What are classic causes of high output cardiac failure?	Thyrotoxicosis, chronic anemia, large AVMs, Pagets disease of bone
What are classic CXR findings with heart failure?	Big heart, fluffy infiltrates, Kerly B lines, blunted CVA (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
Dx and Tx of Dilated Cardiomyopathy	H/o HTN or ischemia, big heart on XR, low EF on echo; Tx underlying cause/CHF/dysrhythmias, anticoagulate if mural thrombus, transplant if severe
Dx and Tx of Restrictive Cardiomyopathy	2/2 fibrosis, radiation, TB causing stiffness; seen in heart failure with normal sized heart and poor filling on echo; Tx underlying cause/CHF/dysrhythmias
Dx and Tx of Hypertrophic Cardiomyopathy	Classically with septal hypertrophy, severe symptoms/syncope with exercise, EKG with LV hypertrophy (tall QRS, needle-like Q waves); Tx avoid exertion, beta blockers (slow rate and increase filling), AICD for ventricular arrhythmias, surgical ablation
Describe the typical murmur of Hypertrophic Obstructive Cardiomyopathy (HOCM)	At left lower sternal border, increases with Valsalva (increased intrathoracic pressure, decreased preload)



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What is the typical time frame for developing peripartum cardiomyopathy?	Last trimester to 5 months postpartum
What are the classic clinical clues for diagnosis of Pericarditis?	recent viral syndrome, pleuritic chest pain radiating to neck, worse with laying flat, intermittent friction rub; may have evidence of pericardial effusion/tamponade but should have clear lungs; unlikely to have trop leak
What are classic EKG changes with Pericarditis?	PR depression (most specific), diffuse STE, TW flattening followed by TW inversion
What is the appropriate treatment for Pericarditis?	Must get Echo to r/o pericardial effusion (then need admission), NSAIDS (+/- colchicine)
What are the classic clinical clues for diagnosis of Myocarditis?	Recent viral illness, symptoms of CHF (wet lungs and edema), arrhythmias, *unresolving sinus tachycardia, usually with positive troponin; Echo usually with global hypokinesis and dilated chambers
What are classic EKG changes with Myocarditis?	May see same changes as pericarditis but most often EKG is nonspecific
What is the appropriate treatment for Myocarditis?	Supportive care, avoid early NSAIDs or steroids, ICU admit if severe/CHF
What is the most common cause of Myocarditis worldwide?	Chagas disease
JVD, decreased heart sounds, and hypotension	Beck's Triad of Pericardial Tamponade; give IVF to increase preload, do pericardiocentesis +/- surgery
What are potential sequelae of Hypertensive Emergency?	Aortic Dissection, Encephalopathy, ACS, Pulmonary edema, CVA, Renal failure, Retinopathy
Review the definitions of 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
Review appropriate ED management of Asymptomatic HTN, HTN Urgency and HTN Emergency	Asymptomatic - no workup or treatment needed, restart home meds (if any), refer to PMD; HTN Urgency - rule out end organ dysfunction (based on symptoms), gradually lower BP over 1-2d 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 symptoms)
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 - Esmolol or labetalol (reduce rate and shear stress) +/- Nitroprusside; Cocaine use - benzos and phentolamine (no beta blockers); Pregnancy - IV Mg, Hydralazine, Labetalol (preeclampsia); ACS/CHF - Nitroglycerin
How should HTN be managed for Ischemic and Hemorrhagic Strokes?	Ischemic Strokes - permissive HTN to protect penumbra up to 220/120 BUT reduce to <185/110 if considering tPA; Hemorrhagic - varied guidelines for BP control, allow some permissive HTN to protect cerebral perfusion pressure, use CCBs to prevent vasospasm
What are potential non-cardiac causes of syncope?	Bleeding (RFB, ruptured ectopic, ruptured AAA), neurological, meds, vasovagal



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What is the differential for potential life-threatening cardiac causes of syncope?	PE, MI, Brugada, WPW, Prolonged QT, arrhythmogenic right ventricular dysplasia, HOCM, critical aortic stenosis; Screen all EKGs for these findings
What minimum workup should be completed on young female patients with syncope	pregnancy test (ruptured ectopic may only present with syncope)
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?	Vasovagal or "idiopathic"
What factors make someone with syncope "high risk" requiring admission and significant workup?	San Francisco Syncope Rule: CHESS - Admit patients with CHF, Hct < 30, EKG that is abnormal, Shortness of Breath or Systolic BP < 90, as they are high risk for serious outcomes. Note other high risk features include family history of sudden death and syncope with exertion.
What EKG changes may be seen in a patient with Wolff-Parkinson-White?	Short PR (most common) and delta wave (slurred upstroke of QRS)
What EKG changes may be seen in a patient with Brugada Syndrome?	Wide QRS, right bundle branch block pattern with coved/downsloping ST elevation V1-V3 followed by TWI, or "saddleback" STE in V1-V3
What EKG changes may be seen in a patient with Long QT?	end of T wave > 1/2 R to R interval
What EKG changes may be seen in a patient with Arrhythmogenic Right Ventricular Dysplasia?	Epsilon wave (positive notch at end of QRS)
What is the underlying pathology in Arrhythmogenic Right Ventricular Dysplasia?	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 antiarrhythmic meds and AICD
What EKG changes may be seen in a patient with Hypertrophic Obstructive Cardiomyopathy (HOCM)?	Large voltages (tall QRS), needle-like Q waves
What patients are higher risk for Aortic Dissection?	Prolonged HTN, 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 radiating in direction of propagation (neck/arms vs back/abdomen); can be associated with any symptoms linked to sequelae of dissection including new murmur, MI, CHF, renal insufficiency, mesenteric ischemia, new neuro deficits. Note BP can be high, low or normal
What is the appropriate management and treatment of a patient with suspected Aortic Dissection?	HR and BP control to decrease shear stress (Esmolol followed by Nitroprusside, or Labetalol), control pain, T&C x 10-15; if unstable consult cards/thoracic surgery with dispo to OR, consider bedside echo; if stable get CT angio; **NEVER send unstable patient to CT



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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?	Age > 60, males, family history, HTN, HL, CAD, connective tissue disease
What are the classic clinical clues for diagnosis of Ruptured AAA?	sudden death, syncope, sudden abdominal/flank pain, peripheral ischemia, abdominal mass
What size AAA is higher risk for rupture?	>3cm is pathological, >5.5cm is high risk and requires surgery
What is the appropriate management and treatment of a patient with 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
History of repaired AAA with massive GI bleed	Aortoenteric fistula
Dx and Tx of Acute Arterial Occlusion	Look for medical problems related to thromboemboli (AFib, MI, or endocarditis); Pain, Pallor, Paresthesias, Paralysis, Pulseless; get CT angio vs US; Tx with heparin vs thrombolysis vs embolectomy
How sensitive is Homen's sign for DVT?	Homens (pain in the calf on dorsiflexion of ankle) has 50% sensitivity
What are risk factors for DVT?	(Virchow's Triad: Stasis, hypercoagulable, endothelial damage) previous DVT, active cancer, paralysis, immobilized (3d within last 4wks); look for tender vein or distended superficial veins, unilateral calf swelling >3cm, unilateral pitting edema
What is the appropriate workup for patients with clinical symptoms and low versus high risk of DVT?	Low risk - d-dimer ok; Moderate to high risk - d-dimer and doppler US (alt CT venography); if high risk may require serial dopplers
What is the appropriate management of isolated calf DVT?	repeat ultrasound to r/o propogation; anticoagulation not required unless within 5cm of popliteal vein
Review the definitions and EKG changes of 1st, 2nd, and 3rd degree AV Block	1st: PR >200 and otherwise normal; 2nd: Mobitz Type I (Wenckebach periodicity - increasing PR interval then dropped beat), Mobitz Type II (stable long PR but dropped beat); 3rd: P waves entirely dissociated from QRS
What types of heart block typically require pacemaker placement?	2nd degree Mobitz Type II and 3rd degree
What is the appropriate treatment for unstable bradycardia?	Atropine may help if narrow QRS, also consider Dopamine, Epinephrine, and if unstable start transcutaneous pacing (+/- transvenous pacing)
Review the general 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
Review the general steps for transvenous pacing	Place IJ or SC cortis, introduce catheter and inflate balloon, set pacer at 80 bpm and voltage to 20 mA, advance catheter to RV (will show LBBB pattern), deflate balloon, secure and decrease voltage to lowest setting with continued capture



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Treatment for arrhythmia and unstable patient	Electricity
Differential for tachyarrhythmia with + P waves; Treatment for stable patient	Sinus tach, AFlutter, MAT; Treat underlying problem If present, and control rate with AV nodal blockers (and shock if unstable!)
Differential for narrow complex tachyarrhythmia without P waves; Treatment for stable patient	AF, SVT, AVNRT, orthodromic AVRT; Treat with Adenosine or AV nodal blockers (and shock if instable!)
Differential for wide complex tachyarrhythmia without P waves; Treatment for stable patient	Antidromic AVRT, VT (VF possible but likely unstable pt); Treat with Procainamide or Amiodarone and AVOID AV nodal blockers (and shock if unstable!)
EKG with chaotic P waves, irregularly irregular rhythm	Atrial Fibrillation; treat with CCB or BB
EKG with "sawtooth" symmetrical P waves, regularly irregular rhythm	Atrial Flutter, treat with CCB or BB
EKG with multiple types of P waves, irregularly irregular rhythm	Multifocal Atrial Tachycardia, likely 2/2 pulmonary disease, Treat with CCB or BB
EKG with regular tachycardia and narrow QRS	AV nodal reentrant tachycardia (AVNRT) OR Orthodromic Atrioventricular Reentrant Tachycardia (AVRT); Try Adenosine first, then consider BB, CCB, shock
EKG with regular tachycardia and wide QRS	Antidromic Atrioventricular Reentrant Tachycardia (AVRT) OR Ventricular Tachycardia; Treat with Procainamide vs Amiodarone, possible Mg (shock 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); Orthodromic travels down AV node and back up accessory pathway (bundle of Kent) resulting in regular and narrow QRS complex (looks like SVT); Antidromic travels down accessory pathway and back up AV node resulting in regular and wide QRS complex (looks like VT)
What is the appropriate management of a patient with tachydysrhythmia and suspected WPW?	Shock if unstable, Procainamide (20cc/kg) or Amiodarone if stable; AVOID AV nodal blockers. If any signs of WPW (delta wave, short PR) or borderline wide QRS, presume WPW and avoid AVNBs
EKG with multiple chaotic ventricular foci that are wide and irregular	Ventricular Fibrillation; shock
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
What EKG findings suggest Ventricular Aneurysm?	STE > 2wks after known MI (and lack of reciprocal changes), most often in precordial leads and may be associated with Q or QS waves
What is "Holiday Heart Syndrome" and how should it be treated?	Typically atrial arrhythmia after excessive ETOH intake; treatment for stable patient is observation, typically will resolve within 48hr
What EKG findings confirm a diagnosis of Ventricular Tachycardia?	Fusion beats and Capture beats (suggests AV dissociation and can help distinguish VT from SVT with aberency)



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What is the most common cause of Cor Pulmonale?	(R heart failure 2/2 respiratory disease) COPD, followed by PE, pulmonary HTN, pulm fibrosis, sleep apnea
What are contraindications for Coumadin with known AFib?	Alcoholism, recent trauma or surgery, active gastrointestinal bleeding, respiratory bleeding, genitourinary bleeding, ICH, or significant risk of falls
Review CHADS2VASc scoring to determine need for anticoagulation with AFib	1pt: CHF, HTN, Age 65-74, DM, Female; 2pts: h/o Stroke, Age ≥75; consider anticoag/antiplatelet if score = 1, start AC if score ≥2
How are vitals assessed on a patient with an LVAD?	Blood pumped by machine from LV to aorta, no pulse will be present, need to check with BP cuff to obtain MAP (goal 70-80)
What characterization of chest pain is most consistent with a cardiac cause?	Radiation of pain down to Right arm, followed by radiation down both arms, and then 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, R&L bundle branches, Purkinje fibers
What are the most appropriate locations for central line placement prior to transvenous pacing?	Right IJ, alt 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 pacing mode; should be done if pt is receiving inappropriate shocks. Note all AICDs are also pacemakers (on XR AICDs have a thicker wire in the distal lead)
What is the appropriate management of a 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 except vasopressin



Trauma

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Difference between tension PTX and pericardial tamponade (for boards)	Tension pneumothorax: tracheal deviation, decreased breath sounds, subQ air. Pericardial tamponade: decreased heart sounds. BOTH will have JVD, hypotension, tachycardia.
How to determine GCS	E4 V5 M6; 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), 2- Decerebrate, 1- None; If < 8 intubate
How to determine ASC Class of Hemorrhagic Shock	I: Normal vitals (<15% loss, 750cc), II: Tachy but normal BP with dec PP (15-30% loss, 750-1.5L), III: Hypotension (30-40% loss, 1.5-2L), IV: AMS confused/lethargic (>40%, >2L)
Vital Sign changes with Brain Herniation	Cushing's reflex (2/2 inc ICP): Hypertension, Bradycardia, Irregular Respirations
Compare subfalcine, uncal and tonsillar herniation	SF - most common, frontal lobe under falx, ssx abnormal gait; U - temporal lobe under cerebellar tentorium, ssx CN3 palsy (blown pupil, down and out), ipsilateral hemiparesis, coma; Tonsillar - rare, brainstem herniation, coma and death
Injuries CT can commonly miss	Diaphragmatic injury, pancreas injury, basilar skull fracture, hollow viscus injuries
Classification of LeFort Fractures	I: Palate mobile (fx below nose); II: Palate + Nose mobile (inferior orbits); III: Entire face is mobile (zygomatic arch), +/- CSF rhinorrhea
Dx and Tx of Mandibular Fractures	Malocclusion, trismus, lower lip paresthesias; most are condylar, get panorex or CT; treat non-condylar fx as open fx with empiric pcn/clinda, ENT/OMFS consult
Dx and Tx of Orbital Fractures	SSx: Diplopia, proptosis, limited EOM, dec VA; Workup: get CT, consult ophtho/ENT, check for infraorbital paresthesia or globe injury; Tx: give abx if sinus involvement
Dx and Tx of Nasal Septal Hematomas	Dx: dark red hematoma associated with nasal fx/trauma; Tx: must incise and pack to prevent saddle nose deformity/pressure necrosis
Classification of Neck Zones	I: sternum/clavicles to cricoid cartilage; II: cricoid to angle of mandible, (most common site of injury); III: angle of mandible to base of skull
Management of Penetrating Neck Injury	Intubate early, straight to OR if unstable vitals or HARD signs of vascular injury ("HARD BRUIT" - Hypotension, Arterial bleeding, Rapidly expanding hematoma, neuro Deficit, Bruit); if Soft signs get CT angio, possible scope/exploration
Possible complications of blunt neck injury	Pseudoaneurysm, carotid artery dissection, tracheal injury; get CT angio, if unstable intubate/ENT consult
Dx and Tx of Traumatic Aortic Dissection	(most die in field) high speed deceleration, chest pain/back pain, new murmur, pulse deficits BUT exam often unremarkable; if stable get XR (1/3 normal, look for mediastinal widening, obscured aortic knob, loss of AP window, R displaced NGT, L displaced bronchus, wide paratracheal stripe, L apical pleural cap), if VERY stable get CTA, if + dispo to OR on beta blocker for BP control
Dx and Tx of Flail Chest	>3 adjacent rib fractures with paradoxical motion during respirations; associated with pulmonary contusion; Tx with intubation, do chest tube prn



Trauma

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Appropriate imaging to eval for sternal fracture	Must include lateral CXR (consider CT if high suspicion and XR neg)
Identify high risk rib fractures	1-2: associated with vascular and broncheal injuries; 9-11: associated with liver and spleen lacerations, Renal injuries; multiple ribs: associated with underlying lung contusion
Indications for OR Thoracostomy with Hemothorax	Unstable vitals, Initial chest tube output >1.5L (20cc/kg) OR >200/hr over 3-4hr (3cc/kg), 7cc/hr, persistent air leak
Management of Traumatic Pneumothorax	Small - O2, repeat CXR; Large - Chest tube, if intubating with ptx do chest tube first to prevent tension ptx
Indications for ED Thoracotomy	Penetrating chest trauma with witnessed loss of vitals within 10 minutes
General approach to traumatic abdominal injury	Unstable vitals, peritonitis, +FAST, or transabdominal GSW -> to OR; if STABLE get CT, DO NOT send unstable patient to CT; give blood for shock even if normal initial H/H
Most common injury sites for abdominal GSW and stab wound	GSW - small bowel injury; Stab - Liver (but Blunt spleen > liver)
Dx and Tx of Diaphragmatic Injuries	L>R for blunt and penetrating, consider with any injury nipple to navel; frequently missed/delayed dx, ssx include SOB, chest pain, abd pain, n/v, XR with ?coiled NGT in chest, blurred hemidiaphragm, air/fluid level in chest; CXR and CT commonly miss this, dx by laparoscopy in OR
Abdominal pain 2/2 bike handlebar injury	Duodenal/pancreas injury
Abdominal pain after lap belt injury	Small bowel injury
When is DPL considered positive?	(consider if pt unstable but equivocal FAST) 10 mL initial gross blood/bile/feces; after 1L NS infused +DPL if >10,000 RBCs for penetrating or >100,000 RBCs for blunt
How to dx retroperitoneal injuries	need CT with IV contrast, FAST will be negative
Dx of scrotal/testicular injuries	History with straddle injury, hematuria, scrotal ecchymosis or ttp; get doppler US and urology consult
Time limit to reimplant amputated penis	8-12hr max
Dx and Tx of Bladder/Urethral Injuries	Hx of pelvic fx, hematuria, blood at meatus, high prostate, urinary retention, perineal bruising, females may have vaginal bleeding; NO FOLEY initially, do RUG to eval for urethral injury, order CT cystogram for bladder injury, uro 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) will show small extravasation with bladder filling; Posterior Urethral Injury (proximal to UG diaphragm, usually normal external exam) will show large extravasation into pelvis
Dx and Tx of Bladder Rupture	Associated with pelvic fx, gross hematuria; Dx on retrograde cystogram; Intraperitoneal go to OR, Extraperitoneal usually tx with foley/monitoring
Management of Renal Injuries	Dx: Get 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



Trauma

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NEXUS Criteria to clear C-spine	DOES NOT HAVE "Cervical PAIN": Cervical ttp, Pain that distracts, AMS, Intoxication, Neuro deficits
How to read C-spine XR	Lateral: Ant and Post spinal line, spinal laminar lines should be smooth; Open mouth: C1 and C2 lateral edges should align, look at odontoid for fx
Identify unstable C-spine injuries	"Jefferson Bit Off A Hangman's Toe"; Jefferson fx (C1 burst fracture 2/2 axial load), Bilateral facet joint dislocation (2/2 hyperflexion), Odontoid fx (Type I - tip, stable; II - neck; III - body), Altanto-axial dislocation (C1/C2 dislocation), Hangman's fx (bilateral C2 pedicle fracture 2/2 hyperextension), Teardrop fx (anterior and inferior vertebral body fx with interspinous ligament rupture, due to flexion > extension)
Identify landmarks for anterior, middle and posterior spinal column (Denis model)	A - anterior half of vertebral body, M - posterior half of vertebral body, P - posterior to vertebral body
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 and middle columns. Chance: fracture through all columns, associated with lap belt injuries.
Identify spinal cord syndromes: Central Cord, Anterior Cord, Brown-Séquard	CC - 2/2 hyperextension, usually elderly person hitting chin, UE > LE motor deficit, urinary retention; AC - 2/2 hyperflexion, bilateral motor paralysis, no pain, normal proprioception; BS - penetrating injury to 1/2 spinal cord, half of body with motor/proprioception loss, other half with pain/temp loss
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
What are the clinical findings in Neurogenic Shock?	"Warm shock", blocks sympathetic outflow -> hypotension, bradycardia, warm extremities
What is Spinal Shock (stun)?	No circulatory involvement, transient neurological deficits 2/2 spinal cord contusion, first reflex to return is bulbocavernosus
Indication for Perimortem C-Section	Witnessed arrest, completed within 5 min of arrest, gestation estimated >24wks (above umbilicus)
What population is at highest risk for intimate partner violence?	Pregnant women
Differential for serious complications in Pregnant Trauma?	Placental abruption, maternofetal hemorrhage, uterine rupture, preterm labor
Review Blast Injury Types I-IV	I - Blast Wave Pressure (hollow viscous injury), II - Debris from blast/Shrapnel, III - Trauma from pt thrown/hit objects, IV - everything else (burns, smoke, radiation, etc.)
Review concerning specialized blast-related injuries	Blast Lung (high mortality, butterfly pattern), TM perforation, delayed intraabdominal injuries, compartment syndrome
Immediate and Delayed possible complications with myocardial contusion	Immediate - arrhythmia, reduced EF; Delayed - pericardial effusion (50%), ventricular wall rupture (rare)



Trauma

Bizz	Buzz
What is the most common cause of in hospital death following near-hanging?	Pulmonary edema



Gastrointestinal

Bizz	Buzz
What pain medication is best for biliary colic?	NSAIDS, it is prostaglandin mediated pain
US with +gallstone and dilated common bile duct	Choledocolithiasis, +/- Jaundice, needs ERCP
How sensitive is Murphy's sign for Acute Cholecystitis?	65-70%
What are possible US findings in Acute Cholecystitis?	Gallbladder wall thickening (>5mm), pericholecystic fluid, sonographic Murphy's
Who is most at risk for Acalculous Cholecystitis?	Typically in very sick (hospitalized) or elderly patients, inflamed GB but no stone
Fever + RUQ pain + Jaundice	Cholangitis (Charcot's Triad; add AMS and Hypotension for Reynold's Pentad); biliary obstruction with bacterial infection, HIGH Mortality, need abx and ERCP vs surgery
Chronic RUQ abd 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
Abdominal pain with bruising around the flank and umbilicus?	Hemorrhagic Pancreatitis (Grey Turner sign and Cullen sign)
Does lipase level correlate with severity of disease in Pancreatitis?	No
What are the components of Ranson's Criteria in Acute Pancreatitis?	(predicts mortality) At admission: Age > 55, WBC > 16, Glucose >200, AST > 250, LDH > 350; At 48hr: Ca < 8, HCT drop > 10%, PO2 < 60, BUN increase >5, Neg base excess > 4, Fluid sequestration > 6L
What is a potential consequence of Chronic Pancreatitis?	Malabsorption when 90% affected
Painless jaundice and palpable gallbladder (Courvoisier sign)	Pancreatic Cancer; most common at head of pancreas, high mortality, high CA 19-9; also may have "Trousseau's sign" (migratory thrombophlebitis)
What is the difference between incarcerated and strangulated hernias?	Incarcerated - stuck; Strangulated - ischemic (requires surgery)
What is the underlying pathology in Achalasia?	Impaired relaxation of the lower esophageal sphincter (LES), absence of peristalsis; most common esophageal motility disorder
Chest pain after vomiting, ill-appearing	Boerhaave's Syndrome: full-thickness perforation of esophagus causing mediastinitis; may have neck crepitus, "Hamman's Crunch" (crunching sound around heart); can Dx on CT; need IVF, antibiotics, surgical consult
On what side of the esophagus is rupture most common?	Left side
What condition predisposes to spontaneous rupture of the esophagus?	Esophageal Candidiasis (consider in HIV patient), Tx with oral fluconazole



Gastrointestinal

Bizz	Buzz
Regurgitating food and recurrent aspiration pneumonia	Esophageal Diverticula (Zenker's is pharyngeal mucosa above UES)
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), 2nd- Aortic Arch (T4), 3rd - GE junction (T11)
What foreign bodies in the esophagus require immediate/emergent removal?	button batteries, sharp objects
What is the appropriate management for a Food Impaction?	Glucagon 1mg IV (relaxes LES and causes vomiting), Esophagoscopy; Patients must followup 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)
Small volume blood after frequent emesis	Mallory-Weiss Syndrome, partial thickness esophageal tear, usually at GE junction
Pediatric patient with respiratory distress with feeding and recurrent pneumonia	Tracheoesophageal Fistula
Smoker with chest pain and dysphagia	Esophageal Cancer, increased risk for men, heavy ETOH, smoking, chronic GERD/Barrett's esophagus, most likely Squamous Cell
HIV patient with chest pain and dysphagia	Candida Esophagitis; risk of perforation
What medications are more likely to cause Pill Esophagitis and what is the appropriate management?	NSAIDs, potassium chloride, iron, vitamin C, bisphosphonates, and antibiotics (esp Doxycycline); Tx stop inciting medication, endoscopy if severe or persistent symptoms
What type of caustic ingestion is worse and why?	Alkali ingestions are worse (cause liqueactive necrosis and deeper burns) than Acid ingestions (cause coagulative necrosis and more superficial damage)
What is the appropriate management for Caustic Ingestion?	Do NOT induce vomiting or attempt decontamination, get upright CXR to r/o perforation, consult GI for endoscopy, consult surgery prn
What is the most common cause of Cirrhosis?	ETOH in US; Hepatitis C outside the US
Cirrhosis + GIB (Dx and Tx)	Esophageal Varicies 2/2 portal HTN; Treat with airway protection, blood transfusion, PPI, octreotide, antibiotics (ceftriaxone), GI consult for endoscopy vs IR for TIPS
What are options for tamponade of massive GI bleeding?	Sengstaken-Blakemore tube, Minnesota tube, Linton tube
Liver disease and new renal dysfunction	Hepatorenal syndrome (acute renal failure without other reversible cause); may be 2/2 large fluid shifts and renal hypoperfusion; high mortality
Liver disease + AMS	Hepatic Encephalopathy; accumulation of nitrogenous waste (e.g. ammonia), often triggered by infection (SBP common), meds, or constipation; Tx - give lactulose and find/Tx underlying cause



Gastrointestinal

Bizz	Buzz
What is the usual source of infection and diagnostic criteria for Spontaneous Bacterial Peritonitis (SBP)?	E.coli translocation from gut; Paracentesis positive if WBC > 500 OR Neutrophils > 250, or per gram stain/culture
What are the two main types of Liver Abscess and what is the correct treatment?	Pyogenic - (80% in US) usually with sepsis, mixed bacteria (staph/strep), JAUNDICE, Tx broad spectrum antibiotics (Ceftriaxone, Ampicillin, metronidazole), surgical drainage; Amoebic- (10%) usually subacute presentation, 2/2 entamoeba histolytica, no jaundice, Tx with metronidazole, medical management; BOTH may cause biliary obstruction
What lab abnormalities are expected with Acute Viral Hepatitis?	elevated AST/ALT (to 1000s), high conj and unconj bili, high Alk Phos, Coagulopathy
Which is more common: Hep B or Hep C?	Hepatitis C (85%), Hepatitis B (15%)
How do LFTs help distinguish acute viral hepatitis from alcoholic liver disease?	ALT > AST with acute viral hepatitis; AST > ALT with alcoholic liver disease
What antibody is diagnostic for Acute Hepatitis A virus?	IgM HAV antibody
What antibody is diagnostic for Acute Hepatitis B virus?	Hep B surface antigen, IgM anti-core antibody; IgM ACUTE infection, IgG not acute; Hep B e antigen is marker of infectivity (Hep B e antibody low infectivity)
Severe abdominal pain in patient with AFib, nonfocal abdominal exam	Mesenteric Ischemia - 2/2 embolism, alt thrombosis; usually severe pain out of proportion to exam (nonfocal abd exam), high mortality, high LA is late finding; Must rule out perf/free air with XR, CT angio to Dx, surgery consult
What is the most common location of injury with Mesenteric Ischemia?	Superior Mesenteric Artery
What is the most sensitive sign of acute appendicitis?	Onset of pain before vomiting
Sudden severe abdominal pain and inability to pass NGT	Gastric Volvulus - closed loop obstruction, ischemia and perforation
What is the most common type of bezoar?	Phytobezoar (food, fiber), also Trichobezoar (hair) and Pharmacobezor (antacids, aspirin)
What is a common contributing cause of Gastric Adenocarcinoma	H. pylori; GI CA associated with left supraclavicular lymph node; MC cancer with H.pylori is Mucosa-associated lymphoid tissue lymphoma (MALToma)
Periumbilical Lymph Node	Metastatic spread of CA to peritoneum (Sister Mary Joseph node)
Describe the intestinal and extraintestinal manifestations of Crohn Disease	Classically with terminal ileitis, "skip lesions" of normal bowel between disease, can involve ANY part of the GI tract, can get abscess, fistula, stricture, toxic megacolon; may also have arthritis, uveitis, erythema nodosum; Tx steroids, immunosuppressive
Describe the intestinal and extraintestinal manifestations of Ulcerative Colitis	Continuous disease (no skip lesions) of rectum and colon only, can cause toxic megacolon and increased risk of cancer; associated with arthritis, uveitis, erythema nodosum; Tx steroids, less often antibiotics



Gastrointestinal

Bizz	Buzz
What is the most common cause of Small Bowel Obstruction?	Adhesions (very common with prior surgery), followed by tumor/mass and (3rd) hernia
History of AAA repair with massive GI bleed	Aortoenteric fistula; may first present with "herald bleed"; uncommon but high mortality; immediate surgical consult
Diarrhea after recent antibiotic use	C.difficile (anaerobic gram positive bacillus) causing Pseudomembranous Colitis; Dx: stool antigen; Tx: metronidazole or PO vanco vs stool transplant
Describe Rovsing sign, Psoas sign and Obturator sign associated with Appendicitis	Rovsing - RLQ pain with palpation to LLQ; Psoas - RLQ pain with passive extension of the hip; Obturator - RLQ pain with internal rotation of the hip
What two signs/symptoms exclude a diagnosis of Irritable Bowel Syndrome	Fever or blood in stool
Review the typical presentation and treatment for Sigmoid vs Cecal Volvulus	Sigmoid - often old, immobilized with chronic constipation, if stable can attempt initial decompression by sigmoidoscopy but will subsequently need surgery; Cecal - often younger, more likely to necrose, always requires emergent surgery
Risk with chronic perirectal abscess	Fistula formation (classically with Crohn disease)
Abscess above gluteal cleft near midline	Pilonidal cyst/abscess; can drain in ED but will require surgical removal with recurrent disease
Dx and Tx of Proctitis	Inflammation of lining of the rectal mucosa caused by STDs, radiation, Crohn's; causes rectal fullness, tenesmus, LLQ pain; Dx with sigmoidoscopy, treat infection
What is the most common location for an anal fissure? What should be considered for anal fissures NOT at this location?	Midline (posteriorly); if anal fissure found not at midline (lateral) should consider systemic process including Crohn's, HIV, leukemia, tuberculosis or syphilis
Tx of thrombosed hemorrhoid	I&D in ED greatly relieves pain
Dx and Tx of Rectal Prolapse	Seen in young and elderly (related to constipation), also with anal intercourse; Dx red mass protruding from anus; Tx with manual reduction, surgery consultation prn
Large bowel obstruction without identified obstructing lesion on CT?	Ogilvie's Syndrome, pseudoobstruction, typically in elderly bedridden patients with comorbidities, massive dilatation of the colon >10cm, no clear cause of the obstruction; Tx colonic decompression and neostygmine
What medication improves mortality when given for variceal bleeding?	Ceftriaxone; likely increased translocation of bacteria (causing SBP) during GI bleed in cirrhotics
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 are diagnostic criteria for diagnosis of Acute Appendicitis on US?	Non-compressible tubular structure with a diameter of at least 6-7 mm must be visualized; may also have surrounding fluid, target sign, appendicolith
Which hepatitis virus is most likely to cause chronic infection?	Hepatitis C - 80% cause chronic infection, 20% of these progress to cirrhosis



Gastrointestinal

Bizz	Buzz
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
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)
What is the most common cause of acute pancreatitis?	Gallstones; Alcohol is second
What is the appropriate treatment for epiploic appendagitis?	NSAIDs, supportive, likely discharge with outpt f/u
What is the appropriate management for intussusception in children and adults?	Kids - barium or air enema to reduce if uncomplicated; Adults should be managed surgically as most are associated with a mechanical cause (most often tumor)
What LFT abnormalities are expected in the following conditions: Gilbert's, Hemolysis, Alcoholic Hepatitis, Cholestasis, Ischemic Hepatitis	Gilberts & Hemolysis - elevated indirect bili; Alcoholic - AST>ALT in a 2:1 ratio; Cholestasis - elevated direct bili; Ischemic - very high AST and ALT (e.g. 10,000)



Pediatrics

Bizz	Buzz
What are the most concerning (and unique) causes of abdominal pain in the following age groups: 0-3mo, 3mo-2yr, school aged kids	0-3mo - Necrotizing Enterocolitis, Hirschprung's/Toxic Megacolon, Volvulus, Pyloric Stenosis; 3mo-2yr - Intussusception, Meckel Diverticulum, Foreign Bodies; School - similar to adults including pregnancy (consider if >8)
Dx and Tx of Necrotizing Enterocolitis	Occurs in premature newborns, translocation of bacteria into intestinal wall. Dx: XR with dilated bowel, gas in wall. Tx surgical consult and admit.
Dx and Tx of Hirschsprung Disease	No myenteric nerve ganglia in sigmoid colon, no passage of stool by 48hr, leads to obstruction and vomiting, enterocolitis. Dx: XR with dilated bowel and no stool in rectal vault. Tx: surgery consult and admit.
Dx and Tx of Midgut Volvulus	Congenital malrotation, causes bilious vomiting (always emergent), abd pain/distention, possible rectal bleeding (bowel ischemia). Dx: XR may be normal, may show small bowel over liver, distended stomach, dilated loops of small bowel, "double bubble" or corkscrew; definitive Dx with upper GI or US, XR with "corkscrew" or "apple core" sign. Tx: NGT, surgery consult.
Dx and Tx of Intussusception	Dx: 3mo-2yr with LETHARGY, post-viral colicky pain, "currant jelly" stools, sausage-shaped mass in abd (usu. RLQ); XR with obstruction, US with mass (target sign). Tx: abx, if sick go to OR, if well then air vs. barium enema.
Dx and Tx of Meckel Diverticulum	Incomplete closure of vitelline duct -> ectopic gastric mucosa. Dx: painless rectal bleeding 2/2 ulceration, can cause intussusception/volvulus/hernia, can become inflamed and mimic appendicitis; Rule of 2s (2% of population, 2% symptomatic, 2ft proximal to terminal ileum, 2x more often in males, 2yo most common). Dx: Meckel scan. Tx: surgical consult.
Where do ingested foreign bodies usually get stuck?	Cricopharyngeus (60-80%), GE junction (10-20%), Aortic Arch (5-20%). Coin most common object swallowed, appears flat on AP if in esophagus.
What are indications for emergent endoscopy for ingested foreign body?	High-grade obstruction, object in esophagus >24hr, object >6cm, sharp objects, button battery in esophagus, button battery in stomach >48hr or if symptomatic (earlier).
Dx and Tx of Pyloric Stenosis	Most common congenital GI disorder (esp. firstborn males). SSx: nonbilious projectile vomiting after feeding, infant still hungry, occurs within first 2wks of life, causes hypoCl, hypoK, metabolic alkalosis (2/2 vomiting), dehydration. Dx: olive-shaped mass on exam, US (doughnut or bulls eye). Tx with IVF and surgery.
What is the most likely location of traumatic C-spine injury in young children?	C1-C2 (*especially in Down syndrome with atlanto-axial instability*)
What are normal variants in pediatric c-spine imaging?	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.
Review common causes of anemia in young children	Physiologic nadir (Hgb 9 at 6wks), B12/folate deficiency (high MCV, hypersegmented polys, seen in vegans), Fe deficiency (1-2yr, low MCV, associated with <i>pica</i> , breath holding), Sickle Cell (hemolysis, high retic count), Lead Poisoning (basophilic stippling, abd pain, AMS)



Pediatrics

Bizz	Buzz
Approximate weight for newborn, 1yr, 5yr, 10yr	Newborn - 3.5kg, 1yr - 10kg, 5yr - 20kg, 10yr - 40kg
How do you determine ETT size, depth, and blade size in young children?	Newborn - 3.5 ETT, otherwise ETT = Age/4 + 4 (minus 0.5cm for cuffed); depth = 3x tube size; Blade = 1 for newborn and 2 from 2-12yr, 3 > 12yr
What are the general cutoffs for abnormal vitals in a newborn/infant?	Pt is SICK if SBP < 60, RR > 60, HR > 180; Normal SBP = Age x 2 + 70
Dx and Tx of Breath Holding Spells	Common 6mo-6yr, associated with pain/emotion, may turn blue then pass out, but child returns to normal after this and is otherwise well. Tx: rule out Fe deficiency anemia, otherwise pt will grow out of it.
Dx and red flags of Tic/Movement Disorders	More common in males, suppressible but involuntary in otherwise normal child. Red flags include 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 should initial bolus of blood and IVF be?	10cc/kg of blood, 20cc/kg of IVF
Review distinguishing characteristics of the following viral exanthems: Measles/Rubeola, Rubella, Erythema Infectiosum/5th Disease, Varicella, Roseola, Hand/Foot/Mouth Dz	Measles/Rubeola: cough, coryza, conjunctivitis, look sick, Koplik's spots; rash follows fever, starts on head and spreads caudally. Rubella: suboccipital LNs, petechiae on hard palate, rash spreads head to trunk lasting 3d, low-grade fever. Erythema Infectiosum: Parvovirus B19, "slapped cheek," central clearing (aplastic crisis in sickle cell). Varicella: vesicles in different stages (emergency if immunosuppressed), spares palms/soles, check Tzank smear, consider secondary infection. Roseola: high fever followed by rash. Hand/Foot/Mouth: Coxsackievirus, forms flat papules -> vesicles/blisters on buccal mucosa and hands/soles of feet.
Distribution and Tx of Tinea Infections	T. capitis - head, T. corporis - body, T. pedis - foot, T. cruris - groin. Tx: topical antifungals unless in hair (oral griseofulvin x 8wks).
Dx and Tx of Kerion	Inflammatory fungal lesion on scalp. Tx: griseofulvin, eval for superinfection.
Distinguish, Dx, and Tx staph/strep infections including Impetigo, Bullous Impetigo, Staph Scalded Skin	Impetigo: crusty lesions on face with honey-colored exudate, tx with topical mupirocin vs. oral Keflex. Bullous Impetigo: bulla formation, tx with topical and systemic mupirocin/Keflex. SSSS: extensive bulla formation with +Nikolsky sign and epidermal sloughing, tx admit and IV abx.
Dx and Tx of Scarlet Fever	Due to Group A Strep infection. SSx: sore throat, strawberry tongue, sandpaper rash (peels at 2wks), pastia lines (linear petechia). Tx: give ABX (pcn) to reduce incidence of rheumatic fever (not glomerulonephritis).
Dx and Tx of Erysipelas	SSx: Dermal infection with dark red rash, sharp borders, due to GAS. Tx: abx (pcn).



Pediatrics

Bizz	Buzz
Distinguish, Dx, and Tx Scabies vs. Lice	Scabies: linear burrows, itchy rash to hand/feet/groin; Tx permethrin (NOT lindane if peds/pregnant, causes seizures) or ivermectin. Lice: nits (eggs attached to hairs) on itchy head; Tx permethrin (alt. malathion), scrape out nits, repeat tx 7-10d.
Dx and Tx of Kawasaki Disease	SSx: High fever x minimum 5d + 4/5 hallmarks (1.5cm cervical LN, rash, hand/foot changes, mucosal changes esp. lip cracking and "strawberry tongue," bilateral conjunctivitis); concern for cardiac aneurysms (get Echo). Tx: high-dose ASA and IVIG.
Dx and Tx of Henoch-Schönlein Purpura	SSx: Post-infectious vasculitis (IgA deposition) causing palpable purpura, abd pain, renal disease (check for failure). Tx: steroids or immunosuppression (controversial), resolves in 3-4wks. May be complicated by intussusception.
Dx and Tx of Pityriasis Rosea	SSx: Herald patch, Christmas tree distribution of rash on back, unknown cause. Tx: improved with sunlight, treat pruritis with antihistamines, otherwise benign and nothing to do.
Dx and Tx of Cat Scratch Disease	<i>Bartonella henselae</i> . SSx: cat scratch/bite 1-3 weeks prior, causes regional LAD. Tx: Doxycycline (or azithromycin in pregnancy).
Distinguish Simple from Complex Febrile Seizures	Occurs in 6mo-6yr (NOT less than 6mo). Simple: fever, <15min, single episode/24hr, generalized, no neuro hx and normal exam; no special workup or treatment needed. Complex: anything else.
Name most common midline and lateral congenital neck masses	Midline: thyroglossal duct cyst (vs. hemangioma). Lateral: brachial cleft cyst (vs. cystic hemangioma).
Dx of Peds Respiratory Foreign Body	Most commonly coins, peanuts, beans. SSx: high suspicion if "choking" episode at home, eval with lateral decubitus XR (inflated dependent side with +FB), XR normal in 40%, if in doubt get CT or bronch
What is the approach to resuscitation in a choking child <1yr?	5 back blows, 5 chest compressions (no abd compressions)
Dx and Tx of Croup	Occurs at 6mo-3yr, parainfluenza virus. SSx: barky cough, stridor with agitation vs. rest. Dx: XR with steeple sign. Tx: Decadron (0.6mg/kg), racemic epi if stridor at rest (monitor for rebound), admit if sick, hypoxic, or with persistent stridor (consider bacterial superinfection).
Dx and Tx of Epiglottitis	Classically <i>H. influenzae</i> in kids (since vaccine, more adults and now most commonly 2/2 <i>S. pneumoniae</i>). SSx: toxic child, leaning forward/"tripod" position, drooling, stridor, fever; XR with thumbprint sign. Tx: ceftriaxone and OR for airway eval, BVM ok, avoid RSI.
Dx and Tx of Bronchiolitis	Occurs < 2yrs, most commonly 2/2 RSV. SSx: lower airway inflammation causing wheezing, 1-2wks duration. Tx: trial of nebs (nebs and steroids don't help), otherwise supportive; admit if persistently hypoxic or < 3mo for apnea monitoring.
Dx and Tx of Retropharyngeal Abscess	SSx: sick-appearing kid <6yrs, drooling, fever, caused by strep/staph/anaerobes; XR with pervertebral soft tissue swelling on lateral. Tx: IV clinda, ENT/OR.



Pediatrics

Bizz	Buzz
Review the most common causes of pneumonia by age group: <3mo, 3mo-5yr, >5yr	< 3mo: GBS, Klebsiella, Listeria, <i>E. coli</i> , Chlamydia (Tx: CXR, LP, admit for cefotaxime and ampicillin, azithro if chlamydia). 3mo-5yr: RSV, <i>S. pneumo</i> , HiB, mycoplasma (Tx: amoxicillin). >5yr: mycoplasma, atypicals (Tx: azithro or doxy). Give Vanco if kid looks sick.
Review the appropriate workup and treatment of fever in kids <4wks, 4-8wks, >8wks	<4wks: (GBS, <i>E. coli</i> , Listeria) get blood and urine cultures, XR, LP, admit, give empiric cefotax and ampicillin, add acyclovir and vanc depending on risk. 4-8wks: more targeted, low threshold to treat like <4wks. >8wks: use clinical decision rules (Philadelphia, Rochester, Boston - generally well appearing, WBC <15, bands <1.5, CSF wnl, UA WBC <10) if low risk home, high risk LP, abx, admit; always send UA.
Compare Dx and Tx of Myocarditis vs Pericarditis in kids	Myo: (MCC HF in kids) viral infection; SSx poor feeding and sweating, inc RR and HR, big liver; Dx nonspecific EKG, +trop; Tx admit for workup. Peri: viral infection; SSx pain worse with lying flat; Dx diffuse STE or PR depression, trop neg, get echo to r/o effusion; Tx NSAIDs.
Compare Dx and Tx of PDA vs. ASD vs. VSD in kids	PDA: L -> R shunt (aorta to PA); SSx continuous machine murmur, wide PP, **may be worse with O2**; Tx indomethacin, surgery. ASD: usually missed, L -> R shunt and eventual R heart failure; SSx asymptomatic unless large so often delayed dx. VSD: (MC congenital heart dz) SSx loud, harsh holosystolic murmur at LLSB, L -> R shunt and R heart failure, usu present at 6wks; all require peds cards and possible surgery.
Name the 5 cyanotic congenital heart lesions	(all involve R -> L shunt) Truncus Arteriosus, Transposition of Great Arteries, Tricuspid Atresia, Tetralogy of Fallot, Total Anomalous Pulmonary Venous Return
Dx and Tx for ductal dependent congenital heart lesions	(coarctation of aorta, critical aortic stenosis, hypoplastic left heart, tricuspid atresia, tetralogy) rapid decompensation with cyanosis at d2-10 (when PDA closes); Initial Tx with PGE1 to reopen duct (0.1 mcg/kg/min, side effect hypotension, apnea) and admit to PICU
Dx and Tx of Tetralogy of Fallot	RV hypertrophy, pulm stenosis, overriding aorta, VSD; SSx: causes cyanosis d2-10 with duct closure, shock, little improvement with O2; Dx: XR boot-shaped heart; Tx: PGE1, bicarb, fluids, blood, sat to 70s is ok
Describe a typical tet spell and appropriate treatment	Hypercyanosis associated with feeding, straining, crying, or exertion; Tx knee to chest (inc peripheral resistance), O2, morphine (dec pulm pressure)
Dx and Tx of Coarctation of the Aorta	SSx: HTN/plethora in upper extremities/face, decreased BP/pulse in LE, present with shock d2-10 2/2 duct closure. Associated with Turner's syndrome. Tx: PGE1 (watch for hypotension/apnea)
What is the appropriate administration of glucose for hypoglycemia in neonates and kids?	(Rule of 50) D10 in infants (5cc/kg), D25 in kids (2cc/kg), D50 in teens/adults (1cc/kg)
Dx and Tx of Congenital Adrenal Hyperplasia	21-hydroxylase most common, causes virilization (noticeable in females) and salt wasting. SSx: present with adrenal crisis (low Na, high K). Tx: glucose, IVF, IV steroids (preferably with mineralocorticoid activity, i.e. not dexamethasone, which only has glucocorticoid activity)



Pediatrics

Bizz	Buzz
Dx and Tx of (Generic) Inborn Error of Metabolism	Ammonia and acid production. SSx: present at day 3-5 with hypoglycemia, acidosis, seizures, odd smell. Dx: Send ammonia level. Tx: IVF, glucose.
Dx painless abdominal mass, age 3-5yr	Wilms Tumor (nephroblastoma)
Risk factors for SIDS	Kids <1yr with unexpected and otherwise unexplained death. Risks: URI, sleep in bed with parents, smokers, poverty, prone sleeping.
Dx and Tx of ALTE	1wk-2mo, perioral cyanosis, associated with pertussis and RSV. Workup per history, for the ISE and Boards admit for monitoring.
Dx: Poor family, infant with seizure	Hyponatremia from dilue feeds. Tx with hypertonic saline (5ml/kg 3% NaCl)
Dx: AMS, kid with ETOH ingestion	Hypoglycemia (replete per rule of 50)
Dx: kid at grandma's house with AMS, pinpoint pupils	Clonidine ingestion, give (lots of) narcan
Dx: kid with lethargy, intermittent crying	Intussusception
Dx: kid with bloody diarrhea, lethargy	EColi O157:H7 and possibly HUS (do NOT give abx, increases chance of HUS)
Dx: Boyfriend babysits	Non-accidental trauma/abuse
Dx: Recurrent RML pna	Aspirated foreign body
Compare Dx and Tx of Phimosis vs. Paraphimosis	Phimosis: unable to retract foreskin, ok unless urinary obstruction; Paraphimosis: foreskin stuck retracted over glans, causes ischemia, must reduce ASAP
Describe the risks for UTI, criteria for sending Ucx, and dispo criteria for UTI in kids	M <1yr have increased risk, all females and uncircumcised M < 3 increased risk; always send UCx (even if udip normal, >50K CFU+); Fever + UTI = Pyelo and requires admission, no fever can likely d/c with abx
What is a common cause of UTI <1yr	50% with vesicouretral reflux or other structural abnormality
Dx and Tx of Reyes Syndrome	Kid takes aspirin for viral URI -> AMS and fatty degeneration of the liver, cerebral edema. Tx is supportive.
What is the appropriate intervention for a failed airway in a pediatric patient (<8-10yr)?	Cricothroidotomy is contraindicated in this age group, should do needle cric with transtracheal ventilation. Can attach syringe without plunger to 7.0mm cap for BVM ventilation OR 3.5mm ETT cap can be attached to the angiocatheter.
What is the appropriate interspace for LP in infants?	L4/L5 or L5/S1; in young infants the spinal cord ends at L3 (in adults it is L1/L2).
What is the most common cause for meningitis in a neonate?	Group B Strep
What is the appropriate compression to ventilation ratio in a newborn?	30:2 compression-to-ventilation ratio for single rescuers, 15:2 compression-to-ventilation ratio for 2 person rescuers
What is the most sensitive and specific sign for pneumonia in kids?	O2 sat < 92%
Dx: Rectal prolapse in a kid	Cystic Fibrosis



Respiratory

Bizz	Buzz
What is the most common cause of infectious airway obstruction in children?	Croup, i.e. "laryngotracheobronchitis"; caused by parainfluenza virus. SSx: barky cough worse at night, stridor
What is the characteristic XR finding in Croup?	"Steeple sign" (tapering of the upper airway on AP view)
What is the appropriate treatment of croup?	Cool/humidified air, steroids (PO or IV dexamethasone), give racemic epinephrine if stridor at rest, admit for severe or refractory symptoms.
Dx: Sore throat, normal posterior oropharynx, ill-appearing, in tripod position	Epiglottitis, caused by H.flu if unvaccinated, MC Staph/Strep if vaccinated, and more common in adults now thanks to the HiB vaccine
What is the characteristic XR finding in Epiglottitis?	"Thumbprint sign" (enlarged epiglottis on lateral view)
What is the appropriate treatment of Epiglottitis?	Emergent airway management - if at all unstable/ill-appearing, get to the OR with ENT for direct visualization/scope. If well-appearing/stable consider XR, antibiotics, steroids with ENT consult.
Dx: Inspiratory whoop between violent coughing spells	Pertussis, caused by <i>Bordetella pertussis</i> . SSx: Occurs in phases (Catarrhal with URI, Paroxysmal for 2-4wks with violent "whooping" cough, Convalescent with milder persistent symptoms for weeks/months), associated with siezures. Tx: macrolides (also cover contacts).
What is the appropriate treatment for Pertussis?	Erythro-/Azithromycin or TMP-SMX; treat close contacts, update vaccinations.
Dx: Bleeding from trach site weeks after placement	Tracheo-innominate fistula; there is often a smaller sentinel bleed weeks after placement followed by massive hemorrhage. Tx: intubate to compress bleeding through trach site; can also hyperinflate cuff.
Dx: Child alone in room starts coughing	Inhaled foreign body
What is the appropriate treatment for suspected hereditary angioedema?	FFP, icatibant; normal allergic rxn meds don't work.
What is the general approach to treatment of patients with pneumonia and the following dispos: Outpatient, Inpatient, ICU	Outpatient/CAP: likely S.pneumo or atypicals, tx with Doxycycline/Azithro. Inpatient: add Gram negative coverage, Tx fluoroquinolone or ceftriaxone + azithro. ICU: cover Pseudomonas and MRSA with cefepime and vanc.
Most common cause of community acquired pneumonia? Tx?	<i>Strep pneumoniae</i> (rusty sputum), a Gram positive lancet-shaped encapsulated diplococcus; most commonly causes lobar pneumonia, abrupt onset with shaking chills. Tx: ceftriaxone/azithro.
Dx: Pneumonia + history of Cystic Fibrosis	Pseudomonas, a Gram negative rod; SSx: green sputum, multilobar pneumonia. Tx: give antipseudomonal antibiotics (e.g. cefepime).
Dx: Pneumonia + alcoholic + currant jelly sputum	Klebsiella, an encapsulated Gram negative bacillus in pairs, higher risk in alcoholics, diabetics, COPD, nursing homes. Dx: XR may show "bulging" RUL or air-fluid level, pt may also have GI symptoms, hyponatremia. Tx: IV ceftriaxone (cephalosporin) + Gent/Amikacin
Dx: Pneumonia after Influenza	<i>Staph aureus</i> , associated with IVDA, hospitalized patients. Patients look sick, may have multilobar pneumonia, empyema, pumonary abscess.
Dx: Infection in a patient with an indwelling urinary catheter	<i>Pseudomonas</i> likely



Respiratory

Bizz	Buzz
What are risk factors for Health Care Associated Pneumonia?	Nursing homes, hospitalization in the last 90 days, HD, home IV abx; more likely to have drug-resistant bugs and thus require broad coverage including for <i>Pseudomonas</i> and MRSA (NOTE: HCAP is now defunct, replaced by Hospital Acquired Pneumonia, but for test purposes you should know the criteria for HCAP, as the test often lags behind practice by a few years).
Dx: Immunocompromised with marked dyspnea and hypoxemia	PCP pneumonia, seen in HIV with CD4 < 200. Dx: increased LDH, "bat wing" sign on CXR. Tx: TMP-SMX, IV Pentamidine (may cause hypoglycemia, hypotension), oral dapsone (may cause methemoglobinemia); risk of deterioration after abx started, treat with antibiotics + steroids (if PaO ₂ < 70 or A-a gradient >35).
Dx: Mild pneumonia symptoms and ear pain	<i>Mycoplasma pneumoniae</i> , atypical pneumonia with insidious onset and frequent extrapulmonary symptoms such as bullous myringitis, conjunctivitis. Dx: CXR with diffuse interstitial pattern, can dx with cold agglutinin test. Tx: azithromycin. (NOTE: bullous myringitis is not solely associated with <i>M. pneumoniae</i> , but the test tends to associate the two.)
What complications are associated with <i>Mycoplasma pneumoniae</i> ?	Aseptic meningitis, hemolytic anemia, Guillain-Barré, erythema multiforme
Dx: Pneumonia + Gram Positive Rods	Pulmonary anthrax
Dx: Infant with staccato cough	<i>Chlamydia pneumoniae</i>
Dx: Pneumonia and headache in a bird owner	Psittacosis, <i>Chlamydia psittaci</i> . Tx: tetracycline or doxycycline.
Most common viral pneumonia in adults?	Influenza
Dx and Tx: ARDS after exposure to rodents	Hanta Virus; supportive care only
Dx and Tx: Pneumonia + diarrhea + hyponatremia	Legionnaire's Disease (<i>Legionella pneumophila</i> , a Gram negative rod), associated with aerosolized water e.g. in air conditioning of nursing homes or hospitals. SSx: high fever, headache, diarrhea, hyponatremia, seizures or focal neuro deficits. Dx: urinary antigen testing. Tx: cipro, erythro, or azithro.
Dx and Tx: Pneumonia + sheep	Q fever (<i>Coxiella burnetii</i> , an obligate intracellular Gram negative bacterium). Tx: tetracycline or doxycycline.
Dx and Tx: Pneumonia + high temp + hunter/butcher	Tularemia (<i>Francisella tularensis</i> , a Gram negative coccobacillus). Tx: Streptomycin.
Dx and Tx: Pneumonia in alcoholic who passed out/vomiting	Aspiration pneumonia, usually in RLL. Tx: broad antibiotic coverage including Gram negatives, anaerobes.
What pathogen is associated with bullous myringitis accompanying pneumonia?	Classically <i>Mycoplasma pneumoniae</i> ; newer studies suggest it is actually caused by <i>Strep pneumoniae</i> .
What is the underlying pathologic process in emphysema?	Irreversible destruction of alveolar septae, associated with smoking, certain jobs (e.g. ship-building), CF, <i>alpha</i> -1-antitrypsase
What are the typical CXR findings in a patient with COPD?	Hyperinflation, flat diaphragms, blebs/bullae



Respiratory

Bizz	Buzz
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 for acute decompensation in COPD patient?	Pneumothorax (high risk), mucous plug, PE, MAT/arrhythmia, pneumonia
Review the approach to mechanical ventilation of a COPD patient	Avoid barotrauma, minimize auto-PEEP by using lower RR (8-10/min), lower TV (5cc/kg), prolong expiration time, and tolerate respiratory acidosis/permissive hypercapnea
Review the approach to supplemental O2 in a COPD patient	They are chronically hypoxic and hypercapnic, 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 preoxygenating.
What are the typical pulmonary function test abnormalities in Asthma and COPD patients?	decreased FEV1, decreased FEV1/FVC, decreased PEFR
Review the approach to treatment of COPD patient	Supplemental O2 only as needed for target SpO2 88-92%, antibiotics for change in sputum or obvious infection, steroids, albuterol/ipratropium, BiPAP, intubate if all else fails
What are the most likely causes/triggers for COPD and asthma?	COPD most likely 2/2 infection (usually viral); asthma more likely 2/2 meds, exercise, allergens
What is the underlying pathologic process in asthma?	Bronchoconstriction due to hyperreactivity causing airflow obstruction, lower airway inflammation
Dx: Persistent cough in patient with atopic history	Cough-variant asthma
Management of 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
Review the approach to treatment of asthma patient	Ok to supplement O2 (not as dependent on hypoxic drive as COPD pts), steroids, albuterol/ipratropium, Mg if sick, Epi if sick, 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, decreases cGMP and promotes bronchodilation in larger airways by inhibiting vagally-mediated bronchoconstriction
What is the mechanism of systemic steroids in treatment of asthma?	Limits recruitment and activation of inflammatory cells, decreases leukotriene and prostaglandin production; note that these effects are delayed, not immediate.
Review the approach to intubation and mechanical ventilation of an asthma patient	Avoid barotrauma, minimize auto-PEEP by using lower RR (8-10/min), lower TV (6cc/kg), prolonged expiration time; note that you can tolerate respiratory acidosis/permissive hypercapnea. Give IVF before intubation (PPV decreases preload and may cause hypotension).



Respiratory

Bizz	Buzz
What is the best measurement of airway pressure in pt on vent?	Plateau pressure; peak pressure measures flow resistance in larger airways. Keep plateau pressure < 30 in asthma/COPD pts.
Dx and Tx: PEA arrest after intubation of asthma patient	Tension pneumothorax; disconnect from vent, squeeze chest, place bilateral chest tubes, give IVF.
Dx and Tx of Bronchiectasis	Permanent destruction and dilatation of bronchi 2/2 recurrent infections, cystic fibrosis. SSx: chronic foul-smelling sputum, hemoptysis, recurrent pna. Dx: CXR may show honeycombing, "tram-track" markings, get CT to dx (dilated, tortuous airways). Tx: abx (cover <i>Pseudomonas</i>), albuterol.
Dx: Child or teenager with pancreatitis	Suspect cystic fibrosis (GI variant)
What is the pathophysiology of cystic fibrosis?	Autosomal recessive disorder involving a variety of mutations in a cellular chloride channel, leading to abnormally viscous mucous secretions that cause impaired airway clearance and obstruction, reproductive dysfunction, and a variety of GI effects (e.g. pancreatic dysfunction, ileus, etc.).
How is cystic fibrosis diagnosed?	Elevated quantitative sweat chloride test or DNA testing
Dx: Fever, sick, possible ruptured esophagus	Mediastinitis (2/2 Boerhaave syndrome)
Most common cause of pleural effusion in elderly patients	Malignant effusion
What is the pathophysiologic difference between exudative and transudative effusions, and how are each of these managed?	Exudative: damaged capillaries leak thick fluid usually 2/2 inflammation, effusion must be removed. Transudative: intact capillaries leak thin fluid 2/2 increased hydrostatic or decreased oncotic pressure, tx underlying cause.
What are common causes of exudative and transudative pleural effusions?	Exudative: pneumonia, malignancy, trauma. Transudative: CHF, 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.
Dx: PCP pneumonia with sudden worsening SOB	Pneumothorax (strong association PCP and PTX)
What is the most sensitive bedside test for possible pneumothorax?	Bedside ultrasound (better than CXR); look for "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
Treatment of tension pneumothorax	Immediate needle decompression (2nd intercostal space at midclavicular line) followed by chest tube. DO NOT take the time to get CXR.
What is the treatment for empyema?	(Empyema = pus in pleural space.) Can dx with thoracentesis, ultimately requires tube thoracostomy vs. thorotomy, and long-term antibiotics.
What is the most common cause of hemoptysis in the US and abroad?	US: bronchitis; Worldwide: TB



Respiratory

Bizz	Buzz
What defines massive hemoptysis?	50mL single expectorant, 600mL in 24hr
What is the most common cause of death in massive hemoptysis?	Hypoxia/asphyxiation (not blood loss); early airway management is key.
What is the appropriate treatment for an 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; blood transfusion is less important. After initial stabilization the pt will need bronch or angio to ID source of bleeding.
Dx and Tx: Young person, massive hemoptysis, bilateral whiteout on CXR	Diffuse Alveolar Hemorrhage (usu. inflammatory or autoimmune); Tx with high dose steroids, supportive care.
Dx and Tx: AMS + vomiting + patchy dependent consolidation	Aspiration pneumonitis, chemical pulmonary inflammation. Initial treatment is supportive with monitoring for development of aspiration pneumonia and need for antibiotics.
Dx and Tx: Alcoholic with foul breath, cough and CXR with air fluid level	Lung abscess, often polymicrobial (incl. Staph). Aerobes/TB are usually in upper lobe, anaerobes in lower lobe. Tx: antibiotics, surgery if severe.
What are potential CXR findings in primary, reactivation and miliary TB?	Primary: lower lungs, hilar LNs. Reactivation: upper lobe granuloma +/- cavitation. Miliary: scattered nodules throughout lung fields.
How is TB diagnosed?	Sputum stain for AFB is suggestive, faster but must be confirmed with sputum culture (takes weeks). Quantiferon Gold is a possible alternative but more expensive. Tuberculin skin testing can be used to screen, but positive tests require followup (CXR, Quant Gold, etc.).
What defines a positive TB skin test?	5mm induration: HIV/immunosuppressed, close contact with active TB, abnormal CXR. 10mm induration: h/o IVDA, exposure to high risk setting (immigrant from TB-endemic area, jail, healthcare worker), children <4yo. 15mm induration: everyone else.
What is the treatment for latent and active TB?	Latent: Isoniazid x 6-9 mo. Active: Rifampin, Isoniazid, Pyrazinamide, Ethambutol (alt Streptomycin) x 9-12 mo.
What are potential side effects of RIPE therapy?	Rifampin: orange body fluids, hepatitis, low platelets. Isoniazid: neuritis (B6 deficiency), hepatitis, seizure in OD (give B6). Pyrazinamide: hepatitis, high uric acid -> gout. Ethambutol: optic neuritis. Streptomycin: vestibular nerve damage, renal injury.
What are potential EKG changes seen with pulmonary embolism?	Sinus tachy most common, nonspecific ST changes, R heart strain (e.g. new RBBB, inverted TW in II/III/aVF and V1-V3), S1Q3T3 is classic but uncommonly seen.
What is a classic CXR finding with pulmonary embolism?	Hampton's hump (pleural-based wedge infarct)
When should the following diagnostic tools be applied in the workup of possible PE: PERC rule, D-dimer	PERC can be used in low-risk patients (as identified by e.g. Wells score); if they meet all the criteria of PERC, pretest probability is reduced to <2% and no further workup or testing is needed. D-dimer (quantitative) can be used in low- to moderate-risk patients to rule out PE. Patients with multiple risk factors (i.e. medium or high-risk per Wells score) require CTA (alt VQ scan).



Respiratory

Bizz	Buzz
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 (may need serial Doppler US if high risk) to exclude. PE: need negative imaging (CTA or VQ scan) to exclude.
When should thrombolytics be considered in a patient with PE? Dx: IVDA + multiple infiltrates on CXR	Unstable vitals AND one of the following: confirmed dx, high clinical suspicion, or RV dysfunction on echo. Septic pulmonary emboli (raising concern for endocarditis)
Dx and Tx of pulmonary arterial hypertension	Dx: SOB, chest pain, hypoxia, XR with enlarged pulmonary arteries, EKG with R heart strain. Tx with vasodilators (sildenafil).
Potential cause of acute decompensation in patient with pulmonary hypertension?	PE or IV pump failure (if on continuous PGA infusion and infusion stops)
Potential cause of acute decompensation in patient with pulmonary fibrosis?	Progression of disease vs. acute pneumonia
XR findings in pneumoconiosis	Small opacities in upper lung fields; associated with coal mining.
XR findings in silicosis	Small round opacities throughout the lung with calcified hilar nodules; associated with minerals mining.
XR findings in asbestosis	Thickened pleura, interstitial fibrosis, calcified plaques on lateral chest wall or diaphragm; associated with ship building and demolition.
XR findings in berylliosis	Hilar adenopathy and increased interstitial markings; associated with aerospace industry.
Dx and Tx: Non-caseating granulomas in lungs with bilateral hilar adenopathy	Sarcoidosis, associated with erythema nodosum. Tx: steroids.
What labs are classically abnormal in patients with sarcoidosis?	Hypercalcemia, high ACE
What are the criteria for diagnosis of ARDS?	Symptoms within 1wk of causative insult, normal heart size and bilateral diffuse infiltrates, no cardiac cause, impaired O ₂ exchange (PaO ₂ /FiO ₂ < 300)
What are the clinical features of ARDS?	Poor lung compliance, pulmonary edema, severe hypoxemia unresponsive to supplemental O ₂ ; almost any severe illness can cause this but NOT heart failure.
What is the approach to "lung protection" in ventilated ARDS patients?	Low tidal volume (4-6cc/kg), high PEEP (5-20), permissive hypercapnea but can increase RR as needed, supplemental O ₂ as needed.
What is the expected PCWP in ARDS vs CHF?	ARDS with low/normal PCWP vs high PCWP in CHF
Dx: Intermittent cough and episodic diaphoresis, XR with lung mass	Pulmonary carcinoid
Dx: Cough and ulnar neuropathy	Pancoast tumor, XR with mass at lung apex, causes brachial plexus compression



Respiratory

Bizz	Buzz
What size pneumothorax can be managed with O2 and observation alone?	20% or less
What is the most common airway location for foreign bodies to lodge?	In adults, upper airway - larynx, trachea, main bronchi (most likely R mainstem bronchus).
What mechanism of hypoxemia will not improve with O2 supplementation?	Right to left shunt
What mechanisms of hypoxemia cause an increase in the A-a gradient (>15)?	Right to left shunt, Diffusion impairment, V-Q mismatch
What is the most common symptom and sign of pulmonary embolism?	Dyspnea (73%) and tachypnea (54%). Other "classic" symptoms are less common, such as pleuritic pain (44%), cough (37%), hemoptysis (15%), tachycardia (24%), calf pain/swelling (44%).
What are potential CXR findings in pulmonary embolism?	CXR: nonspecific abnormalities, Hampton's hump (pleural-based wedge infarct), Westermark's sign (vascular cut-off sign)
What is the most common cause of pneumonia with bullous myringitis?	<i>Strep pneumoniae</i> is the most common cause; the classic association is with <i>Mycoplasma pneumoniae</i> (which is less common).
Treatment of refractory hiccups?	Thorazine



HEENT

Bizz	Buzz
Treatment of blepharitis	Wash with gentle soap, topical antibiotics (Strep/Staph)
Dx and Tx: hordeolum vs. chalazion	Hordeolum: acute painful blocked gland of Zeis at lid margin, Tx warm compresses, abx if concurrent with preseptal cellulitis. Chalazion: chronic or gradual-onset nontender granuloma due to blockage of meibomian gland, Tx warm compresses, ophtho excision.
Hordeolum vs. stye	They are the same thing.
Dx and Tx: Iritis, Uveitis, Choroiditis	Inflammation of iris, ciliary body and choroid, respectively. SSx: painful red eye, photophobia; exam shows decreased visual acuities, cell and flare, ciliary flush. Tx: Ophtho consult, dilate, steroids, pain meds.
Dx and Tx: Dacrocystitis	Tear duct infection (usu. due to <i>S. aureus</i>). SSx: purulent discharge, possible adjacent cellulitis. Tx: warm compresses and antibiotics.
Dx and Tx: Corneal dendrites	HSV keratitis; get Ophtho consult, topical trifluridine unless complicated
Dx and Tx: Bacterial conjunctivitis + contact lens wearer	Risk for <i>Pseudomonas</i> infection, treat with tobramycin drops (increasing resistance to cipro)
Dx: Metal worker + eye pain	Intraocular foreign body (look for teardrop pupil, Seidel's sign to r/o globe rupture)
Primary concern after hyphema? Treatment?	Rebleed worse than initial, risk for glaucoma. Tx: bedrest, HOB elevation, pain meds, cycloplegics, ophtho consultation.
Dx and Tx of endophthalmitis	Infection of anterior, posterior and vitreous chambers of the eye, may be 2/2 trauma or iatrogenic after surgery; causes severe pain and visual impairment. Dx: exam with decreased visual acuity, injected conjunctiva, chemosis, possible hypopyon. Tx: ophtho consult, intraocular and systemic antibiotics.
Treatment of acute angle closure glaucoma	Acetazolamide, timolol, mannitol, pilocarpine (goal is to decrease aqueous production and increase outflow)
Dx: Sudden painless unilateral vision loss, retina with "box-cars" or "cherry-red spot"	Central retinal artery occlusion
Dx: 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
Dx: Dizzy + vertical, multidirectional, or non-fatigable nystagmus	Central vertigo
Ddx for gingival hyperplasia	Acute necrotizing ulcerative gingivitis, HIV, phenytoin toxicity, acute leukemia
White plaques on oral mucosa, can be scraped off	Candidia, associated with immunocompromise, abx use
AP neck XR with "steeple sign"	Bacterial tracheitis (croup in kids)
Lateral neck XR with "thumb print sign"	Epiglottitis
Name Centor criteria for acute bacterial pharyngitis	Fever, tender anterior LAD, no cough, tonsillar exudates; 4/4 -> empiric abx, 3/4 consider culture/rapid strep



HEENT

Bizz	Buzz
What medication is most likely to improve symptoms of viral pharyngitis?	Dexamethasone
Dx and Tx: Barky cough	Croup, caused by parainfluenza in kids 6mo-3yr. Tx: steroids, racemic epi if stridulous at rest.
Dx and Tx of dry socket (alveolar osteitis)	Severe pain 2-5d after dental extraction, exam shows exposed bone, loss of protective clot. Tx with iodoform guaze, eugenol (oil of clove), abx, and oral surgery referral.
Dx and Tx of CMV retinitis	Occurs in HIV with CD4 <50. SSx: decreased visual acuities, with floaters/visual field cuts/photophobia; exam shows white fluffy perivascular lesions with hemorrhage. Tx with IV gancyclovir.
Four causes of afferent pupillary defect	CRVO, CRAO, optic neuritis, retrobulbar neuritis
Dx and Tx: Monocular vision loss, worse centrally, afferent pupillary defect, pain with EOM, diminished color vision	Optic neuritis. Consult neurology and ophtho, start IV steroids, MR to eval for MS.
Treatment of CRAO	Digital massage, acetazolamide, mannitol, topical timolol, sublingual nitro (goal is to dislodge, dilate, decrease IOP).
Dx if positive head impulse test (i.e. presence of corrective saccade)	Vestibular neuritis / labyrinthitis
Pinguecula vs. pterygium	Pinguecula: raised fleshy conjunctival mass, 2/2 chronic inflammation from wind and UV light (usually lateral due to shadowing of the medial eye by the nose). Pterygium: vascular triangular mass (usually nasal, "bat wing" shape), more likely to interfere with vision requiring surgery.
Identify classifications of dental fractures and appropriate management	Ellis I: enamel (white, painless), optional dental followup. Ellis II: dentin (yellow, painful), apply Ca hydroxy paste and dental followup. Ellis III: pulp (pink/red, painful), dental emergency, cover with moist cotton and dental foil, give empiric abx, pain meds, and get dental consultation or arrange dental f/u within 24hr for root canal and pulpectomy.
What should be the approach to stopping anterior epistaxis?	Direct pressure, vasoconstrictors (oxymetaxoline/Afrin, pheynlephrine, cocaine), balloon/tampon devices (be sure to soak with water not saline), send home with antibiotics if packing left in place. Silver nitrate sticks can be used to cauterize a site of recent but not active bleeding.
What are the most common sources of anterior and posterior epistaxis?	Kiesselbach plexus (anterior) and sphenopalatine artery (posterior)
What is the appropriate treatment and disposition for patients with posterior nasal packing?	Prophylactic antibiotics and admit to ICU/monitored bed due to risk of vagally-mediated bradycardia and airway compromise.
When draining a peritonsillar abscess, what structure is at risk and how can it be avoided?	Carotid artery (2.5cm posterolateral to tonsil). Keep the needle as medial as possible, and cut the needle cap to make a needle guard, ensuring a maximum of 1 cm insertion depth.



HEENT

Bizz	Buzz
What is the appropriate management for an insect in 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.
Most common site of sialoadenitis? Tx?	Submandibular gland (Wharton duct). Tx: milk stone, give sialogogues.



Neurology

Bizz	Buzz
Dx: Eye down and out	CN III palsy; consider CVA, uncal herniation if with blown pupil
Dx: Bilateral internuclear ophthalmoplegia	Combined 3rd and 6th nerve palsy; usually multiple sclerosis
Dx: Urinary incontinence, AMS, ataxia	Normal Pressure Hydrocephalus; also may be shunt malfunction
Dx: Young obese woman, headaches, vision changes	Idiopathic intracranial hypertension (pseudotumor cerebri); risk permanent vision loss if not dx/tx; CT normal, LP diagnostic and therapeutic
Dx and Tx: Neuroleptic Malignant Syndrome	Antipsychotic use, hyperthermia, "LEAD PIPE" MUSCLE RIGIDITY; Tx: symptomatic (IVF, benzos, cooling)
Dx and Tx: Serotonin Syndrome	Serotonergic agent use (e.g. SSRI) or multi-drug overdose, CLONUS/HYPERREFLEXIA, hyperthermia. Tx: symptomatic (IVF, benzos, cooling), +/- Cyproheptadine
Dx: CNS mass lesion in AIDS	1) Toxo (multiple ring-enhancing lesions), 2) CNS lymphoma
Treatment of intraparenchymal hemorrhage	Reverse coagulopathy, lower ICP if herniating (mannitol), lower BP to 160/90, craniotomy (if cerebellar) vs. ventriculostomy
Classic symptoms for ACA vs. MCA vs. PCA strokes	ACA - leg weakness/numbness; MCA - aphasia and face/arm numbness/weakness; PCA - vision changes
Treatment of sickle cell pt with CVA	Exchange transfusion
Indications for tPA for CVA	Adult patient, symptoms < 4.5hr, CTb negative for bleed, no clear reversible cause
Absolute contraindications for tPA for CVA	Ischemic stroke, neurosurgery, or head trauma within 3mo; any ICH (current or previously); major surgery within 2wks; BP >185/110 after reduction attempted; possible SAH; known intracranial tumor, aneurysm, or AVM; possible reversible cause; recent bleeding or coagulopathy (PT >15s, INR >1.7, Plt <100)
Major difference between lacunar and cortical infarcts	Lacunar causes motor OR sensory symptoms; Cortical causes both motor AND sensory symptoms
How to use ABCD2 for TIA dispo	Age >60, BP >140/90, Clinical features - speech disturbance (1pt) or unilateral weakness (2 pts), Duration of symptoms 10-60m (1pt) or >60m (2 pts), Diabetes. Score predicts stroke risk within 90d; 0-3 = low risk (ok for outpt f/u in 2d), >3 = high risk (admit for carotid Dopplers and echo)
Best study to diagnose venous sinus thrombosis	MR venography
Appropriate treatment for suspected bacterial meningitis	CT brain, IV steroids, IV abx (Ceftriaxone, Vanc, +/- Amp and/or Acyclovir in appropriate patients), then LP
Dx and Tx: bloody and necrotizing encephalitis	HSV; Tx: IV acyclovir
Findings with UMN lesion	Spastic paralysis, hyperreflexia, positive (upgoing) Babinski, increased tone
Findings with LMN lesion	Flaccid paralysis, muscle wasting, hyporeflexia, fasciculations
What distinguishes Conus Medullaris Syndrome from Cauda Equina Syndrome?	CMS is UMN lesion above level of L1 but otherwise presents similarly to CES; exam will have positive (upgoing) Babinski



Neurology

Bizz	Buzz
Dx and Tx: Guillain-Barré Syndrome	Autoimmune demyelination causing ascending motor and sensory loss, loss of reflexes, usually after preceding infection (Mycoplasma, Campylobacter). Tx: plasmapheresis or IVIG, airway management, steroids are NOT helpful.
What is the Miller Fisher variant of GBS?	Presents with ataxia and CN abnormalities (bulbar symptoms)
Difference between GBS and tick paralysis	GBS: paresthesias/pain and motor loss, post-infectious autoimmune dz. TP: ascending weakness only, caused by neurotoxin in tick saliva so must remove tick
Dx and Tx: Botulism	Wound or food related, blocks release of acetylcholine at neuromuscular junction, causing smooth muscle paralysis initially and presenting with CN/bulbar symptoms, urinary retention, constipation. Tx: antitoxin, abx if wound related, airway management.
Dx and Tx: Syringomyelia	Cyst in upper spinal cord, causes "cape-like" loss of pain/temp sensation to upper extremities and back, chronic headaches if Chiari malformation. Tx: neurosurgery consultation, monitor vs. drain.
Dx and Tx: Myasthenia gravis	Autoantibodies against nicotinic acetylcholine receptors (25% with associated thymoma), present with CN 3 palsy, ptosis, EOM deficits, proximal muscle weakness, arrhythmia, and heart block; worse with repetitive movements. Dx: improved SSx with edrophonium (Tensilon Test, usually done by neurology). Tx: airway management (follow vital capacity, NIF), immunosuppression, IVIG, plasmapheresis, thymectomy.
Difference between Myasthenia Gravis and Lambert-Eaton Myasthenic Syndrome?	MG: fatigue with repeated movement. LEMS: improves with repetition. Note that LEMS is often paraneoplastic, so look for underlying cancer if not already diagnosed.
Dx and Tx: Young man presents with LE paralysis, high thyroid, low K	Thyrotoxic Periodic Paralysis: caused by transmembrane shift of K into cells. Tx: give oral K repletion (not aggressive) and beta blockers.
Treatment of seizures related to eclampsia	Magnesium sulfate 6gm IV
Treatment of seizures related to INH overdose	Vitamin B6/Pyridoxine (1gm per 1gm of INH toxicity)
Prophylaxis for close contacts of pt with <i>Neisseria meningitis</i>	Rifampin
Treatment for brain abscess	IV ceftriaxone, flagyl (for anerobes), and neurosurgery consult
Describe the technique for Kernig and Brudzinski signs for meningeal irritation?	Kernig: knees/hips flexed to 90 degrees, knee extension causes pain. Brudzinski: flexion of the neck causes reflexive flexion at hips and knees while pt is lying supine.
What is appropriate chemoprophylaxis for a healthcare worker exposed to <i>N. meningitidis</i> ?	Rifampin 600mg BID x2d OR Ceftriaxone 250 mg IM x1 OR Ciprofloxacin 500 mg PO x1
What medications are most appropriate for the treatment of status epilepticus?	Benzodiazepines, phenytoin or fosphenytoin (second line), phenobarbital (third line)



Neurology

Bizz	Buzz
Dx and Tx: HSV Encephalitis	SSx: Fever, behavioral changes, focal neuro deficits. Dx: CSF with increased RBCs and no bacteria, usually focal at temporal lobes (may see hemorrhage on CT). Tx: IV acyclovir.
Dx and Tx: Neurocysticercosis	Often presents as seizure in immigrant, caused by larvae of tapeworm <i>Taenia solium</i> (pork tapeworm). Dx: CT with multiple ring-enhancing lesions, can lead to obstructive hydrocephalus. Tx: Albendazole.
What is the most common cause of meningitis in an adult?	<i>Streptococcus pneumoniae</i>
In what direction would you expect nystagmus with normal caloric testing?	Tests vestibulo-ocular reflex. COWS: Cold Opposite, Warm Same.
Dx and Tx: Posterior Reversible Encephalopathy Syndrome (PRES)	SSx: Neuro symptoms including headache, AMS, seizures, vision loss; associated with vasogenic edema of the brain, most often in occipital and posterior parietal lobes, associated with preeclampsia/eclampsia. Dx: mainly clinical, CT may show edema, MR is more specific. Tx: supportive.
What is the dosing for tPA in ischemic stroke?	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
Most common cause of seizure worldwide	Cysticercosis
Dx: Diplopia with lateral gaze	Internuclear ophthalmoplegia, associated with MS
What diseases typically present with ascending vs descending weakness?	Ascending: GBS, tick paralysis. Descending: Botulism, myasthenia gravis, Miller Fisher variant GBS, Lambert-Eaton myasthenic syndrome.



Infectious Disease & Immunology

Bizz	Buzz
Dx and Tx: Fish tank granuloma	<i>Mycobacterium marinum</i> , Tx with clarithromycin + Ethambutol OR Rifampin
Dx: Rose thorn injury and rash	<i>Sporothrix schenckii</i> . Tx: itraconazole (amphotericin B if systemic)
Dx and Tx: Dog and cat bite with rapid infection	<i>Pasteurella multocida</i> . Tx: amoxicillin-clavulanate
Dx: Reptile bites and infection	<i>Salmonella</i>
Dx: Sickle cell disease and joint pain	<i>Salmonella osteomyelitis</i>
Dx: Cat scratch fever	<i>Bartonella henselae</i>
Dx and Tx: Human bite and infection	<i>Eikenella corrodens</i> . Tx: amoxicillin-clavulanate
Dx: Gastroenteritis on a cruise ship	Norwalk virus
Dx: Gastroenteritis at a daycare	Rotavirus
Compare general Dx and Tx of toxin-mediated vs. invasive bacterial diarrheal illness	Toxin: abrupt onset, watery, non-bloody; Tx IVF, +/- loperamide, +/- Cipro (prolonged/severe ssx). Invasive: gradual onset, bloody, systemic symptoms; Tx IVF, +/- Cipro UNLESS kids or elderly patients with possible <i>E. coli</i> O157:H7 (can increase risk of HUS)
Dx: Watery diarrhea + eggs/mayo	<i>Staph. aureus</i> (toxin)
Dx: Watery diarrhea + fried rice	<i>Bacillus cereus</i> (toxin)
Dx: Watery diarrhea + travel	Enterotoxigenic <i>E. coli</i> (toxin)
Dx: Watery diarrhea + meat/poultry	<i>Clostridium perfringens</i> (toxin)
Dx: Watery diarrhea + dark meat fish + rash/itching	Scombroid (excess histidine in fish gets broken down by bacteria to histamine, which gets absorbed and causes symptoms similar to an allergic reaction)
Dx: Watery diarrhea + carnivorous fish + neuro ssx	Ciguatera (toxin causes neuro ssx)
Dx: Bloody diarrhea + undercooked eggs/chicken + relative bradycardia	<i>Salmonella</i> (invasive), cafeteria outbreaks, classically with high fever and relative bradycardia; can cause osteomyelitis in sickle cell patients
Dx: Bloody diarrhea (severe) + high fever + institutionalized	<i>Shigella</i> (invasive); can cause seizures in kids
Dx and Tx: Bloody diarrhea + followed by weakness	<i>Campylobacter</i> (invasive), can also mimic appendicitis and cause Guillain-Barré; Tx Azithro/Erythro (resistance to cipro)
Dx: Bloody diarrhea + farm animals + appendicitis ssx	<i>Yersinia</i> (invasive); can mimic appy, may cause post-infectious arthritis
Dx: Bloody diarrhea + undercooked seafood + alcoholic who gets very sick	<i>Vibrio parahaemolyticus</i> (invasive)
Dx: Bloody diarrhea + poorly cooked ground beef/raw milk	<i>E. coli</i> O157:H7, associated with TTP (adults) and HUS (kids); NO ANTIBIOTICS
Dx: Rice-water stools + contaminated water	<i>Vibrio cholerae</i> (toxin)
Dx and Tx: Profuse diarrhea after recent antibiotics	<i>Clostridium difficile</i> (invasive); Tx metronidazole or PO Vanco



Infectious Disease & Immunology

Bizz	Buzz
Dx: Diarrhea + AKI +/- low platelets	<i>E. coli</i> O157:H7 causing TTP/HUS
Dx: Food-borne illness associated with premature delivery in pregnant patients	<i>Listeria monocytogenes</i>
Review the general pathophysiology, Dx, and Tx of botulism	<i>Clostridium botulinum</i> (anaerobic spore-forming bacillus, associated with infection in infants after ingestion of raw honey, and in adults with wounds [black tar heroin] vs. ingestion [dented cans]), toxin inhibits ACh release and causes descending paralysis (vs. GBS ascending; also all motor ssx), bulbar neuropathy ("Ds": Diplopia, Droopy eyes, Dilated pupils, Dry mouth, Dysphonia, Dysarthria), urinary/stool retention, and respiratory failure. Tx is supportive, intubate as needed, contact CDC, give antitoxin if possible, antibiotics if wound-related.
What is the most common cause of bacterial diarrhea in the US?	<i>Salmonella</i> ; 2nd <i>Campylobacter</i>
Leading cause of infertility?	<i>Chlamydia trachomatis</i>
Dx and Tx: Painless vesicular lesions or ulcers to groin + buboes (huge LNs)	<i>Chlamydia trachomatis</i> causing lymphogranuloma venereum; Tx azithro/doxy (and treat partners), drain abscesses
Dx and Tx: Painful ulcer with irregular borders to groin + buboes (huge LNs)	<i>Haemophilus ducreyi</i> causing chancroid (looks like syphilis but the lesion is painful); Tx single dose of azithro or ceftriaxone, drain abscesses
Dx: Neonate with copious purulent discharge from eyes	<i>Neisseria gonorrhoeae</i> conjunctivitis
Review the timing of the various causes for neonatal conjunctivitis	Chemical: first 24 hours. Gonococcal: first 2-5 days. Chlamydial: 5 days to 2 weeks.
Dx: "Gunmetal grey" pustules to hands/skin, septic arthritis +/- tenosynovitis	Disseminated gonococcus (gram-negative intracellular diplococci), Tx IV ceftriaxone
Dx: Contact with armadillos	Leprosy (<i>Mycobacterium leprae</i>); Tx dapsone + rifampin (+clofazimine for lepromatous disease)
Dx and Tx: Contact with prairie dogs	Bubonic plague (<i>Yersinia pestis</i>); Tx streptomycin, tetracycline, doxycycline (alt. fluoroquinolones)
Most common cause of viral pneumonia in adults?	Influenza
Dx and Tx: HIV + Lung Disease + Pancytopenia	<i>Mycobacterium avium intracellulare</i> (MAI) (seen in patients with CD4 < 50); Tx with rifampin + ethambutol + azithro/erythro
Dx and Tx: Primary tuberculosis	SSx: often asymptomatic, acquired via inhaled active droplets with <i>Mycobacterium tuberculosis</i> , may cause lower lobe pneumonia, may have Ghon complex (calcified lung lesion, +/- calcified LNs a.k.a. Ranke complex), may progress to latent or reactivation TB. Tx: Isoniazid (+ pyridoxine) x9mo



Infectious Disease & Immunology

Bizz	Buzz
Dx and Tx: Reactivation TB	SSx: often occurs if immunocompromised, other stressor; causes cough, fever, night sweats, weight loss, hemoptysis. Dx: XR with upper lung apical lesions +/- cavitation, Dx with mycobacterial culture/PCR of sputum (takes weeks), can send AFB (suggestive but not diagnostic, need culture to confirm). Tx: RIPE (Rifampin, Isoniazid, Pyrazinamide, Ethambutol) and **respiratory isolation** , test/treat contacts
What are the common side effects of TB treatment with RIPE?	Rifampin: orange body fluids, hepatotoxicity. Isoniazid: neuropathy and liver injury (and seizures in overdose). Pyrazinamide: liver injury. Ethambutol: optic neuritis (red/green vision)
Dx and Tx: Rapidly progressive skin infection, unusually high HR, and indifferent patient	Gas gangrene/myonecrosis caused by Clostridial myonecrosis (usually <i>C. perfringens</i> , similar presentation to necrotizing fasciitis), also tachy out of proportion to fever. Dx: subQ/intramuscular gas, incision with foul-smelling "dishwater" fluid and dead muscle. Tx: wide surgical debridement, abx (amp + gent + clinda).
Review the definitions of SIRS, sepsis, severe sepsis, septic shock	SIRS: Temp <36 (96.8) or >38 (100.4), Tachy >90, RR>20, WBC <4k or >12k or >10% bands. Sepsis: SIRS + infection. Severe Sepsis: Sepsis + end organ damage. Septic Shock: Sepsis + hypotension not initially responsive to fluids. [NOTE: these definitions have poor evidence basis and will likely be phased out, but as the ISE (and Medicare) lag behind evidence by a few years it will still be important to know.]
Review the key components of Early Goal-Directed Therapy for sepsis	2L IVF early, early empiric antibiotics, CVP 8-12 (give IVF), MAP >65 (IVF or pressors), SvO ₂ >70%, transfuse pRBCs if Hct <30%. [NOTE: strict adherence to this regimen has been debunked by several recent trials, but the necessity of adequate fluid resuscitation (30cc/kg) and early antibiotics remains well-supported.]
Dx and Tx: Young woman with high fever + rash + shock and organ failure	Toxic Shock Syndrome (2/2 tampon, alt. nasal packing or other foreign body, may also occur with skin/soft tissue infections) 2/2 Staph (MCC, more rash, assoc. with FB, lower mortality) or Strep (less rash but often with existing wound, higher mortality). Tx: remove foreign bodies, supportive care, and antibiotics (clinda first to reduce protein production, then empiric broad-spectrum for sepsis coverage)
Dx and Tx: Primary syphilis	Caused by <i>Treponema pallidum</i> (spirochete). SSx: painless genital ulcer (chancere), regional LAD. Dx: VDRL/RPR are nonspecific and often negative at this stage. Tx: PCN G benzathine 2.4 million U IM x1.
Dx and Tx: Secondary syphilis	Occurs 2-10wks after primary; SSx include body rash including palms/soles, can have kidney/liver/CNS involvement. Dx: VDRL or RPR, confirm with FTA-ABS. Tx: PCN G benzathine 2.4 million U IM x1 (if late disease three weekly doses).
Dx and Tx: Tertiary syphilis	Occurs 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: VDRL or RPR, confirm with FTA-ABS. Tx: admit for IV PCN q4h x2wks
Dx: Worsened rash and toxicity shortly after treatment of syphilis	Jarisch-Herxheimer reaction (2/2 endotoxin release from dying spirochetes)



Infectious Disease & Immunology

Bizz	Buzz
Care plan if syphilis pt is allergic to penicillin?	Admit for desensitization, they need pcn
Pathophysiology, Dx, and Tx: Tetanus	Clostridium tetani spores in soil inoculate wound, puncture wounds being high risk 2/2 anaerobic environment; bacterium produces tetanospasmin (neurotoxin) that blocks GABA, causing excitatory discharge and consequent muscle spasticity (lockjaw, painful tonic convulsions) but normal mental status. Tx: Prevent with Tdap booster q5-10yrs, for acute disease give tetanus IG, benzos, intubate PRN, antibiotics (metronidazole or Pcn G)
Dx and Tx: Red rash to diaper area with satellite lesions	<i>Candida</i> ; Tx topical antifungals (also occurs in moist areas/skin folds esp. on diabetics)
Dx and Tx: Immunocompromised + odynophasia/dysphasia	<i>Candida</i> esophagitis; Tx oral fluconazole
Dx and Tx: Indwelling catheter + yeast on blood cultures	<i>Candida</i> fungemia; Tx Amphotericin B
Dx and Tx: AIDS + Diarrhea	<i>Cryptosporidium</i> , <i>Isospora</i> , CMV, <i>M. avium</i> ; often unclear cause, Tx with symptomatic care
Dx and Tx: Immunocompromised + Painless brown/black skin lesions	Kaposi sarcoma (classically on face, chest, oral cavity); Tx cryo or radiation
Dx and Tx: AIDS + white plaque on oropharynx	Either <i>Candida</i> /Thrush (can scrape off, bleeds) vs. Oral Hairy Leukoplakia (can't scrape off, caused by EBV, very specific for HIV, precancerous)
Dx and Tx: Meningitis and focal neuro findings in AIDS pt	<i>Cryptococcus neoformans</i> (encapsulated yeast in soil with pigeon poop), also causes pulm disease. SSx: AMS or CN abnormalities. Dx: CSF cryptococcal antigen, LP with high opening pressure, + india ink stain. Tx oral fluconazole vs amphotericin B.
Dx and Tx: Histoplasmosis	Dimorphic fungus from bird/bat poop, can cause epidemics if soil upturned; endemic to Ohio and Mississippi River valleys. SSx: Often in immunocompromised patients; can cause disseminated disease or chronic progressive pulmonary disease (diffuse infiltrates and calcified nodes). Tx: itraconazole, amphotericin B.
Dx and Tx: Immunocompromised + encephalitis + ring-enhancing lesions on CT	<i>Toxoplasmosis gondii</i> (protozoan). Associated with cat poop, bad for fetus if infection occurs during pregnancy (TORCH). Tx: Pyrimethamine, folinic acid.
Dx and Tx: Travel + cyclical fever	Malaria (<i>Plasmodium</i> protozoan transmitted by female <i>Anopheles</i> mosquito); infects red blood cells and hepatocytes. SSx: causes cyclical fevers (febrile during periods of RBC rupture and merozoite spread), headache, lethargy, abdominal pain, anemia. Dx: thick and thin blood smears (ring forms) +/- Giemsa or Wright stain. Tx: Chloroquine (alt Quinine and doxy) +/- artemisinin.
What is the most dangerous/severe strain that causes malaria?	<i>P. falciparum</i> : causes severe organ damage and death; requires IV quinine (can cause profound hypoglycemia and high fevers causing seizures)
What is the cause, vector, and treatment of Lyme disease?	<i>Ixodes</i> tick carrying <i>Borrelia burgdorferi</i> , primarily in northeast US and Wisconsin; tick bite history is often absent. Tx with doxycycline



Infectious Disease & Immunology

Bizz	Buzz
What are the typical stages of Lyme disease?	Stage 1: erythema migrans "bull's eye" rash (1 wk). Stage 2: joint pain, neuro changes (e.g. bilateral Bell's palsy), heart block (days to weeks). Stage 3: chronic joint pain, neuro ssx (months to years).
Dx, vector, and Tx: Rash spreading inwards (includes palms/soles) and multiple organ failure	Rocky Mountain Spotted Fever caused by <i>Rickettsia rickettsii</i> , transmitted by wood tick (<i>Dermacentor andersoni</i>), in eastern US (Carolinas, Oklahoma). Labs may show low platelets. Tx: doxycycline, alt. chloramphenicol.
Dx and Tx: Tick exposure followed by fever, myalgias, optic neuritis, multi-organ dysfunction, low WBCs, and low platelet count	Ehrlichiosis; Tx with doxycycline or tetracycline
Dx and Tx: Fever, exudative pharyngitis, posterior lymphadenopathy	Infectious mononucleosis caused by Epstein-Barr virus; may have splenomegaly (risk rupture, limit contact/activity). Tx: supportive.
Dx: Mono + amoxicillin for presumed strep	90% develop maculopapular/petechial rash (NOT an allergy)
What are associated lab abnormalities found in patients with mono?	Atypical lymphocytes, +heterophile antibodies, hemolytic anemia, thrombocytopenia, false positive RPR or VDRL
What is the difference between genetic drift and genetic 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 usual cause of death?	Extremes of age and pregnant women are highest risk; most common cause of death is secondary pneumonia.
What is the appropriate treatment regimen for influenza?	Oseltamivir/Tamiflu or zanamivir/Relenta (Neuraminidase inhibitors) if within 48hr of symptom onset or hospitalized; no amantadine 2/2 resistance.
Dx and Tx: Rat poop and ARDS	Hantavirus (transmitted via aerosolized rodent excretions, causes Hantavirus pulmonary syndrome - ARDS, thrombocytopenia). Tx is 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?	HSV-1: oral, stomatitis, possible corneal ulcers, vesicles on digits (Whitlow); HSV-2: genital and anal (do C-section if pregnant and in labor). Dx: Tzanck smear (multi-nucleated giant cells), viral culture.
Compare the presentation and treatment of chickenpox vs. shingles (Varicella Zoster Virus)	Primary varicella (chickenpox): highly contagious, presents 2wks after exposure; causes vesicles of different stages over entire body (+mucous membranes), Tx is supportive, monitor for bacterial superinfection, give IV acyclovir if immunocompromised. Shingles: reactivation of dormant VZV, causes a painful vesicular eruption usually unilaterally in a single dermatome, can cause post-herpetic neuralgia; Tx steroids (may prevent neuralgia), acyclovir, pain control.
Dx: Bell's palsy and vesicle on ear	Ramsay-Hunt syndrome/Zoster Oticus (VZV of CN VIII)
Dx: Vesicle on tip of nose	Hutchinson's sign, V1 zoster, predicts corneal involvement/ulceration (zoster ophthalmicus)



Infectious Disease & Immunology

Bizz	Buzz
Treatment of pregnant or immunocompromised patient after exposure to varicella/zoster?	Send titers to check for immunity, and if negative give varicella zoster IG.
What animals are high risk for rabies transmission?	Dogs, bats, skunks, foxes, raccoons, coyotes; NOT rabbits or rodents.
What are symptoms of rabies infection?	Incubation 3-7wks, 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; prophylaxis includes rabies vaccine (5 injections over a month) and IG at wound and at a distant site
What defines AIDS?	HIV with CD4 < 200 OR AIDS defining illness (esophageal candidiasis, cryptococcus, CMV, Kaposi, PCP, toxoplasmosis)
What is the usual presentation of acute HIV infection?	Often missed, SSx are a non-specific viral syndrome (fever, rash, headache, myalgias). Viral load will be high but antibody testing will be negative (takes 10-24wks to seroconvert).
How is HIV diagnosed	ELISA to screen (sensitive, but delayed seroconversion for weeks to months), rapid DNA/RNA tests return more quickly, Western blot to confirm dx (sensitive and specific).
What opportunistic infections are more likely below the following CD4 counts: <500, <200, <100, <50	<500: TB, HSV, zoster, Kaposi's sarcoma. <200: PCP, HIV encephalopathy, candidiasis, PML. <100: toxoplasmosis, histoplasmosis, cryptococcus. <50: CMV (GI, pulm, retina), CNS lymphoma. **NOTE: HIV pts get all usual infections as well, but have increased risk of opportunistic as CD4 drops.**
What common lab test can be used as a surrogate to determine CD4 count?	Absolute lymphocyte count <1000 suggests CD4 <200
What is the time range for starting post-exposure prophylaxis after HIV exposure?	Should start within 72hr
Dx and Tx: Immunocompromised + pneumonia with severe dyspnea/hypoxia + high LDH	PJP pneumonia (<i>Pneumocystis jirovecii</i> , formerly PCP), most common opportunistic infection in AIDS, classically with "bat wing" pattern on XR. Tx with TMP-SMX, give steroids if PaO ₂ <70.
What are possible side effects with pentamidine (Tx for PCP pna)	Hypoglycemia, hypotension, pneumothorax
What are typical CT (non-contrast and contrast) findings with <i>Toxoplasmosma</i> encephalitis?	Non-contrast CT: multiple subcortical lesions in basal ganglia. Contrast CT: ring-enhancing lesions with surrounding edema.
Dx: Ring-enhancing intracranial lesions with 1) focal neuro deficit or 2) generalized AMS	Focal deficits: <i>Toxoplasma</i> . Generalized AMS: CNS lymphoma
Dx: HIV with CD4 <200, focal neurologic deficits with nonenhancing white matter lesions	PML (JC virus)
Dx and Tx: Progressive blindness in AIDS patient	CMV retinitis; exam shows "fluffy white perivascular lesions (cotton wool spots) with areas of hemorrhage." Tx: Gancyclovir (intraocular and oral).



Infectious Disease & Immunology

Bizz	Buzz
What 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 <72hr: HAART for 28d; if low risk and >72hr no treatment is necessary. All others per clinical judgement.
What is the difference between anaphylaxis and anaphylactoid reactions?	anaphylaxis is IgE dependent; however they look the same and should be treated the same
What is the typical presentation and appropriate treatment of anaphylaxis?	2+ organ system involvement: bronchospasm, hypotension, urticaria (possible GIB), nausea/vomiting, usually occurs within 60 min of exposure. Tx with placement of IV, supplemental O2, cardiac monitor, intubate PRN, give IM epi (0.3 ml of 1:1000 - NOT subQ), epi gtt PRN, H1 and H2 blockers, steroids
What medication should be given for a patient on beta blockers who develops anaphylaxis?	Glucagon - may improve response to epi
Dx and Tx: ACE inhibitor-induced angioedema	Usually mild, not IgE-mediated, standard allergy/anaphylaxis drugs don't work too well but you can give them anyways. Supportive care including intubation as necessary is all you can really do.
Dx and Tx: Hereditary angioedema	Autosomal dominant mutations causing deficiency or dysfunction in C1 inhibitor; angioedema often occurs with minor trauma, can be severe with airway involvement, often GI involvement. As no histamines are involved, usual allergy/anaphylaxis therapy is often ineffective, BUT GIVE FFP or recombinant C1 esterase (expensive) or Icatibant (a bradykinin-B2 receptor antagonist, also expensive)
Review Type I-IV allergic reactions and give an example of each	I: IgE-mediated, immediate onset, e.g. drug allergy/anaphylaxis. II: IgG-mediated cell destruction, cytotoxic, delayed onset, e.g. hemolytic transfusion reactions. III: drug-immune complex deposition (IgG), delayed onset, e.g. serum sickness and vasculitis. IV: cell-mediated, delayed onset, e.g. Stevens-Johnson syndrome, TB skin test, contact dermatitis
Dx and Tx: Serum sickness	Immune Type III reaction classically after antibiotics/new drug, causing fever, rash (fingers/toes then morbilliform) and joint pain. Tx: supportive with antihistamines.
Most likely infection after renal transplant?	CMV
Management: S/p transplant and sick	Assume infection AND rejection (they look the same); less likely to have fever with infection.
Dx and Tx: Graft versus host disease	Acute is <100 days since transplant; SSx include fever, rash, hypoxemia, multi-organ failure. Tx: stress dose steroids, empiric antibiotics; avoid ASA and NSAIDs.
What is the best prognostic marker for graft function after renal transplant?	Creatinine - must calculate GFR
What are potential oral antibiotic options for community acquired MRSA?	Clindamycin, TMP-SMX, doxycycline (requires IV vanco if hospital-acquired)



Infectious Disease & Immunology

Bizz	Buzz
Dx: Skin lesion, Gram positive rod	Anthrax
Dx and Tx: Cutaneous vs. pulmonary anthrax	<i>B. anthraxis</i> (Gram positive rod). Cutaneous: red lesion develops black central eschar over 1-2wks. Pulmonary: due to inhaled spores (not contagious), rapid progression to sepsis and death. Tx: penicillin, cipro or doxy
Dx and Tx: Pneumonic and bubonic plague	<i>Yersinia pestis</i> . Pulmonic: inhaled aerosolized rat droppings, very contagious, causes severe pulm ssx. Bubonic: transmitted via flea bite, causes buboes and acral necrosis (black/dead distal extremities), may travel to lungs (and then becomes contagious). Tx with streptomycin, gentamicin, doxycycline.
What risk factor is most strongly associated with cellulitis?	Lymphedema
When should Tetanus IG be given to a patient?	High risk (contaminated, deep) wound and NO completed primary vaccination
What is the appropriate management of a patient with a tick bite, target rash, and Bell's palsy?	CT and LP followed by ceftriaxone with concern for disseminated Lyme/CNS Lyme
What is the most infectious blood-borne pathogen?	Hep B, followed by Hep C and HIV
What are the most likely sources of infection in transplant patients in the following periods post-transplant: <1mo, 1-6mos, 6+mos?	Within 1mo: infection related to procedure and hospitalization including Strep, Staph/MRSA, and <i>Pseudomonas</i> . 1-6mos: Viruses including CMV and EBV. >6mos: chronic viral infections including CMV, EBV, HSV, VZV, Hep B and C.
What is the timeline for hyperacute vs. acute vs. chronic rejection after transplant?	Hyperacute: minutes to hours after transplant, 2/2 preformed antibodies causing irreversible graft destruction (esp. ABO mismatch). Acute: 1-2wks, humoral/T-cell mediated. Chronic: months-years.
Dx: Bilateral adrenal hemorrhage	Waterhouse-Friderichsen syndrome with meningococcemia



Toxicology

Bizz	Buzz
How does activated charcoal work for decontamination and how should it be administered?	High surface area binding to toxin and preventing systemic absorption, dose 10g AC per 1g drug.
When is activated charcoal contraindicated or ineffective?	Contraindicated in AMS/obtunded patient, risk of seizure or aspiration, ileus. Ineffective for heavy metals, alcohols, hydrocarbons, caustics.
How does whole bowel irrigation work for decontamination and how should it be administered?	Iso-osmotic agent (e.g. Go-Lytely) taken in large volume will hasten progress through intestines and prevent absorption; give 1-2L/hr (adults) or 500mL/hr (kids), consider giving by NGT, and continue until clear rectal effluent is produced.
For what types of ingestion is whole bowel irrigation most effective?	Iron, lithium, sustained-release formulations, enteric-coated meds, body packers
What toxins are cleared by HD?	"I STUMBLE": Isopropyl alcohol, Salicylate (aspirin), Theophylline, Uric acid (uremia), Methanol, Barbiturates/Beta-blockers, Lithium, Ethylene glycol
Review the general pathophysiology, Dx, and Tx of acetaminophen overdose	Broken down by CYP450 enzymes to toxic NAPQI metabolite, which overloads glutathione inactivation/metabolism, and excess NAPQI causes liver toxicity. Dx: for single acute ingestions can use acetaminophen nomogram - get level at 4hr (level prior to 4hr is NOT helpful unless 0). High risk of toxicity if >150mg/kg (acute) or >4g/day (chronic). Tx: N-acetylcysteine (NAC) restores glutathione and acts as an antioxidant; note risk of anaphylactoid reaction with IV formulation. Dose PO (140mg/kg load, 70mg/kg q4hr) or IV (150mg/kg load, 50mg/kg over 4hr, 100mg/kg over 16hr).
Review the general pathophysiology, Dx, and Tx of NSAID overdose	COX inhibitor decreases prostaglandin production, have minimal toxicity but can cause GI upset (rarely GI Bleed); in large doses can cause AMS/ataxia, coma, metabolic acidosis, seizure. Tx is supportive.
Review the general pathophysiology, Dx, and Tx of opioid overdose	Analgesic causing respiratory depression and impaired consciousness. SSx: somnolence/unresponsiveness, pinpoint pupils. Tx: naloxone (start low dose to avoid withdrawal and vomiting, uncomfortable but not life-threatening except in neonates)
Review unique clinical complications for meperidine, tramadol and methadone	Meperidine: can cause seizures, often dilated pupils. Tramadol: can cause seizure, serotonin syndrome, has narrow therapeutic window. Methadone: can cause hypoglycemia, QT prolongation and torsades des pointes
What types of opioids are NOT seen on urine tox screen?	Synthetics (fentanyl, hydromorphone, buprenorphine, methadone, meperidine); natural derivatives will show up (heroin, morphine, codeine, hydrocodone, oxycodone).
What is the potential risk of using meperidine, tramadol, or dextromethorphan in the setting of antidepressant use?	Serotonin syndrome



Toxicology

Bizz	Buzz
Review the general pathophysiology, Dx, and Tx of clonidine intoxication	Alpha-2 agonist, which on overdose appears similar to opioid toxidrome but causes bradycardia as well; syndrome includes AMS, miosis, respiratory depression, bradycardia, hypotension. Tx: supportive, atropine, pressors, naloxone.
What common substances are associated with methanol, ethylene glycol, and isopropyl alcohol ingestions?	Methanol: wood alcohol, moonshine, windshield washer fluid, paint solvent, perfume, antifreeze. Ethylene glycol: antifreeze and other automotive fluids, radiator coolant, aircraft de-icing. Isopropyl alcohol: rubbing alcohol, hand sanitizer.
What are the potential clinical consequences and clues to diagnosis of methanol, ethylene glycol, and isopropyl alcohol ingestions?	Methanol: metabolized to formic acid, causes blindness and basal gangliar injury; labs show + anion gap metabolic acidosis, elevated osmolar gap. Ethylene glycol: metabolized to oxalic acid, binds Ca (so causes low Ca and subsequent cardiotoxicity) and renal failure; labs show calcium oxylate crystals in urine, +anion gap metabolic acidosis, elevated osmolar gap. Isopropyl alcohol: metabolized to acetone (uncharged ketone), no significant pathology other than CNS depression similar to ethanol overdose, NO acidosis, NO osmolar gap.
How do you calculate osmolar gap?	Serum Osmolality: $2xNa + Glucose/18 + BUN/2.8 + EtOH/4.6$; Gap = Calculated - Measured, normal is +/- 14
What is the treatment for methanol, ethylene glycol and isopropyl alcohol ingestions?	Methanol: Ethanol, fomepizole (inhibits alcohol dehydrogenase and prevents formation of toxic metabolites), HD. Ethylene glycol: Ethanol, fomepizole, HD. Isopropyl alcohol: supportive care only.
What cofactors are required with treatment of ethylene glycol and methanol ingestions?	Ethylene glycol metabolism requires thiamine and pyridoxine; methanol metabolism requires folinic acid.
What are potential adverse effects of ethanol intoxication?	"4 Hs" (Hypotension, Hypoventilation, Hypothermia, Hypoglycemia), atrial tachycardias ("holiday heart")
What is the time course of symptoms in alcohol withdrawal?	Symptoms begin within 6-24 hours after the last drink; more severe symptoms occur in a delayed fashion (e.g. hallucinosis after 12-48 hours and delirium tremens after 48-96 hours).
Review the general pathophysiology, Dx, and Tx of lidocaine toxicity	Blocks Na channels and thereby blocks/slows nerve conduction. Toxic dose is $>4mg/kg$ plain or $>7mg/kg$ with epi. SSx: CNS toxicity (perioral numbness, slurred speech, seizure), CV toxicity (VT/VF, AV block, AVNRT), methemoglobinemia, allergic rxn. Tx: benzo for seizure, bicarb for arrhythmia, methylene blue for MetHgb, epi for allergic rxn, consider intralipid for cardiovascular collapse.
What is the difference between esther and 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, OK to use if allergy to esther; if pt has allergy to lido can use crash cart lido (preservative free) or IV diphenhydramine



Toxicology

Bizz	Buzz
Review the general pathophysiology, Dx, and Tx of anticholinergic toxidrome	Caused by atropine, antihistamines, belladonna (nightshade), jimsonweed, tricyclic antidepressants, phenothiazines. Clinically DRY: "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 (hot/dry skin), bloated as a toad (urinary and stool retention), and the heart runs alone (tachycardia)." Tx: supportive and benzos, less often physostigmine (cholinesterase inhibitor - avoid if known TCA OD or wide QRS, seizure)
How might you identify TCA overdose in a patient with anticholinergic toxidrome?	Get an EKG: TCA overdose is suggested by wide QRS or terminal R wave in aVR (due to sodium channel blockade)
Review the general pathophysiology, Dx, and Tx of cholinergic toxidrome	Caused by insecticides, organophosphates, chemical warfare, mushrooms. Clinically WET: "DUMBBBELLS" (Diarrhea, Urination, Miosis, Bradycardia, Bronchorrhea, Bronchospasm, Emesis, Lacrimation, Lethargy, Salivation). Tx: atropine (often high doses, titrate to dry secretions), 2PAM (pralidoxime)
What is the mechanism of and approach to reversal of warfarin?	Inhibits vitamin K activation, blocking VitK-dependent synthesis of clotting factors (II, VII, IX, X, monitored by INR). If asymptomatic hold doses and follow INR; if active bleeding give FFP (or prothrombin complex concentrates, although these are very expensive) and vitamin K.
What is the mechanism of and approach to reversal of heparin and LMWH?	Potentiates antithrombin III enzyme and thus inactivates thrombin (monitored by PTT) and activated factor Xa (LMWH). Reversed with protamine sulfate (only partially effective for LMWH) dosed at 1mg PS:100U heparin if pt is symptomatic/active bleeding; may cause allergic reaction.
Dx and Tx: Heparin-induced thrombocytopenia (HIT)	5% of pts develop antibodies that inactivate platelets, usually at 5d if naive and only min/hours if prior exposure. Dx: platelets decrease by 50% or +presence of HIT antibody;. Tx: STOP heparin or LMWH, can give argatroban instead; HIT is associated with thrombosis.
What is the mechanism of and approach to reversal of clopidogrel?	Anti-platelet agent monitored with P2Y12 level; can cause hemorrhage, TTP, neutropenia. Tx with platelet transfusion.
What is the mechanism of and approach to reversal of dabigatran (Pradaxa)?	Direct thrombin inhibitor. Reverse with HD, albumin, prothrombin complex concentrates (NB: makes pt transiently hypercoagulable), idarucizumab (Praxibind).
What is the mechanism of and approach to reversal of rivaroxaban (Xarelto) and apixaban (Eliquis)?	Direct factor Xa inhibitors. Tx is supportive, no known reversal agent - can consider PCC or tranexamic acid if life-threatening bleeding is present.
Review the general pathophysiology, Dx, and Tx of phenothiazine (e.g Compazine, Phergan, Thorazine) toxicity.	Block dopamine receptors, also have a range of effects on acetylcholine receptors, ion channels, etc. Cause sedation, dystonia, parkinsonism, TCA-like ion channel effects, seizures, long QT/Torsades, hypotension, pinpoint pupils, neuroleptic malignant syndrome. Tx is supportive with IVF, benzos, Mg as needed.



Toxicology

Bizz	Buzz
Review the general pathophysiology, Dx, and Tx of 5HT3 (serotonin) antagonists.	Ondansetron (Zofran); can cause prolonged QT and torsades. Tx: Mg 2g IVP.
What drugs are at risk for causing prolonged QT/torsades and what is the treatment?	Any class Ia or III antidysrhythmic, macrolides, fluoroquinolones, antipsychotics, antiemetics. Tx with 2g Mg IVP over 60sec (alt. overdrive pacing with isoproterenol).
Review the general pathophysiology, Dx, and Tx of cocaine intoxication	Inhibits neuronal uptake of catecholamines (e.g. norepinephrine), causes Na channel blockade. Increased catecholamines cause HTN, hyperthermia, rhabdo, MI 2/2 coronary vasospasm, seizure, VT. Tx with benzos, cooling, nitrates, nicardipine, AVOID beta blockers as these might cause unopposed alpha, can give phentolamine for tachycardia (on exam).
Review the general pathophysiology, Dx, and Tx of amphetamine intoxication	Increases catecholamine release, causing HTN, tachycardia, hyperthermia, rhabdo, hypertensive intracranial hemorrhage. Tx with benzos, cooling, nitrates, nicardipine (avoid beta blockers).
Review the general pathophysiology, Dx, and Tx of synthetic cannabinoid ("K2," "Spice," "Herbal Marijuana") intoxication	Causes a variety of effects on neuromodulation, causing anxiety, paranoia, tachycardia, diaphoresis, psychosis, seizures; labs can show marked metabolic derangements. Tx: supportive with IVF, benzos for agitation and seizures.
Review the general pathophysiology, Dx, and Tx of hallucinogenic amphetamines (e.g. MDMA/ecstasy).	Increases catecholamine, serotonin, and dopamine release. SSx: appears like amphetamine OD with serotonergic properties: hyperthermia, rhabdo, bruxism, hyponatremia. Tx: supportive with IVF, benzos, cooling, intubation/paralysis PRN.
Review the general pathophysiology, Dx, and Tx of GHB intoxication	"Date rape drug," rapid onset, acts on specific inhibitory neuroreceptor. Causes bradycardia, decreased RR, poor coordination, hypotension, coma, rapid awakening after metabolism of drug. Testing is not often useful (in blood 6hr, urine 12hr). Tx: supportive, intubate PRN.
Review the general pathophysiology, Dx, and Tx of "bath salts" intoxication	Similar to sympathomimetic with adrenergic effects, users redose often. Causes hallucinations, tremor, tachycardia, HTN, agitation, psychosis, hyperthermia, bruxism. Tx: supportive with benzos (large doses), nitro, nicardipine (avoid beta blockers), cooling, RSI with rocuronium (avoid succinylcholine given possibility of rhabdo).
Review the general pathophysiology, Dx, and Tx of irritant gas (e.g. chlorine, ammonia, hydrogen chloride) exposure	Causes respiratory tract and mucosal irritation with subsequent cough, SOB, pulmonary edema, and conjunctivitis. Tx: ABCs, O2, bronchodilators, bicarb.
Review the general pathophysiology, Dx, and Tx of alkaline vs. acidic ingestions	Alkaline: causes liquefactive necrosis, leading to deep injuries, perforation (4-7d), and subsequent stricture. Acid: causes coagulative necrosis and thus more limited injury, perforation risk (3-4d), gastric outlet obstruction (2-4w). Tx: do NOT attempt to induce emesis or neutralize, supportive care with early intubation.



Toxicology

Bizz	Buzz
Dx and Tx: Hydrofluoric acid burns	Common associations: glass etching, electronic manufacturing, rust removal, metal cleaning. Burns cause severe pain, severe skin burns leading to eschar formation; also binds Ca and Mg and can cause severe hypocalcemia and hyperkalemia (muscle spasms, arrhythmia). Tx with copious low-pressure irrigation, calcium gluconate gel and injection.
Review the general pathophysiology, Dx, and Tx of button battery ingestions	Can generate electrical current against mucosal surface and cause burns; high perforation risk. If found in nose, ear, or esophagus it requires emergent removal; if passed to stomach and asymptomatic can monitor.
Review the general pathophysiology, Dx, and Tx of botulism	Classic associations: Infants after eating raw honey, adults with wound (black tar heroin) vs. ingestion (dented cans or home-canned vegetables). Botulinum toxin inhibits ACh release and causes descending paralysis (vs. GBS ascending), bulbar neuropathy, respiratory failure. Tx: supportive, intubate as needed, contact CDC, antitoxin possible.
Dx and Tx: Beta blocker overdose	SSx: Bradycardia, hypotension, HYPOglycemia or normoglycemia, AV blockade, QT prolongation in some agents. Tx: GI decontamination, atropine, glucagon infusion, calcium, high dose insulin (1U/kg/hr) + glucose, intralipid if crashing, pacing (minimally effective), pressors (minimally effective).
Dx and Tx: Calcium channel blocker overdose	SSx: Bradycardia, hypotension, HYPERglycemia (often refractory to even high-dose insulin), AV blockade and any bradydysrhythmia. Tx: GI decontamination, atropine (minimally effective), calcium, high-dose insulin (1U/kg/hr) + insulin (but this may not be necessary given refractory hyperglycemia with CCB overdose), pressors (will need high dose), glucagon, intralipid if crashing, pacing (minimally effective).
Review the general pathophysiology, Dx, and Tx of cardiac glycoside intoxication (e.g. digoxin, floxglove, oleander)	Blocks Na-K-ATPase, increasing Ca in cell and thereby increasing contractility. SSx: bradycardia, PVCs, **bidirectional VT** (rare but pathognomonic), agitation, yellow vision, n/v, hyperkalemia (marker of degree of toxicity). Tx with activated charcoal, Fab fragments (e.g. Digifab, Digibind), IVF, atropine, transcutaneous pacing, AVOID Ca for HyperK (stone heart - occurs on the test but not in real life).
What characteristic EKG changes may be seen with digoxin effect vs digoxin toxicity?	Dig effect: short QT, downsloping ST (reverse Nike check, "Salvador Dali mustache"), biphasic T wave. Dig toxicity: can do literally anything to the EKG including PVCs, AV block, atrial tachycardia with block, polymorphic and bidirectional VT (pathognomonic but rare).
Name 4 common medications that cause bradycardia and bypotension ("Brady Bunch") in overdose	Beta blockers, calcium channel blockers, digoxin, clonidine
Dx: Depression + seizure + wide QRS	TCA Overdose



Toxicology

Bizz	Buzz
Review the general pathophysiology, Dx, and Tx of TCA overdose (amitriptyline, nortriptyline, doxepin)	Affect basically all neuromodulatory receptors, inhibiting reuptake of serotonin, norepinephrine, and dopamine, and causing anticholinergic effects, alpha blockade, Na channel blockade, GABA blockade, histamine blockade. SSx: lethargy, seizure, QRS widening, QT prolongation, VT/VF. Tx: supportive, key treatment is sodium bicarb for wide QRS or dysrhythmia.
What common medications are associated with Na channel blockade?	TCAs, diphenhydramine (Benadryl), propranolol, procainamide, cocaine.
Review the general pathophysiology, Dx, and Tx of MAOI toxicity (phenelzine, selegiline)	Blocks breakdown of catecholamines, dopamine, serotonin. SSx: interact with many foods (tyramine - dark beer, red wine, cheese) and drugs (meperidine, cocaine, dextromethorphan, SSRIs, lithium); causes tachycardia, severe HTN followed by hypotension, hyperthermia, agitation, seizure. Tx: supportive, IVF, nitroprusside PRN.
What are primary concerns in SSRI overdose?	Serotonin syndrome, delayed seizure, and arrhythmia (QTc prolongation), requiring tele monitoring even if asymptomatic
Review the general pathophysiology, Dx, and Tx of carbon monoxide toxicity	Associations: Closed space fires, gas heaters. Moves O2 dissociation curve to left (poor O2 delivery) due to greater binding affinity to Hgb than O2. SSx: flu-like symptoms (multiple people with same ssx), cherry-red skin (with severe toxicity or when dead), O2 sat and ABG PaO2 not accurate. Tx: supplemental O2, hyperbaric O2 if pregnant, dying, >25% COHb, AMS/LOC, or end organ dysfunction.
What is the half-life of carboxyhemoglobin on 1) room air, 2) 100% NRB, and 3) hyperbaric O2?	Room air: 4-6 hours. NRB: 90 minutes. Hyperbaric O2: 30 minutes.
What are the expected O2 sat, PCO2, and PO2 values in CO toxicity?	O2 sat will likely be normal (can't distinguish carboxyHb from oxyHb; PCO2 is unaffected, PO2 is dissolved O2 (not bound) and is unaffected; Co-oximetry will be abnormal.
Review the general pathophysiology, Dx, and Tx of cyanide toxicity	Associations: burning of wool, silk, plastics. CN inhibits oxidative phosphorylation, blocks ATP production. SSx: pt smells of "bitter almonds," presents with HA, syncope, seizure, coma, CV collapse, false high O2 sat, cherry red skin; labs show severe lactic acidosis. Tx: amyl nitrate, Na nitrate, Na thiosulfate OR hydroxycobalamine (forms carboxy-B12).
What is the appropriate treatment for combined CO and CN toxicity?	O2, ONLY Na thiosulfate or hydroxycobalamine (amyl nitrate and Na nitrate cause methemoglobinemia, which worsens symptoms).
Review the general pathophysiology, Dx, and Tx of methemoglobinemia	Converts Fe ²⁺ to Fe ³⁺ in Hgb molecule, can't transport O2, causing low O2 sat (classically 85% regardless of degree of toxicity). SSx: "chocolate" brown blood, central cyanosis. Tx: methylene blue (except if G6PD, which causes hemolysis).
What are potential causes of methemoglobinemia?	Dapsone, nitrates/nitrites, antimalarials, local anesthetics, aniline dyes, phenazopyridine (Pyridium), benzos, well water



Toxicology

Bizz	Buzz
Review the general pathophysiology, Dx, and Tx of hydrogen sulfide toxicity	Associations: decay of sulfur material from industrial sources, volcanoes, sulfur springs, septic tanks. Binds Fe in Hgb molecule in similar fashion to carbon monoxide. Consider if "rotten egg smell" is present or pt is an industrial worker with unknown cause of LOC. Tx: remove from source, can give methylene blue.
Review the general pathophysiology, Dx, and Tx of "metal fume fever"	Association: welder with flu-like illness, SOB worse on Monday and decreased effect with repeat exposure through the week (tachyphylaxis), aka "Monday morning fever." Dx: normal CXR. Tx: supportive.
Review the general pathophysiology, Dx, and Tx of arsenic toxicity	Associations: wood preservatives, garlic taste/smell after ingestion. Decouples oxidative phosphorylation, interfering with ATP production and leading to multisystem organ failure. SSx: GI ssx, hemolysis, renal failure, shock, arrhythmia, seizure. Tx: intramuscular dimercaprol or oral dimercaptosuccinic acid (DMSA).
Review the SSx and Tx of hydrocarbon intoxication (paint thinners, gasoline, chloral hydrate, lighter fluid)	Associations: commonly sniffed, huffed, or bagged; ingestion is usually not toxic but can cause ARDS if aspirated. May 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.
Review the general pathophysiology, Dx, and Tx of iron overdose	Ferrous sulfate is most common (20% elemental). Acts as mucosal corrosive, inhibits oxidative phosphorylation and ATP synthesis. >20mg/kg dose is toxic, >60mg/kg lethal. SSx come in 5 overlapping stages: 1) 0-6hr GI ssx, 2) 6-24hr asymptomatic, 3) 6-72hr systemic illness (shock, lactic acidosis, multiorgan failure), 4) 12-96hr hepatotoxicity/necrosis, and 5) 2-8wks GI scarring (esp. gastric outlet obstruction). Tx: whole bowel irrigation, IVF, deferoxamine (IV) only if Fe level >500 mcg/dL OR >300 mcg/dL and symptomatic.
Review the general pathophysiology, Dx, and Tx of lead poisoning	Associations: paint, old batteries, ceramic glaze. SSx: causes anemia (basophilic stippling - blue dots in RBCs), abd pain, AMS, seizure. Dx: peripheral smear, send whole blood lead level. Tx: dimercaprol (British anti-Lewisite), EDTA, or DMSA (chelators).
Review the general pathophysiology, Dx, and Tx of isoniazid overdose	Inhibits pyridoxine (B6), causes seizures/status epilepticus. Tx with pyridoxine IV (1g B6 : 1g INH vs 5g empiric).
Review the general pathophysiology, Dx, and Tx of lithium toxicity	Usually interactions with drugs that affect renal function (NSAIDs, diuretics, ACE). SSx: n/v/d, tremors, TWI on EKG. Tx with IVF, whole bowel irrigation, HD if renal failure is present.
How does the timing of symptoms in mushroom ingestions impact clinical management?	In general, if pt has symptoms (n/v/d) within 6hr of ingestion it is likely non-toxic. If symptoms start after 6hr hepatotoxicity may occur.
Review the SSx and Tx of cyclopeptide mushroom ingestion (<i>Amanita</i> , <i>Galerina</i> , <i>Lepiota</i>)	Onset of n/v/d 6 hours after ingestion, subsequently improving but then progressing to liver failure, renal failure, AMS, and death. Tx: supportive care and GI decontamination only.



Toxicology

Bizz	Buzz
Review the SSx and Tx of monomethylhydrazine mushroom ingestion (<i>Gyromitra</i> - "false morel")	Onset of n/v/d 6 hours after ingestion, progressing to delayed neuro SSx, hepatic failure, seizures. Most patients return to baseline after a few days. Tx: supportive, ?activated charcoal, benzos and B6 for seizures (may be refractory).
Review the general pathophysiology, Dx, and Tx of muscarine mushroom ingestion (<i>Inocybe, Clitocybe</i>)	Causes muscarinic (cholinergic/"DUMBBBELLS") effect. Tx with atropine, 2PAM.
What is the key clinical effect (and treatment) of Psilisybin mushrooms ("magic mushrooms" - <i>Psilocybe, Conocybe, Gymnophilus, Panaeolus</i>)?	Hallucinations, euphoria, agitation (tx benzos).
What is the key clinical effect (and treatment) of Coprine mushrooms (inky caps)?	Disulfiram-like reaction (tx supportive).
Review the SSx of phenytoin (Dilantin) toxicity	PO: gingival hyperplasia, seizure uncommonly, no cards effect with PO. IV: hypotension (2/2 propylene glycol), give fosphenytoin instead.
Review the general pathophysiology, Dx, and Tx of carbamazepine (Tegretol) toxicity	Na channel blockade, anticholinergic effect. SSx: ataxia, n/v/d, QRS widening, can cause seizure at high doses. Tx: supportive, give sodium bicarb if wide QRS.
Review the general pathophysiology, Dx, and Tx of aspirin overdose	Uncouples oxidative phosphorylation (can't make ATP, generates heat leading to hyperthermia), causes primary respiratory alkalosis (increases respiratory drive) plus metabolic acidosis, ketosis (can mimic DKA but with hypoglycemia), pulmonary and cerebral edema. SSx: increased RR, increased temp, increased HR, tinnitus, vertigo, AMS, seizure. Tx: activated charcoal or whole bowel irrigation, urine alkalinization with bicarb (+K, +Mg) infusion (enhances urinary excretion of salicylate, also prevents CNS distribution), HD if acute level >100, chronic level >60, OR there is a presence of renal failure, severe acidemia, or pulmonary/cerebral edema. **If you intubate, you must set high RR or the acidemia will worsen and the pt will arrest.**
Review the general pathophysiology, Dx, and Tx of benzodiazepine overdose	GABA agonist. SSx: somnolence/obtundation, respiratory depression. Tx: supportive, intubate PRN, don't use flumazenil except in kids (can precipitate withdrawal in pts who use benzos or EtOH normally)
Review the general pathophysiology, Dx, and Tx of barbiturate overdose	GABA agonist. SSx: hypotension, bradycardia, respiratory depression, rhabdo ("barb blisters"). Tx: supportive, intubate PRN.
What meds/ingestions are radiopaque on X-ray?	CHIPES: Chloral hydrate, Heavy metals, Iron/Iodine, Phenothiazine, Enteric-coated, Solvents
Dx and Tx: Neuroleptic Malignant Syndrome	Antipsychotic use, hyperthermia, "LEAD PIPE" MUSCLE RIGIDITY; Tx: symptomatic (IVF, benzos, cooling)
Dx and Tx: Serotonin Syndrome	Serotonergic agent use (e.g. SSRI) or multi-drug overdose, CLONUS/HYPERREFLEXIA, hyperthermia. Tx: symptomatic (IVF, benzos, cooling), +/- Cyproheptadine



Toxicology

Bizz	Buzz
Review the general pathophysiology, Dx, and Tx of strychnine poisoning	Associations: gopher poison, adulterant in heroin; inhibits glycine (similar to tetanus), causing agitation, myoclonus, severe and painful muscle contractions, rhabdo. Tx: benzos, paralysis PRN, IVF.
Review the general pathophysiology, Dx, and Tx of sulfonylurea overdose (Glipizide, Glyburide)	Stimulates insulin release. SSx: sulfonylureas are long-acting, leading to severe recurrent hypoglycemia, so always admit for monitoring. Tx: dextrose IV push PRN and dextrose gtt, octreotide (blocks Ca channel and inhibits release of insulin).
Review the general SSx and Tx of insulin overdose	SSx: hypoglycemia. The length of effect and need for monitoring is determined by the half-life of the type of insulin. Tx: glucagon and dextrose PRN.
What are common toxic causes of hypoglycemia?	Ethanol (especially in kids), insulin/hypoglycemics (NOT metformin), beta blockers, salicylates, quinine
Review the general pathophysiology, Dx, and Tx of metformin overdose	Inhibits gluconeogenesis and thus reduces hepatic glucose output, converts glucose to lactic acid, causing lactic acidosis. Tx with bicarb, lasix (increasing excretion), HD PRN.
Review the general pathophysiology, Dx, and Tx of theophylline toxicity	Methylxanthine derivative (like caffeine) and beta agonist, metabolized by hepatic CYP450 enzymes (meaning that there are many drug interactions). SSx: hypotension, dysrhythmia (multifocal ATach or SVT), can also cause seizures. Tx with IVF, beta blocker, consider HD in severe intoxication.
Review the general pathophysiology, Dx, and Tx of hydrogen peroxide ingestion	Symptoms occur with industrial strength concentrations; can cause cerebral gas embolism and stroke. Tx with hyperbaric oxygen.
Antidote for acetaminophen toxicity?	N-acetylcysteine (NAC)
Antidote for aspirin toxicity?	Bicarb, HD
Antidote for beta blocker toxicity?	Glucagon
Antidote for calcium channel blocker toxicity?	High-dose insulin + glucose, calcium
Antidote for carbon monoxide toxicity?	Oxygen (or hyperbaric O2 if severe and available)
Antidote for cyanide toxicity?	Hydroxycobalamine OR triple therapy (sodium nitrite, amyl nitrate, sodium thiosulfate)
Antidote for digoxin toxicity?	Digoxin Fab (e.g. Digibind, Digifab)
Antidote for ethylene glycol and methanol toxicity?	Ethanol or fomepizole
Antidote for benzodiazepine toxicity?	Flumazenil (but can cause seizures in pts otherwise taking benzos)
Antidote for opioid toxicity?	Naloxone
Antidote for malignant hyperthermia?	Dantrolene
Antidote for serotonin syndrome?	Cyproheptadine, benzos
Antidote for neuroleptic malignant syndrome?	Bromocriptine, benzos
Antidote for anticholinergic syndrome?	Physostigmine, benzos



Toxicology

Bizz	Buzz
Antidote for iron toxicity?	Deferoxamine
Antidote for mercury toxicity?	Dimercaprol or dimercaprosuccinic acid (Succimer)
Antidote for lead toxicity?	Dimercaprol, EDTA, or dimercaprosuccinic acid (Succimer)
Antidote for isoniazid toxicity?	Vitamin B6 (pyridoxine)
Antidote for organophosphate toxicity?	Atropine, 2PAM
Antidote for valproic acid overdose?	Carnitine
What treatments for hyperkalemia and bradycardia are classically contraindicated in digoxin toxicity?	Hyperkalemia: don't give calcium - rare risk of "stone heart." 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
Dx and Tx: Opioid withdrawal	Reverse opioid effects: tachycardia, HTN, abd pain, N/V/D, sweating, agitation, dilated pupils, piloerection, yawning. Opioid withdrawal is NOT life-threatening except in neonates. Tx: antiemetics and clonidine.
Dx and Tx: Valproic acid toxicity?	SSx: n/v and AMS. Dx: labs with high VA level and high ammonia. Tx: activated charcoal, L-carnitine, hemodialysis (if renal failure, severe cases).
What poisoning mimics tetanus?	Strychnine



Environmental

Bizz	Buzz
Differentiate Dx and Tx of chillblains (pernio) from trench foot (immersion foot)	Chillblains: inflammatory lesions resulting from exposure to cold; usually dry or damp, red/blue edematous plaques with itchy, burning pain; Tx by warming, drying, giving topical steroids, ?nifedipine. Trench foot: nerve and tissue injury resulting from prolonged immersion in cold water, which causes vasoconstriction, ischemia/gangrene but NO freezing; Tx is warming, drying, and prevention with dry footwear.
Differentiate Dx and Tx of frostnip from frostbite	Frostnip: no ice formation or tissue loss, symptoms resolve with rewarming. Frostbite: intracellular ice forms and causes tissue loss (can't initially distinguish the two); Tx by rewarming in warm water (107deg - DO NOT USE dry heat), provide pain control, debride clear blisters, update tetanus, delayed debridement/amputation of necrotic tissue may be necessary.
What are the phases of frostbite? How is severity graded?	I: water in tissue freezes causing cell death. II: reperfusion of warmed tissues with inflammation/edema/blisters and dry gangrene. Severity is graded by tissue death: 1st/2nd is superficial/distal and unlikely to require debridement, 3rd/4th is deep/proximal, subQ to bone, and usually requires debridement.
Distinguish stages of hypothermia: mild, moderate, and severe	Mild: 90-95, causes shivering, mild confusion. Moderate: 86-90, physiologic slowing, no shivering, AMS. Severe: <86, dysrhythmias (brady, slow AFib, VFib, asystole), irritable myocardium, cold diuresis, usually obtunded, Osborn/J-waves on EKG.
Review common physiologic changes in hypothermia	Hyperglycemia (don't treat initially), functional coagulopathy, irritable myocardium, OxyHb curve left shifted (increased O2 affinity and decreased delivery)
Review appropriate treatment of severe hypothermia	ABCs: CPR/intubation PRN, 1 round of ACLS/shock, then just rewarm passively (insulating blanket) and actively (Bair Hugger, warm O2, and IVF to 107 F, bladder/stomach/peritoneal/chest tube lavage; ECMO is most effective). Goal rewarming to 86 degrees in arrest. "Not dead until they're warm and dead."
Pathophysiology and prevention: Altitude sickness	Exact mechanism is unknown. It is thought that hypoxia causes pulmonary vasoconstriction and pulmonary HTN leading to pulmonary edema, as well as cerebral vasodilation leading to headaches/acute mountain sickness and ultimately AMS/cerebral edema; with acclimatization people hyperventilate leading to respiratory alkalosis and bicarb diuresis. Prevention: acetazolamide causes bicarb diuresis and metabolic acidosis, triggering hyperventilation and speeding acclimatization. Note: young and healthy people are NOT protected from altitude sickness (and in fact are more likely to get it).
Dx and Tx: Acute mountain sickness	Common, occurs at >2000m (6500ft). SSx: headache, n/v, anorexia. Tx: supplemental O2 and descent (this is the only reliably effective treatment), acetazolamide, steroids, NSAIDs.
Dx and Tx: High altitude pulmonary edema (HAPE)	Most common lethal altitude illness. SSx: ARDS picture when over 3000m (9500ft), pneumonia-like symptoms with SOB at rest, cough, hypoxia, fever. Tx: O2, descent (only definitively effective treatment), nifedipine/PDEIs (for pulm HTN), hyperbaric oxygen (e.g. Gamow bag). **Acetazolamide is NOT helpful in acute illness.**



Environmental

Bizz	Buzz
Dx and Tx: High altitude cerebral edema (HACE)	Most severe altitude sickness but uncommon. Cerebral edema occurs >4500m (14000ft). SSx: ataxia (early), lethargy, AMS, seizure. Tx : O2, descent (only definitively effective treatment), acetazolamide, steroids, hyperbaric O2 therapy (e.g. Gamow bag).
What causes barotrauma (diving) related illness?	Illness 2/2 descent/ascent explained by Boyle's Law (gas volume = 1/pressure); volume change is greater closer to surface (rapid change of 30ft near surface worse than deeper down)
Review injuries related to descent (localized "squeeze") and appropriate treatment	Barotitis Media: pain and vertigo 2/2 TM rupture (inward); Tx: antibiotics and dry ear precautions. Barotitis Externa: edema and hemorrhage to external auditory canal 2/2 blockage; Tx: corticosteroid and dry ear precautions. Barotitis Interna: rupture/bleeding of round window causing decreased hearing, vertigo, nystagmus; Tx: ENT consult/eval. Sinus squeeze: causes epistaxis. Mask squeeze: petechiae and subQ 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: excess intraluminal gas causes burping/flatus. "POPS" (Pulmonary Over-Pressurization Syndrome): pulmonary alveolar rupture and pneumomediastinum, possible pneumothorax, SSx include crepitus, SOB, chest pain; Tx: O2, supportive (needle prn). "AGE" (Arterial Gas Embolism): SSx include pt losing consciousness within 10 min of surfacing caused by nitrogen bubbles occurring in blood vessels leading to occlusion and subsequent MI, CVA, seizure, or AMS; Tx with IVF, O2, and hyperbaric O2 therapy.
What causes dissolved gas (diving) related illness?	Illnesses related to gas in tissue, explained by Henry's law (as pressure increases gas is pushed into solution).
Review illnesses related to dissolved gas at while diving and appropriate treatment	Nitrogen narcosis: "rapture of the deep" (>30m/100ft), partial pressure of nitrogen increases in CNS with anesthetic effect - pt acts drunk and dumb, and may drown 2/2 confusion/behavior. O2 toxicity: increased pO2 with depth causes toxicity, usually with deep diving or using Nitrox; SSx include muscle spasm, nausea, vision changes, seizure. Tx all with ascent or can prevent by decreasing %O2 in tank.
Review illnesses related to dissolved gas after ascent and appropriate treatment	Decompression sickness: rapid ascent causes nitrogen buildup in tissues, and symptoms have gradual onset 1-2hr after dive. Type I demonstrates MSK SSx ("The Bends"): arthralgia, cutis marmorata rash 2/2 lymphatic obstruction. Type II demonstrates neuro ("The Stagers" - scattered neuro ssx, esp. ataxia) and pulmonary symptoms ("The Chokes" - functional PE). Tx all with IVF, O2, hyperbaric O2 (must do this quickly).
What is the key to diagnosis of arterial gas embolism vs decompression sickness?	Timing - arterial gas embolism SSx occur within minutes of surfacing, decompression sickness within hours
Dx and Tx: Heat cramps	Muscle spasms 2/2 dehydration and electrolyte depletion. Tx: rest, passive cooling, fluid replacement, salt replacement.
Dx and Tx: Heat syncope	Sdstanding in heat with peripheral pooling 2/2 vasodilation, and decreased preload causes syncope. Tx: passive cooling, fluids.
Dx and Tx: Heat exhaustion	Flu-like symptoms without CNS changes, core temp usually <104F. Tx: passive cooling, rest, IVF, replete electrolytes.



Environmental

Bizz	Buzz
Dx and Tx: Heat stroke	Due to failure of thermoregulatory mechanisms, mortality 30-80%. SSx: CNS dysfunction (AMS, seizure, ataxia), temp usually >104F. Labs: may develop transaminitis, DIC, rhabdo, ATN, pulm edema. Comes in two categories: "Classic" (nonexertional, due to high ambient temperature and poor thermoregulatory function usually in elderly; usually have dry skin, higher mortality) vs. "Exertional" (young athlete, sweaty, profound dehydration, hypoglycemia, higher morbidity). Tx: Rapid evaporative cooling is BEST (spray lukewarm water on body and use fans to help evaporate - cold water can cause shivering, and if this occurs treat with low-dose benzos or thorazine), ice packs, cold water GI lavage if intubated, IVF (small if "Classic," more if "Exertional"), avoid pressors, STOP COOLING at 102F to avoid hypothermia. Note aspirin and tylenol do NOT help - the problem is hyperthermia, not fever.
What are the key differences between heat exhaustion and heat stroke?	HE: temp usu. <104, flu-like ssx but NO neuro ssx. HS: temp usu. >104 and +neuro changes.
What are the key differences between "Classic" and "Exertional" heat stroke?	Classic: elderly in high ambient temperature with poor thermoregulatory response, causing minor dehydration, dry skin, low morbidity (liver/renal fx, DIC) but high mortality. Exertional: young athlete performing strenuous exercise in hot environment, presenting with profound dehydration, sweaty, higher morbidity and lower mortality.
Differentiate the SSx and Tx of the different degrees of thermal burn injury	1st degree (epidermis): sunburn, redness, blanching, pain, no blisters (NOT counted in TBSA), Tx NSAIDs. 2nd degree (partial thickness, upper dermis): blistering with pain, intact sensation, Tx with NSAIDs, topical antibiotics. 3rd degree (full thickness of dermis): painless, leathery/waxy, nonblanching, Tx requires skin grafting. 4th degree (deep tissue, involves muscle/tendon/bone): painless, Tx requires skin grafting.
Review how to use Rule of 9s (in adults) to calculate TBSA	9% each for head, arms, front of leg, back of leg, 18% front of torso, 18% back of torso; adult palm is 1%; child's entire hand is 1% (**Only counts 2nd-4th degree burns**)
Review appropriate fluid resuscitation in thermal burns using the Parkland Formula	Resuscitation volume = 4 cc/kg x TBSA% x wt (kg). Give lactated Ringers, 1/2 as bolus or gtt in first 8hr since time of burn, 1/2 as gtt over next 16hr. UOP goal >1cc/kg/hr.
What additional injuries are commonly associated with thermal burn injuries?	Inhalation injury (higher risk if in enclosed space; inhaled toxins cause edema and loss of surfactant; exam may show carbonaceous sputum, SSx include cough, stridor, hypoxia, but symptoms are often delayed; if suspicious but pt is asymptomatic intubate early). Toxic exposures including CN (burning plastic) and CO. Associated traumatic injuries. Rhabdo (esp. with electrical burns or 4th degree thermal burns). DIC.
Review key components of treatment of thermal burns	Intubate early if needed for inhalational injury, IVF resuscitation per Parkland formula, check for associated traumatic injuries, check for concurrent COHb and CN poisoning, update tetanus, keep warm, provide wound care but no need for prophylactic antibiotics



Environmental

Bizz	Buzz
Appropriate management of restrictive full thickness burns (respiratory compromise or decreased peripheral perfusion)	Immediate escharotomy
What are indications for referral to a burn center?	Burns involving hands, feet, genitals/perineum, face, major joints; 2nd degree burns >10% TBSA or ANY 3rd/4th degree burn; all pts with associated inhalational injury; all electrical or chemical burns; all circumferential burns; pts with significant comorbidities
What is the appropriate treatment for tar burns?	Cool tar and remove with emulsifier (return to rinse in 24hr), do not peel off
Review the key differences between high vs. low voltage electrical injuries	Voltage = Current x Resistance. Household circuits are low voltage (110V) but more accessible; high voltage/industrial (1000V) 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 2/2 heat produced by resistance (bone, tendon).
Review the key differences between AC and DC current	AC is more lethal, as it causes tetany and the pt can't let go, leading to prolonged exposure; usual presenting rhythm will be VF (although high-voltage AC is more likely to cause asystole). DC usually throws a patient, acts like a defibrillator, may cause asystole; eval for associated trauma.
Review primary clinical concerns with electrical injuries	Arrhythmia/asystole, deep burns, rhabdo, associated trauma, vascular spasm and thrombosis, AMS/seizure, delayed peripheral neuropathies
Review appropriate management of electrical injuries	Low voltage (household): no workup if asymptomatic; for mild symptoms get EKG and urine dip (r/o rhabdo) and d/c if normal. High voltage (industrial): all pts require 12-24hr monitoring regardless of symptoms; send labs, urine dip, CPK, get CTb if pt has AMS, tetanus for burns.
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); ok for d/c if no LOC, no other injury, normal EKG, tolerating PO and reliable parents - instruct parents to hold pressure and return if delayed bleed occurs. Pt will need outpatient f/u with plastics/OMFS for wound check and further care.
Review the general pathophysiology of lightning injuries	Large DC voltage, causes asystole and apnea. Can also get steam burns, TM rupture, superficial fern-shaped/branching burns, associated trauma, delayed cataracts. **Note: apparently dead lightning strike victims are an exception to mass casualty triage rules, can survive with rescue breathing.**
Dx and Tx: Leg numbness/weakness and cyanosis after lightning strike	Keraunoparalysis: current goes up one leg and down the other causing vasospasm and neuroparalysis; usually spontaneously resolves after 6hr
What skin finding is pathognomonic for lightning injury?	Lichtenberg figure: ferning/branching superficial burn, usually resolves within 6hr
What is the usual cause of death in submersion injury?	Pt can't hold breath anymore and gasps -> LOC, active aspiration of fluid causing loss of surfactant and ARDS; also causes airway obstruction and metabolic acidosis, delayed pneumonia. Consider associated trauma.



Environmental

Bizz	Buzz
What is the mammalian diving reflex?	More common in children. Sudden submersion in cold water causes bradycardia, blood shunting to CNS, and slowed metabolism.
What is the appropriate treatment for submersion injury?	If pt arrives apneic, unconscious, or with severe respiratory distress, apply BiPAP or intubate, consider ECMO, warm, and admit to ICU. If pt arrives asymptomatic monitor 2-3hr then home; mild symptoms with normal pulse ox and CXR can go home after 4hr obs. If moderate SSx or hypoxia admit for obs.
What is the difference between a Gray, a Rad, and alpha, beta and gamma rays?	1 Gy = 100 Rad; these measure energy absorbed by the body. Alpha and beta particles are subatomic particles emitted during radioactive decay; alpha are larger and do not penetrate clothing or skin, but they are dangerous if inhaled or ingested. Beta particles are smaller and can penetrate superficial skin layers. Gamma rays are high energy electromagnetic radiation that are dangerous in any form of exposure because they can penetrate tissues very deeply.
What clinical syndromes are caused by whole body radiation exposure?	>2Gy: pancytopenia and infection within 2 days. >6Gy: n/v/GI bleeding within hours. >10Gy: shock and CNS abnormalities within minutes. Lymphopenia develops first in all exposures.
How does the absolute lymphocyte count (ALC) predict outcomes?	ALC at 48hrs is key to prognosis; if >1200 good prognosis, if <300 lethal.
What medication can be taken before inhaled/ingested radioactive iodine to prevent thyroid cancer?	Potassium iodide
What is the correct approach to decontamination of pt exposed to radiation?	Remove clothing (90%), wash with soap/water, don't abrade skin.
What bacteria cause infection in human, dog, and cat bites and what is the correct antibiotic therapy?	Human: <i>Eikenella corrodens</i> ; dog and cat: <i>Pasturella multocida</i> . Give amoxicillin-clavulanate (Augmentin) or ampicillin-sulbactam (Unasyn); alternate regimens include levofloxacin or metronidazole. Dog bites cause crush injuries, cat bites cause puncture wounds (caution near joints), but have equal rates of infection.
Specific concern and appropriate management of primate bite?	Primates carry herpes simiae, "B virus," which is fatal in humans if not treated early. Early symptoms include paresthesias followed by vesicular rash and encephalitis. Tx: IV acyclovir.
Appropriate management of dog bites?	Primary repair is ok unless delayed presentation or crush injury. If the bite is on the hand or below the knee (or the victim is high risk) give empiric abx.
What type of arthropod bites/stings are most commonly concerning?	Hymenoptera (bees, wasps, hornets, ants): venom contains histamine and proteins potentially leading to anaphylaxis.



Environmental

Bizz	Buzz
Review the following sting reactions: local, toxic, anaphylactic, delayed	Local: typical sting with redness, swelling, pain. Toxic: with >10 stings (killer bees, fire ants), symptoms include syncope, headache, n/v; 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 1-2wks later.
What is the appropriate treatment for Hymenoptera stings?	Remove stinger (with tweezers - all venom is already injected), wound care, NSAIDs; diphenhydramine, steroids, and epinephrine (0.3-0.5 mg 1:1000 IM) for anaphylaxis or systemic symptoms. Infection is uncommon so empiric abx are not necessary (though initially stings may look infected).
Distinguish Dx and Tx of brown recluse vs black widow spider bites	Brown recluse (<i>Loxosceles</i>): "violin" on back, lives in warm/dry places in southern American Midwest; they tend not to be aggressive (hence the name), and the bite is painless, ultimately causing erythema and possibly necrosis (cytotoxic toxin), rarely hemolysis and DIC. Tx with supportive care, tetanus, NO dapsone. Black widow (<i>Lactrodectus</i>): red "hourglass" on stomach, lives in warm/dry places across the US; they tend to be more aggressive, have a painful bite with neurotoxic venom (causes ACh and NE release) resulting in painful muscle cramping and sweating but not usually fatal. Tx: pain meds, benzos, give antivenin only for severe pain (risk of anaphylaxis).
Dx and Tx: Scorpion stings	Bark scorpion (<i>Centruroides</i>): most venomous, resides mostly in Arizona. Small scorpions are worse, stings usually occur at night. Venom is neurotoxic (ACh and NE release), causing HTN, tachycardia, sweating, n/v, bronchoconstriction, bulbar neuropathies, fasciculations, hemiballismus. Tx: supportive with NSAIDs, opioids, benzos, intubate as needed, antivenom as needed. Most likely fatal in children.
Distinguish Dx of Crotalid vs. Elapid snake bites	<i>Crotalidae</i> ("pit vipers" - rattlesnakes, copperheads, cottonmouths): comprise 98% of US envenomations, although 25% are dry bites; venom is cytotoxic (local wound swelling/edema, bullae) and hemolytic (coagulopathy and DIC). <i>Elapidae</i> (includes coral snakes and sea snakes): "Red on yellow, kill a fellow" is true in US only; the snake must hang on and "chew" to inject venom but you don't usually see bite marks. Venom is neurotoxic (delayed up to 12hr, causing bulbar palsy, n/v, respiratory depression, paralysis).
Distinguish Tx of Crotalid vs Elapid snake bites	Crotalid Tx: local wound care, supportive care, q2 coags, update tetanus, consider antivenom (give if progressive swelling, platelet <100, low fibrin). Elapid Tx: admit for monitoring of delayed neuro SSx, no antivenin, intubate and give supportive care PRN.
Dx and Tx: Crotalid compartment syndrome	Rare, only occurs with bite into deep compartment, causing classic "5 Ps" but treat with 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 and minimize movement; NO tourniquet unless it is possibly a coral snake bite with neurotoxic venom. Don't try to suck the venom out of the wound either.



Environmental

Bizz	Buzz
When should CroFab be given and what is the appropriate administration?	Severe symptoms after suspected Crotalid bite. Antivenin causes less anaphylaxis than previous versions, dose is per venom amount not patient weight. Give 4-6 vials (slow over 10 min to monitor for anaphylaxis then give the rest over an hour), titrate doses to arrest of symptoms (mark skin, repeat labs), monitor for possible rebound.
Review Dx and Tx of infection by marine microorganisms including <i>Erysipelothrix</i> , <i>Mycobacterium marinum</i> and <i>Vibrio vulnificus</i>	<i>Erysipelothrix</i> : Gram positive rod in salt water, causes "erysipeloid" cellulitis with red, beefy, sharp demarcation; Tx with cipro or pcn/cephalosporin. <i>M. marinum</i> : "fish tank granuloma," acid-fast bacillus in salt water, causes hard red skin nodules weeks after cleaning a fish tank; Tx with RIPE (TB meds). <i>V. vulnificus</i> : Gram negative rod in salt water, causes necrotizing fasciitis or primary septicemia (e.g. cirrhotic patient eats raw shellfish); Tx with ceftriaxone + doxycycline.
What is the appropriate Tx of jellyfish envenomations (stings)	<i>Cnidaria</i> with nematocysts: venom causes localized pain, erythema, and pruritis, and arrhythmia if systemic. Tx by deactivating with 5% acetic acid/vinegar or isopropyl alcohol x30min OR saltwater rinse (NOT freshwater); scrape off nematocysts, give antivenom if box jellyfish.
What is the appropriate Tx of marine vertebrate wounds (e.g. stingrays, lionfish, stonefish)?	Provide local wound care, give antibiotics (cephalexin/doxycycline), r/o retained foreign body, **hot water immersion to deactivate heat labile toxin**; do NOT close wounds.
Distinguish ciguatera vs. scrombroid vs. paralytic shellfish intoxications	Ciguatera: heat stable toxin from dinoflagellates in fish (Hawaii, Florida, Caribbean), causing onset within 6hr of n/v/d, hot/cold reversal, paresthesias, weakness, "loose teeth," bradycardia, respiratory arrest; Tx with IVF, supportive care, mannitol prn for severe SSx. Scombroid: histamine-like reaction from poorly refrigerated fish caused by bacterial breakdown of histidine to histamine, tastes "peppery," causes rapid onset flushing, n/v/d, often occurs in multiple people with same symptoms (as opposed to allergic reaction), treated with IVF, antihistamines. Paralytic shellfish reaction: toxin from dinoflagellates in "red tide" summer, blocks Na conduction, causes rapid onset n/v/d, paresthesias and paralysis; treated supportively.



Obstetrics & Gynecology

Bizz	Buzz
What size ovarian cyst is high risk for torsion?	>3cm and <10cm
What is the cause of injury in ovarian torsion?	Twisting leading to obstruction of VENOUS and lymphatic flow, leading to congestion, edema and ischemia. Arterial obstruction is rare 2/2 dual blood supply.
What is the most common finding on US with ovarian torsion?	Ovarian enlargement
What is the next step in management if you have high suspicion for ovarian torsion but a normal ultrasound?	OB/Gyne consult for laparoscopy (gold standard)
Dx: Vaginal bleeding in post-menopausal woman	Gynecologic cancer until proven otherwise
What type of cancer is CA-125 a marker for?	Ovarian
Review the classic presentations for ovarian, endometrial, and cervical cancers	Ovarian: age 50s-60s, gradual subacute abd pain, ascites, CA-125+. Endometrial: vaginal bleeding in post-menopausal women. Cervical: h/o HPV or HIV, postcoital bleeding, abnormal cervix on pelvic
What is the age range for administering the HPV vaccine?	9-26yrs
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.
What are the most common causes of vaginal bleeding in reproductive 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 is a potential medication for severe non-pregnant vaginal bleeding?	IV premarin (estrogen)
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 is excessive flow (heavy periods), metrorrhagia is irregular cycles.
Dx: Abdominal pain, vaginal discharge, cervical motion tenderness	Pelvic inflammatory disease, usually polymicrobial (but often with GC/Chlamydia); consider pelvic US to r/o TOA. **Note that they won't always have CMT, but may just have focal uterine or adnexal pain.**



Obstetrics & Gynecology

Bizz	Buzz
PID and RUQ shoulder pain	Fitz-Hugh-Curtis syndrome (perihepatitis): infection to perihepatic space causing liver capsule inflammation and adhesions, with RUQ or R shoulder pain. May see "violin-string" adhesions on CT, usually normal LFTs.
Most common gyne problem in children	Vulvovaginitis
Dx and Tx: Vaginal discharge and clue cells	Bacterial vaginosis caused by <i>Gardnerella/anaerobes</i> : vaginal pH >4.5, pt has thin watery discharge, "clue cells," and fishy odor (+whiff test); Tx: metronidazole.
Dx and Tx: Vaginal discharge and pseudohyphae on wet mount	Candidal vaginitis: overgrowth of normal flora, causing pruritis, "cottage cheese" discharge; Tx with fluconazole.
What other conditions are associated with frequent yeast infections?	Diabetes, HIV, pregnancy; also 2/2 antibiotic use
Dx and Tx: Vaginal discharge and "strawberry cervix"	Trichomoniasis: protozoal infection, causing frothy yellow-green discharge. Tx patient and partner with metronidazole.
What is the definitive treatment for Bartholin's cyst/abscess?	Marsupialization; in ED do I&D of abscess, place Word catheter
Dx and Tx: Early pregnancy with big uterus and high hCG	Hydatidiform mole: associated with abnormal bleeding and hyperemesis; hCG >100,000, US with grape-like vesicles, "snowstorm" pattern on US (if complete mole), high risk of malignancy (choriocarcinoma). Tx with chemo, radiation, or surgery.
What is the ultrasonographic and prognostic difference between partial and complete hydatidiform moles?	Partial: nonviable fetus in US, <5% become malignant. Complete: "snowstorm" appearance on US, 20% become malignant.
Describe the meaning of the following components of labor progression: dilation, effacement, station	Dilation: opening of cervical os, up to 10cm. 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).
Review the 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 concern with late decelerations on tocodynamometer monitoring during labor?	Uteroplacental insufficiency
What is the concern with variable decelerations on tocodynamometer monitoring during labor?	Cord compression
Review the initial management of low FHR on toco monitoring	Change mom's position (left lateral is best), 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



Obstetrics & Gynecology

Bizz	Buzz
Review the protocol for Apgar scoring	Max 10pts measured , 0-2pts for each: Appearance (pink, acral cyanosis, central cyanosis), Pulse (>100bpm, <100bpm, 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
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?	Elevate presenting part, perform immediate C-section (it may help to put mother in knee-chest position or Trendelenburg). Overall high fetal morbidity/mortality.
What is the appropriate management for shoulder dystocia?	(inability to deliver anterior shoulder 2/2 impaction against mother's pubic symphysis) "HELPER": Help (call OB, neonatology, anesthesia), Episiotomy, Legs flexed (McRoberts maneuver), Pressure (suprapubic), Enter vagina (Rubin/Woods screw maneuvers - rotate shoulder), Remove posterior arm. Final option is to break infant's clavicle; can also place Foley to empty the mother's bladder.
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 500cc for vaginal birth, 1L for c-section
What are the most common causes of postpartum hemorrhage based on timing of presentation (<24h or >24h)?	Early (<24hr): **uterine atony** (most common), lacerations, retained POC; Late (>24hr): retained POC, lacerations
What is the appropriate management of postpartum bleeding 2/2 uterine atony, lacerations, and retained products, respectively?	Atony: fundal massage, oxytocin, IVF. Lacerations: surgical repair. Retained products: dx with US, surgical removal. All: transfuse as needed.
What is the incidence of postpartum depression?	Up to 50%, overall underdiagnosed
Dx and Tx: Uterine rupture	Higher risk if pt has had previous c-section or trauma. SSx: fetal distress, shock. Dx: US. Tx: emergency C-section (and likely hysterectomy).
Dx and Tx: Fever and abdominal pain 2-3d post-partum	Endometritis, often with foul-smelling lochia, 2/2 mixed bacterial infection. Tx: IV abx, admission.
What are risk factors for endometritis?	C-section, prolonged rupture of membranes, prolonged labor, internal monitoring, absence of prenatal care
Pathophysiology, Dx, and Tx: Mastitis/breast abscess	Due to blocked duct and secondary infection (Strep/Staph). SSx: breast pain, fever, erythema and induration. Tx: warm compresses, I&D if abscess is present, antibiotics (dicloxacillin, cephalexin). **Pt should continue breastfeeding**



Obstetrics & Gynecology

Bizz	Buzz
Most common cause of third trimester vaginal bleeding?	Abruption placentae - premature separation of placenta
What can increase the risk of placental abruption?	Sympathomimetic (cocaine, meth), trauma, smoking, HTN, heavy EtOH, advanced maternal age, high parity
Dx and Tx: Placental abruption	SSx: Painful (back, abdomen) vaginal bleeding (**may be concealed or painless**). Dx: fetal stress testing (US not very sensitive). Tx: stable patient/fetus may undergo induced vaginal delivery, if unstable perform C-section
Most common cause of painless vaginal bleeding during pregnancy?	Placenta previa - placenta partially or completely covering cervical os, which causes bleeding when the os starts to dilate
What are risk factors for placenta previa?	Advanced maternal age, smoking, high parity, scarring from previous surgery
What percentage of placenta previa diagnosed on US before 20wks will resolve spontaneously?	50%
What distinguishes PROM and PPRM?	Premature rupture of membranes (>37wks/full term gestation) vs. Preterm PROM (<37wks/preterm gestation)
What are potential complications of PROM?	Infection (chorioamnionitis), cord prolapse
What are methods to confirm rupture of membranes?	Nitrazine paper (pH > 7 turns paper orange to dark blue), ferning test (dried secretions will show branching pattern of crystalization)
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 PPRM?	If full term or late preterm (34-37 weeks): admit, place on continuous fetal monitoring, induce labor. If 27-34wks: give steroids for lung development. If <27wks without signs of infection or distress: expectant management.
What medications can be given for premature/preterm labor?	Tocolytics including IV Mg (4-6g followed by infusion) and terbutaline; don't delay labor if there is concern for other serious OB complications or the fetus is nonviable. Consider giving steroids to promote lung development.
What medications are typically used (and safe) in pregnancy for HTN?	Alpha-methyldopa, labetalol, hydralazine
What distinguishes chronic HTN vs. pregnancy-induced HTN vs. preeclampsia/eclampsia?	Chronic HTN: onset prior to pregnancy or before 20wks. Pregnancy-induced HTN: onset >20wks but no symptoms. Preeclampsia/eclampsia (vascular endothelial dysfunction): HTN >20wks with symptoms including edema, proteinuria, seizures.
What is the time range in which pregnant women are at risk for preeclampsia/eclampsia?	20wks gestation until 6wks postpartum
What are risk factors for preeclampsia/eclampsia?	First pregnancy, <20y/o or >35y/o, multiple gestation (e.g. twins), HTN, DM
What are typical clinical findings in preeclampsia?	HTN, proteinuria, edema (don't need all three for dx)



Obstetrics & Gynecology

Bizz	Buzz
What defines mild preeclampsia vs. severe preeclampsia vs. eclampsia?	Mild: BP 140-160/90-110, proteinuria >300mg/24hr but >5g/24hr. Severe: BP >160-180 or >110 diastolic on 2 occasions 6hrs apart, proteinuria >5g/24hr (or Udip 4+ protein), creatinine or LFT elevation. Eclampsia: any of other symptoms + seizures.
What are clinical symptoms for severe preeclampsia?	Headache, blurred vision, RUQ pain, clonus
What is the appropriate treatment for severe preeclampsia or eclampsia?	Emergent delivery, hydralazine or labetalol for BP control, steroids if <36wks (fetal lung development), IV Mg sulfate (4-6g) to treat/prevent seizures
What defines HELLP syndrome and how is it treated?	Hemolysis, Elevated Liver enzymes, Low Platelets (<100); will have schistocytes on smear. Tx: similar to severe preeclampsia/eclampsia with HTN control, Mg, steroids if <36wks, emergent delivery.
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, causing 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 28-29wks and delivery; should also be given to Rh- mom with any chance of fetal blood exposure (vaginal bleeding, any trauma)
Review the definitions of threatened abortion vs. inevitable abortion vs. incomplete abortion	Threatened: vaginal bleeding, IUP, and closed os. Inevitable: vaginal bleeding, IUP, and open os. Incomplete: vaginal bleeding, open os, some POC expelled.
What is the appropriate management of threatened abortion in the ED?	Confirm IUP (vs. ectopic), refer for serial hCG (should double every 48hr), important if early ectopic possible), US, pelvic rest and opt OB f/u, give RhoGam if Rh- mom
Dx: 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 (PID, previous surgery), also associated with previous ectopic, IUD, and tubal ligation
What is the discriminatory zone for visualization of IUP on transvaginal and transabdominal US?	Transvaginal: hCG 1500mU/mL. Transabdominal: hCG 5000-6000mU/mL.
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 <3.5cm, no fetal cardiac activity, no evidence of rupture, pt reliable for followup
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 indications for a perimortem C-Section?	>24wks, loss of vitals in ED, no worse outcome for mother, should be done within 5min



Obstetrics & Gynecology

Bizz	Buzz
What incision should be made for a perimortem C-Section?	Midline vertical from 5cm below xiphoid process to pubic symphysis
What is the most common risk factor for placental abruption?	Hypertension; others include advanced maternal age, cocaine use, tobacco use, chronic alcohol consumption, multiparity, previous abruption, and abdominal trauma.



Renal & Genitourinary

Bizz	Buzz
What defines acute renal failure?	50% increase from baseline Cr OR 50% decrease in Cr clearance
How do you diagnose a prerenal cause of acute renal failure?	2/2 renal hypoperfusion (hypovolemia, sepsis, blood loss, etc); BUN:Cr ratio >20 and FENa < 1%, urine Na <20, relatively normal UA
How do you diagnose an intrinsic cause of acute renal failure (AKI)?	2/2 pathology within the kidney, most commonly acute tubular necrosis (90%). BUN:Cr ratio < 20, FENa > 2% (damaged kidney is unable to retain sodium), low urine osmolality (injured kidney is unable to concentrate causing dilute urine), granular casts on UA
How do you diagnose a postrenal cause of acute renal failure?	2/2 obstruction of urine outflow (bladder CA, ureteral stone, urethral stricture). Relatively normal UA; Dx with ultrasound, post-void residual (>100cc is abnormal)
What is the most likely cause of a code before and after HD in a patient with ESRD?	Before: hyperkalemia. After: hypokalemia or blood loss.
What are indications for emergent HD?	AEIOU: Acidosis, Electrolytes (hyperK refractory to medical management), Intoxication (toxins e.g. ethylene glycol, methanol, Li, etc.), Overload (volume, any pulmonary edema), Uremia with symptoms (e.g. AMS). Also for BUN 100 or Cr 10.
What is the initial treatment for bleeding AV fistula?	Apply pressure to the arterial supply proximal to the AV fistula. Give local and IV DDAVP (desmopressin).
What are symptoms of uremia?	Pericardial effusion/tamponade, pulmonary edema, encephalitis, n/v, anemia/bleeding (2/2 platelet dysfunction)
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
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; pts with hypercalcemia (2/2 sarcoid, multiple myeloma, hyperthyroid and hyperparathyroid, cancer), Crohn's disease (2/2 increased oxalate absorption)
Dx and Tx: Struvite kidney stones?	Increased risk with chronic UTIs, caused by urease-splitting bacteria (e.g. <i>Proteus</i>). May cause staghorn calculi, may have pneumoturia. Tx surgical removal, abx.
Dx and Tx: Uric acid kidney Stones?	Increased risk with gout, leukemia, myeloproliferative disorders, tumor lysis syndrome. **These stones are radiolucent so won't show up on XR, and likely not on CT either.** Tx: IVF, bicarb to alkalinize urine, surgical removal PRN.
How often is there hematuria on UA with + kidney stone?	75-80%
What are admission criteria for kidney stone?	Infected stone, intractable pain, renal failure, single kidney, obstructive nephropathy
What is the most common cause of glomerulonephritis?	Post-streptococcal GN



Renal & Genitourinary

Bizz	Buzz
What are signs and symptoms of glomerulonephritis and nephritic syndrome?	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
What are the signs and symptoms of nephrotic syndrome?	Edema (esp. periorbital in AM), hyperlipidemia, HTN, proteinuria, low albumin. Tx: IVF, Na restriction, steroids, ACE-I (dilates efferent arterioles, reduces glomerular pressure, and decreases protein loss), VTE prevention
What are the most common causes of nephrotic syndrome in kids and adults?	Kids: Minimal change disease. Adults: Focal segmental glomerulosclerosis
Dx: UTI + fever	Pyelonephritis; cystitis rarely presents with fever.
Dx: UA with WBC but no bacteria	Think of STIs and non-urinary causes (appy, diverticulitis, etc.)
Interpretation of +nitrites on UA	Specific for Gram negative infection (esp. <i>E. coli</i>), not sensitive
What distinguishes direct from indirect inguinal hernias?	Indirect go through inguinal canal into scrotum (lateral to inferior epigastric arteries). Direct go through muscle of abdominal wall.
What are potential complications of hernias?	Bowel obstruction, incarceration (hernia gets stuck out), strangulation (no blood flow, dead tissue)
What is the usual cause of balanitis/balanoposthitis?	Inflammation of glans 2/2 fungal infection, less commonly bacterial; seen in uncircumcised men, diabetics, obese.
Cause of bilateral orchitis	Mumps virus
Most common cause (and treatment) of epididymitis/orchitis in young vs. old men?	Young (<35yr): STIs, Tx: ceftriaxone + azithro x1 OR doxycycline for 10 days. Old (>35 yr): <i>E. coli</i> , Tx: fluoroquinolone for 10 days.
What is Phren's sign?	Relief of pain with scrotal elevation in patients with epididymitis/orchitis
Dx and Tx: Prostatitis	Dysuria, urinary frequency, pain with defecation, tender prostate. **Avoid Foley as this will increase inflammation.** If <35yr cover for STDs, otherwise give cipro.
What are the key differences between low-flow and high-flow priapism?	Low-flow is ischemic and painful, 2/2 sickle cell, leukemia, polycythemia, meds. High-flow is usually painless, arterial, 2/2 trauma.
What is appropriate treatment for priapism?	Intracavernosal aspiration and injection; try intracavernosal phenylephrine, consider terbutaline, and consult urology. In sickle cell patients consider exchange transfusion (but low threshold to drain).
Dx and Tx: 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. **Consider this dx 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 clinical finding is characteristic of torsion of the appendix testis?	"Blue dot sign" (tender bluish nodule on the upper pole of the testis on physical exam - present in 25%); treat like testicular torsion until alternate dx is confirmed.



Renal & Genitourinary

Bizz	Buzz
What is the most common misdiagnosis in patients with testicular cancer?	Epididymitis; testicular ca is the most common cancer in men aged 15-35; exam will show a painless, firm, fixed nodule or mass.
What is the characteristic finding on CXR with metastatic testicular cancer?	"Cannonball" lesions in lungs
What are extrarenal problems commonly associated with polycystic kidney disease?	Liver cysts, cerebral aneurysm
What is the most common sign of bladder injury?	Gross hematuria
Which finding should indicate workup for traumatic renal injury: gross or microscopic hematuria?	Microscopic hematuria; if gross hematuria is present consider bladder or urethral injury.
What medication can cause epididymitis?	Amiodarone
Dx and Tx: Peritonitis in a patient on peritoneal dialysis	Dx: cloudy effluent, UA with 100 WBC, > 50% neutrophils or + Gram stain. Tx: In stable patients can treat with outpatient intraperitoneal antibiotics and continued use of catheter. Unstable patients require admission and IV antibiotics. All ABx should cover skin flora (Strep and Staph).



Psychiatry & Behavioral

Bizz	Buzz
What is the difference between substance abuse and dependency?	Abuse: clear consequences of behavior (accident, arrested, fired). Dependency: life organized around drug use (e.g. AM fix), may have tolerance, withdrawal, social retreat
What are the key differences between anorexia nervosa and bulimia nervosa?	Anorexia nervosa: refusal to maintain normal weight, calorie restriction > purging, associated with successful suicide, 50% good outcome. Bulimia nervosa: binge eating, often of normal weight, purging type vs non-purging type, more likely to attempt suicide more often (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 2/2 stomach acid exposure
What is the appropriate treatment for Anorexia vs Bulimia?	Anorexia- IVF, lyte repletion, admit, avoid TPN; Bulimia- CBT + SSRI
What SSx typically distinguish psychiatric and medical causes of psychosis?	Psychiatric: hallucinations are more likely to be auditory, flat affect, intact orientation, symptoms are continuous, generally occurs in a younger patient, gradual onset. Medical: hallucinations are more likely to be visual, affect is labile, pt may be disoriented, symptoms wax and wane, generally occurs in an older patient, abrupt onset
What are the classic positive and negative symptoms of schizophrenia?	Positive: hallucinations, delusions, disorganized speech. Negative: blunted/flat affect, anhedonia, emotional withdrawal
Dx and Tx: 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 are the criteria for diagnosis of depression?	Depressed mood x2wks + 4 of "SAD CAGES" (changes in Sleep, changes in Appetite, Depressed mood, poor Concentration, decreased Activity, feelings of Guilt/worthlessness, decreased Energy, Suicidal ideation)
What are significant risk factors for completed suicide?	"SAD PERSONS": Sex (male), Age (teen or elderly), Depression (or other psych dx), Previous attempt (most concerning risk factor), ETOH/drug use, Rational thinking loss (e.g. 2/2 psych dx, dementia, etc.), Sickness (chronic disease), Organized plan, No social support, Stated future attempt. Marriage and pregnancy are protective.
What is the most common method of attempted and completed suicides?	Attempted: drug ingestions (esp. antidepressants). Completed: 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 with gainful incentive (e.g. drugs, money, bed). Factitious disorder: Intentional symptoms with "sick role" incentive (e.g. Munchausen syndrome). Somatoform: not intentional.
Dx: Kid with unusual presentation of disease, biological mom happy with abnormal results	Munchausen by proxy (form of child abuse)



Psychiatry & Behavioral

Bizz	Buzz
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: flashbacks/startle (2/2 a psychologically and/or physically traumatic event). OCD: compulsive repetitive behaviors and anxiety associated with not performing these. GAD: extreme multifaceted and uncontrollable worrying. 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 and SSRI; benzos can help abort panic attacks.
What is the difference between delirium and dementia?	Delirium: 2/2 medical problem/drugs/tox, symptoms fluctuate, are rapid in onset, cause pt to be lethargic or agitated. Dementia: gradual onset, progressive, primary CNS disorder, associated with sundowning.
Dx: Pt suddenly unable to recall where he lives, but has no other neuro SSx?	Transient global amnesia: sudden onset, pt often repeats questions, condition resolves spontaneously without intervention.
Dx and Tx: Delirium tremens	SSx: Severe etoh withdrawal symptoms, autonomic instability, hallucinations, delirium, seizures. Tx: Benzos, haloperidol, alt. phenobarbital.
What prophylaxis should be offered to patients after sexual assault?	Plan B, GC/Chlamydia/Trichomonas abx, HBV vaccine, HIV post-exposure prophylaxis. There is no need to test for STDs, just empirically treat. Do not give HIV PEP or Plan B after 3d (ineffective).
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. 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 and attention-seeking behaviors. Narcissistic: grandiose, displays constant need for admiration, lacks empathy. Borderline: unstable relationships, labile affect, 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: displays social inhibition, constantly feels inadequate, hypersensitive to criticism. Dependent: indecisive (and needs others to make decisions), constantly feels inadequate, submissive. Obsessive-compulsive: perfectionism/order valued over flexibility/efficiency.
What is the difference between somatization, hypochondriasis, conversion disorder? (psychosomatic disorders, all unintentional)	Somatization: unexplained physical complaints, multiple different symptoms of multiple different systems (GI, GU, neuro) with unexplained cause, often affects life. Hypochondriasis: preoccupation with and fear of disease, conviction one is sick, symptoms out of proportion to clinical findings, often displays "doctor shopping." Conversion disorder: unexplained neuro symptoms, often but not always in response to an emotional stressor (e.g. blindness, paralysis). MUST RULE OUT ORGANIC DISEASE IN ALL BEFORE MAKING THESE DIAGNOSES.



Psychiatry & Behavioral

Bizz	Buzz
What is the most common personality disorder?	Borderline
Dx: Patient with wide variety of complaints, complicated medical history, no clear cause of symptoms	Somatization disorder
Dx: 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.
Dx: Patient is has recurrent infections of a non-healing wound on their leg despite appropriate ABx treatment and multiple hospitalizations for same, with discharge upon clinical improvement	Munchausen syndrome; may have extensive and complex medical records, often well spoken
Dx: Sudden paralysis after a traumatic event	Conversion disorder
Dx and Tx: PTSD	SSx: h/o significant physical or emotional trauma (often reexperienced), often has difficulty sleeping, poor concentration, hypervigilance, is irritable with angry outbursts, symptoms last >1mo. Tx: listening to and validating their symptoms and ensure safety, cognitive behavioral therapy, SSRIs often required
Dx: Drug ingestion + violent behavior	PCP: causes sympathomimetic effects, bizarre and violent behavior and often psychosis; may have horizontal, vertical or rotatory nystagmus. Tx: sedate/restrain to ensure pt and staff safety (benzos), monitor for rhabdo and seizures, provide supportive care.
What criteria are required for a new diagnosis of schizophrenia?	Delusions, disorganized speech or behavior, hallucinations, negative symptoms (at least 2) for at least 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 < 1mo. Schizophreniform: psychotic features for 1-6mo. Schizophrenia: psychotic features >6mo. Schizoaffective: has mania or depression with psychotic features.
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, DTs	Tremor (6-12hr after last drink), hallucinations and seizures (12-48hr), DTs (48hr)



Psychiatry & Behavioral

Bizz	Buzz
Is suicide more common in teenage boys or girls?	Suicide attempts are more common in girls (3:1) but successful suicide is more common in boys (80% of all teen suicides). Medication ingestion is the most common method of attempted suicide, firearms are the most common method of successful suicide in boys (vs. poisoning in girls).
What are the five stages of grief?	Denial, anger, bargaining, depression, acceptance. Pathological grief reaction if lasting >12 months, and causing severe functional impairment, suicidal ideation, psychotic symptoms.



Musculoskeletal / Rheumatology

Bizz	Buzz
Review Salter-Harris classification for pediatric fractures	"SALTR" describes relationship to epiphyseal plate (picture a bone with diaphysis shown superiorly and joint inferiorly): I: Straight across physis. II: Above (physis and proximal bone). III: Lower (physis and distal bone). IV: Through (proximal, physis, and distal). V: Rammed at epiphyseal plate level. More advanced fracture types (=higher number) leads to more likely growth disturbance; I and V can have normal XR, II is most common.
Dx and Tx: Torus or buckle fracture in kids	Incomplete fracture 2/2 impaction/axial load. Dx: buckling or bulging of the cortex on one side of the bone without clear fracture line, with periosteum intact; may have associated angulation. Tx: splint and outpatient ortho f/u.
Dx and Tx: Greenstick fracture	Incomplete fracture 2/2 impaction/axial load, causes fracture line in only one side of bony cortex with opposite side bent but otherwise intact. Tx: splint and outpatient ortho f/u.
Dx and Tx: Toddler fracture	Spiral fx of distal tibia in kids 9mo-3yr (NOT a fracture pattern of abuse)
What fracture patterns suggest child abuse?	Any long bone in child <1yr (non-ambulatory), posterior rib fractures, multiple fractures of different ages, "bucket-handle" or metaphyseal "corner fracture," spiral fx except distal tibia (toddler fx), lateral/parietal skull fractures. Also be concerned if physical exam is not consistent with the history.
Identify the general sensory and motor functions of the radial nerve	Sensory: dorsal/radial aspect of hand (1st dorsal web space). Motor: wrist extension.
Identify the general sensory and motor functions of the median nerve	S: palm and palmar aspect of distal dorsal digits 1-3.5. Motor: wrist and elbow flexion, pincer grasp, pronation.
Identify the general sensory and motor functions of the recurrent branch of the median nerve	Sensory: NONE. Motor: muscles in the thenar eminence - thumb abduction, flexion, and apposition.
Identify the general sensory and motor functions of the ulnar nerve	Sensory: ulnar aspect of palm and palmar aspect of digits 3.5-5. Motor: hand intrinsics.
Dx and Tx: Adhesive capsulitis (frozen shoulder)	Adhesions between joint capsule and humeral head, leading to stiffness and decreased ROM; can occur after injury or spontaneously. Tx: Codman's exercises (pendulum swing with light hand weights)
Dx and Tx: Rotator cuff injuries	Affects SITS muscles (Supraspinatus, Infraspinatus, Teres minor, Subscapularis), associated with repetitive movements. SSx: shoulder aching and cannot abduct or externally rotate at shoulder without pain. Dx: XR to r/o other injury. Tx: NSAIDS, ortho referral for further care. Do not place in a sling, as this increases the risk of developing adhesive capsulitis.
Appropriate management of clavicular fractures	(Most common fracture in kids.) Sling (figure of 8 sling if peds) and outpatient ortho f/u; may require immediate ortho consult for reduction if skin tenting is present, and requires admission and IV abx if open fracture; further eval with CT only if associated or additional injury is suspected.
Appropriate management of AC separation	Mild to moderate, tx with sling and pain meds, ortho f/u. Moderate to severe, tx with surgery.



Musculoskeletal / Rheumatology

Bizz	Buzz
List potential complications of shoulder dislocations	Injury to axillary nerve (most common injury, check for sensation over deltoid) and axillary artery, musculocutaneous nerve, or brachial plexus. Hill-Sachs lesion: humeral head deformity resulting from compression against glenoid fossa. Bankart lesion: tear in glenoid labrum. Adhesive capsulitis may also occur, particularly with recurrent dislocations.
What circumstances increase the chance of a posterior shoulder dislocation?	Most dislocations are anterior; possible posterior if seizure or lightning strike, as the contracting shoulder extensors will be stronger than the shoulder flexors, dislocating the shoulder posteriorly.
List potential complications of humeral head and humeral shaft fractures	Head: brachial plexus injury, axillary artery injury. Shaft: radial nerve injury.
List Dx and potential complications of a supracondylar fracture	More common in kids with FOOSH and hyperextension. Dx: XR shows abnormal anterior humeral line (should pass through middle of the capitellum). Complications: high risk for brachial artery injury, high risk for compartment syndrome/Volkmann's contracture.
What is a Volkmann ischemic contracture?	Consequence of supracondylar fracture: compartment syndrome leads to ischemic necrosis of the wrist and finger flexors in the forearm, causing the muscles to scar and contract, and resulting in a wrist flexion contracture and claw-hand deformity.
If no obvious fracture is present, what signs on XR might indicate an occult supracondylar fracture (kids) or radial head fracture (adults)?	Anterior fat pad elevation ("Sail sign," small anterior fat pad is a normal finding), posterior fat pad elevation (always abnormal), anterior humeral line (should intersect middle 1/3 of capitellum)
List potential complications of elbow dislocations	Posterior dislocations have greater risk than anterior. High risk for brachial artery injury and compartment syndrome, so have a low threshold to get CT angiography.
Dx and Tx: Nursemaid's elbow	Occurs in kids 2-5yrs 2/2 axial traction (e.g. parent pulls kid up by his arm), causing the radial head to jump out of the annular ligament. Dx: no XR needed, try immediate reduction with hyperpronation and/or supination and flexion, monitor for normal use 30min later.
Review paired fracture/dislocations of forearm: Monteggia, Galeazzi, and Essex-Lopresti	Monteggia: proximal ulnar fracture with radial head dislocation. Galeazzi: distal radial fracture with DRUJ disruption. Essex-Lopresti: comminuted radial head crush fracture with DRUJ disruption. ALL require ORIF. Remember "MUGGER" (Monteggia with Ulnar fracture, Galeazzi & Essex with Radial fractures)
Dx and Tx: Nightstick fracture	Midshaft ulnar 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, ACE wrap.
What is the difference between a Colles' fracture and a Smith's fracture?	Colles: distal radius fracture with dorsal angulation usually 2/2 fall onto outstretched hand. Smith's: distal radius fracture with palmar angulation, usually 2/2 fall onto back of hand; carries increased risk of median nerve injury. Both are treated with closed or open reduction.
Dx and Tx: Triquetral fracture	Dorsal chip fx of triquetrum 2/2 FOOSH. Dx: seen on lateral XR of hand. Tx: volar splint and outpatient hand surgery f/u.



Musculoskeletal / Rheumatology

Bizz	Buzz
Dx and Tx: Scaphoid fracture	Usually 2/2 FOOSH. SSx: snuffbox TTP or pain with axial loading of thumb; may have normal XR. Tx: if in doubt place thumb spica and provide outpatient hand surgery followup; risk of nonunion/avascular necrosis.
Dx and Tx: Lunate fracture	Dx: Focal TTP of dorsal proximal hand and with axial load of 3rd digit; may have normal XR. Tx: high risk of avascular necrosis; if clinical suspicion should place sugar tong splint with outpatient hand surgery f/u.
Dx and Tx: Scapholunate dislocation	Dx: >3mm widening between scaphoid and lunate, "Terry Thomas (or David Letterman) sign," localized ttp. Tx: hand surgery consultation, usually requires surgical repair
Dx and Tx: Lunate dislocation	Dx: XR with "piece of pie sign" on AP and "spilled teacup" (volar displacement of lunate) on lateral; high risk of avascular necrosis. Tx: immediate ortho consult for reduction, long-arm splint.
Dx and Tx: Perilunate dislocation	(perilunate dislocation = capitate dislocation) Dx: Capitate is displaced dorsally with normal lunate alignment over radius, with the capitate dorsal to lunate "cup" on lateral view. Tx: immediate ortho consult for reduction, long-arm splint.
Dx and Tx: Boxer's fracture	Fx of 5th metacarpal neck or shaft. Tx: must 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 injury in mallet finger, boutonniere deformity, jersey finger	Mallet finger: digital extensor tendon disruption +/- avulsion fx, unable to extend DIP joint. Boutonniere deformity: slip of extensor tendon at PIP joint causing flexion at PIP and extension at DIP. Jersey finger: flexor digitorum profundus avulsion 2/2 hyperextension during active flexion, can't flex at DIP.
Dx and Tx: Gamekeeper's thumb	Tear/sprain of ulnar collateral ligament. SSx: weakness with pinch, laxity with valgus stress. Tx: place in thumb spica and refer to hand surgery.
What is a Bennett fracture-dislocation?	Two-part intra-articular fracture of the base of the 1st metacarpal (requires surgery)
What is a Rolando fracture?	Comminuted intra-articular fracture of the base of the 1st metacarpal (requires surgery)
Dx and Tx: Carpal Tunnel Syndrome	Most common entrapment neuropathy of the wrist, compression of the median nerve. SSx: numbness/weakness first 1-3.5 digits, worse at night, improved with "shaking their hands out." Dx: most sensitive test is median nerve compression testing (Durkan's); Phalen's and Tinel's signs have poor sensitivity/specificity. Tx: wrist splint at night, NSAIDs, hand surgery referral PRN.
What are Kanavel's signs for flexor tenosynovitis? Tx for flexor tenosynovitis?	Pain with passive extension (first to appear), fusiform swelling ("sausage digit"), finger held in slight flexion, pain with palpation of proximal flexor tendon sheath (erythema is NOT one of the signs). Tx: surgical washout, abx.



Musculoskeletal / Rheumatology

Bizz	Buzz
Dx and Tx: Compartment syndrome	Pain out of proportion to clinical findings is the earliest sign. Classic "6 Ps" are typically later findings: pain on passive stretch, paresthesias, pallor, paralysis, pulselessness, poikilothermia. Compartment pressure >20 is abnormal (normal is <10), fasciotomy is indicated if compartment pressure >30 mmHg OR (diastolic BP - compartment pressure) <30.
Disposition for high-pressure injection injuries?	Always go to OR despite benign-appearing wound
Contraindications for finger reimplantation	Mangled tissue, >6hr elapsed since injury, fingertip amputation only
Appropriate care of amputated digit	Wrap in saline-soaked gauze, place in plastic bag, put bag in ice water.
List possible red flag symptoms for concerning cause of low back pain	Trauma, fever, spinal surgery, focal neuro deficits, HIV/immunosuppression, TB, cancer, age >55, symptoms >4wks, IVDA, pain at rest or mostly in the evening, saddle anesthesia, constipation/urinary retention, urinary incontinence
Appropriate management of low back pain if NO red flag symptoms vs. YES red flag symptoms	NO RED FLAGS: short course of pain control, early back to work, no imaging or additional workup needed. +RED FLAGS: start with labs and XR, consider MRI depending on SSx.
Dx and Tx: Ankylosing spondylitis	Classic SSx: 30s-40s y/o male (more frequent than female) with AM back pain/stiffness improved by motion, 25% associated with iritis. Dx: XR shows "bamboo spine" (fusion of vertebrae), genetic link to HLA-B27. Tx: PT and NSAIDs.
What finding is most sensitive for diagnosis of cauda equina syndrome?	Post-void residual >50-100cc. Other symptoms include saddle anesthesia, sexual dysfunction, neuro deficits, bowel/bladder dysfunction, BILATERAL symptoms.
Identify the spinal cord level and nerve associated with each reflex: Patellar, Babinski, Achilles, Biceps, Bracheoradialis, Triceps	Patellar: L3-4 (femoral nerve). Babinski: L4-5, S1-2 (tibial nerve). Achilles: S1 (tibial nerve). Biceps: C5 (musculocutaneous nerve). Brachioradialis: C6 (radial nerve). Triceps: C7 (radial nerve).
Identify the spinal cord level associated with each joint movement: shoulder abduction, elbow flexion, wrist flexion, finger flexion, finger abduction, finger extension, wrist extension, elbow extension	Shoulder abduction: C5. Elbow flexion: C6. Wrist flexion: C7. Finger flexion: C8. Finger abduction: T1. Finger extension: C7. Wrist extension: C6. Elbow extension: C7.
Identify the spinal cord level associated with each joint movement: hip flexion, knee extension, ankle dorsiflexion, great toe extension, ankle plantarflexion, knee flexion	Hip flexion: L2. Knee extension: L3. Ankle dorsiflexion: L4. Great toe extension: L5. Ankle plantarflexion: S1. Knee flexion: S2.



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Dx and Tx: Slipped capital femoral epiphysis	SSx: Obese preteen (M>F) with hip/knee pain and limp. Dx: XR (frog leg and lateral are best) shows epiphyseal displacement ("melted ice cream"), check Kline Line (line from lateral femoral neck fails to intersect epiphysis). Tx: non-weight bearing prior to surgical pinning. **Note that SCFE is bilateral in 20-50% of patients.**
Dx and Tx: Legg-Calvé-Perthes	Avascular necrosis of femoral head, occurs in 4-8yo with hip pain or limp. Dx: XR shows "moth-eaten" appearance of femoral head. Tx: NSAIDs and abduction braces.
Dx and Tx: Unstable pelvic fracture	Dx: XR 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). Can cause extensive blood loss, mostly posterior/retroperitoneal and venous. Tx: with pelvic binder, angio or surgery, blood transfusion.
Dx and Tx: Hip fractures	SSx: High risk in elderly (esp. femoral neck), intertrochanteric fractures are most common. Tx: treat surgically, have a low index of suspicion for an occult fracture in the setting of severe pain with negative XR and get CT/MRI in an elderly person who is unable to ambulate.
What is the most common type of hip dislocation? What associated injuries and sequelae should you anticipate?	Posterior, usually due to high force (e.g. MVC). Hip dislocations require quick reduction to prevent AVN of the femoral head, and have a high risk for associated fractures.
Identify components of the Ottawa Knee Rules	Age >55, isolated patellar TTP, TTP over fibular head, inability to flex knee 90°, inability to bear weight (4 steps) immediately after injury AND in ED. If any of these are true, then get an XR.
Dx and Tx: Osgood-Schlatter syndrome	Tibial tuberosity apophysitis 2/2 trauma or overuse, occurs in M>F, mainly preteens. Dx: localized TTP, clinical Dx, no XR needed (but you may see an avulsion fx of the tibial tuberosity if you get one). Tx with rest, RICE.
Dx and Tx: Meniscal injury	Medial > lateral, occurs 2/2 rotational force. Dx: joint line TTP, feeling of clicking and locking with knee giving way, +/- knee effusion, +Appley Grind Test and McMurray's; can get outpatient MRI to confirm. Tx: RICE, NSAIDs, surgery for refractory SSx.
Dx and Tx: Cruciate ligament injuries	Occurs when pivoting while running/cutting; ACL tear is most common. SSx: audible "pop," followed by knee instability, hemarthrosis. Dx: + Lachman's test (better than anterior drawer), eval with XR then +/- outpatient MRI. Tx: leg immobilizer ONLY if very unstable, non-weight bearing, ortho referral; ACL tears are associated with Segond fx (avulsion at lateral tibial plateau, which requires knee immobilization).
Dx and Tx: Tibial plateau fx	Occurs with high force blow to tibia, e.g. MVC or pedestrian vs. auto. Dx: localized TTP, XR often negative, get CT if significant clinical suspicion exists. Tx: usually requires ORIF, place knee immobilizer, give crutches (pt should be totally non-weight bearing), and place ortho consult.
Dx and Tx: Knee dislocation	May spontaneously relocate, so have a high index of suspicion esp. if bicruciate instability is found on exam; high risk of popliteal artery injury and peroneal nerve injury. Dx: consider CTA. Tx: knee immobilizer, ortho consult.



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Potential nerve injury resulting from knee injuries (e.g. prox fibular fx, tibial plateau fx)	Deep peroneal nerve: unable to dorsiflex and loss of sensation to 1st web space
Identify components of 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. XR if any of these are positive - follow this for exam purposes.
Dx and Tx: Maisonneuve fracture	Medial malleolus fx (or deltoid ligament injury) + proximal fibular fracture. Tx: requires splint, non-weight bearing, and ortho referral for ORIF.
Dx and Tx: Jones fracture (vs pseudo-Jones/dancer's fx)	Jones fracture: Fx of proximal diaphysis of 5th metatarsal; Tx with post-mold and non-weight bearing, usually requires surgery. Pseudo-Jones/dancer's fracture: avulsion at base of 5th metatarsal, splint and refer for ortho followup, management is nonsurgical.
Dx and Tx: Lisfranc fracture/dislocation	Unstable midfoot due to disruption of the Lisfranc joint (arch of the foot), usually from high-energy shearing force (e.g. falling from a horse with your foot in a stirrup) or with axial loading onto a hyper-plantarflexed foot. Dx: check if 1st and 2nd cuneiform bones line up with metatarsals on AP/lateral/oblique films, consider stress view if high suspicion. Tx: splint, non-weight bearing, and most require surgery.
Dx and Tx: Achilles tendon rupture	Associated with landing from jumping (e.g. in basketball), pt feels audible pop over Achilles tendon, also occurs with taking fluoroquinolones or steroids. Dx: consider US for dx of partial tears, will have positive Thompson (calf) squeeze test. Tx: Splint in equinus, complete tears require surgery.
Dx of septic arthritis based on joint fluid analysis	Purulent/yellow/green synovial fluid, WBC >50K, PMNs 75%, glucose <25, or culture positive
What is the most common primary bone cancer, and how is it diagnosed?	Multiple myeloma: hypercalcemia, renal failure, bony pain, anemia, Bence-Jones protein, XR skull with "punched out lesions." NOTE: most bone tumors are metastatic and found in the spine (prostate, breast, kidney, thyroid, skin).
What are clues for diagnosis of osteosarcoma?	Second most common primary bone cancer, usually located in long bones (femur, tibia, humerus). NOT associated with trauma but may be found incidentally, presents in teens and 60s (bimodal), associated with radiation for childhood cancer. SSx: pain more prominent at night. Dx: XR shows radiodense and lytic lesion at metaphysis ("sunburst" pattern), Codman's triangle (elevation of periosteum at periphery of tumor).
What are clues for diagnosis of Ewing sarcoma?	Painless mass in the femur, occurs in adolescence (M>F), "onion peel" appearance on XR
Differentiate crystals in gout vs. pseudogout	Gout: negatively birefringent, needle-like crystals (urate). Pseudogout: positively birefringent, rhomboid crystals (calcium pyrophosphate).
Dx and Tx: Polyarteritis nodosa	Vasculitis of the small/medium vessels with multiorgan involvement but sparing the lungs, associated with chronic HBV. Occurs in M>W during 40-60s. SSx: anorexia, abdominal pain, neuropathy, palpable purpura, lacy rash (livedo reticularis); associated with intra-renal aneurysm. Dx: ESR/CRP elevation, ANCA+. Tx: high dose steroids, immunotherapy.



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Bizz	Buzz
Dx and Tx: Polymyositis	Similar clinical picture to dermatomyositis, including inflammation of striate muscle causing mainly proximal muscle weakness, but no rash; strong association with malignancy. Dx: elevated ESR/CRP, CPK, and aldolase. Tx: high dose steroids, methotrexate
Dx and Tx: Dermatomyositis	Similar clinical picture to polymyositis, including inflammation of striate muscle causing mainly proximal muscle weakness but also with heliotrope rash around eyes; strong association with malignancy. Dx: elevated ESR/CRP and CPK. Tx: methotrexate.
Dx and Tx: Polymyalgia rheumatica	Bilateral, symmetric proximal muscle weakness ("cape-like" distribution), stiffness worse in AM, associated with temporal arteritis. Dx: elevated ESR, rheum consultation. Tx: steroids.
Dx and Tx: Reactive arthritis (formerly Reiter Ssyndrome)	Seronegative arthritis occurring after infection; associated with HLA-B27. SSx: urethritis, conjunctivitis, asymmetric large LE joint arthritis with normal-appearing synovial fluid, often occurring after STI (<i>Chlamydia</i>) or GI infection. Tx: NSAIDs, physical therapy.
Dx and Tx: Rheumatoid arthritis	SSx: polyarticular, symmetric, deforming arthritis, especially affecting hands (Boutonniere and swan neck deformities) but sparing DIP joint; has broad extraarticular involvement. Dx: elevated RF (70-80%, but also present in 5-10% of healthy population) or anti-CCP, elevated ESR/CRP, XR with bony destruction. Tx: NSAIDs, DMARDs, steroids.
Dx and Tx: Juvenile idiopathic arthritis	Systemic JIA (Still's disease): daily fever, myalgia, polyarthritis, "salmon-pink" rash, anemia, thrombocytosis, ANA and RF usually negative; Tx with NSAIDs, steroids, methotrexate. Polyarticular JIA: symmetric arthritis with 4+ joints affected, anemia, possible positive ANA; Tx: NSAIDs, DMARDs. Pauciarticular JIA: arthritis in <4 joints, associated with uveitis, ANA often positive with neg ESR/CRP; Tx with NSAIDs, steroid injections.
Dx and Tx: Psoriatic arthritis	Psoriatic skin lesions usually precede joint disease. SSx: symmetric polyarthritis, "sausage digits" (dactylitis), nail pits. Dx: anemia, RF neg, ANA+, XR with erosion AND new bone formation, "pencil in cup" deformities. Tx: NSAIDs, DMARDs, NO STEROIDS (causes pustular psoriasis), or antimalarials.
Dx and Tx: Wegener's granulomatosis (granulomatosis with polyangiitis)	(Upper and lower respiratory tract involvement, renal failure, c-ANCA+) SSx: hemoptysis, hematuria, renal insufficiency, cutaneous nodules, and palpable purpura. Dx: c-ANCA positive. Tx with steroids, DMARDs.
Dx and Tx: Goodpasture's syndrome	SSx: cough/hemoptysis, renal insufficiency. Dx: anti-basement membrane antibodies. Tx: steroids, DMARDs, plasmapheresis.
Dx and Tx: Churg-Strauss syndrome	(vasculitis + eosinophilia + asthma) SSx: bronchospasm, sinusitis, possible cardia and GI SSx. Dx: peripheral eosinophilia. Tx: steroids, DMARDs.
Dx and Tx: Systemic lupus erythematosus	Broad clinical features including: classic "butterfly" malar rash, oral ulcers, arthritis, serositis (including pericarditis), renal disease, anemia, thrombocytopenia, seizures; high risk of thrombosis (ACS, PE). Dx: **Must exclude drug-induced lupus caused by isoniazid, methylidopa, procainamide, hydralazine;** ANA+. Tx with NSAIDs, steroids, antimalarials, DMARDs.



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Bizz	Buzz
Dx and Tx: Scleroderma (systemic sclerosis)	Occurs 2/2 collagen deposition in skin. SSx: fatigue, joint pain, pulmonary HTN, CREST syndrome (Calcinosis, Raynaud's syndrome, Esophageal dysmotility, Sclerodactyly, Telangiectasias), renal failure presenting with HTN. Tx: symptomatic treatment, rewarm digits, CCBs.
Dx and Tx: Sjögren syndrome	Autoimmune chronic inflammation of salivary and lacrimal glands. SSx: dry eyes and mouth. Dx: Anti-Ro and Anti-La antibodies, RF+, ANA+, Schirmer's test to eval for tear production. Tx: lubricants, pilocarpine, DMARDs.
What is the appropriate treatment for rhabdomyolysis?	IVF with UOP 3cc/kg/hr, consider bicarb gtt to alkalinize urine (this is controversial and may not be helpful); goal is to prevent renal failure (causes ATN), relative endpoint CK <1000 (although the initial CK level does not correlate with the likelihood of renal failure).
Dx: Rheum disease + higher risk with intubation	Rheumatoid arthritis with atlantoaxial joint instability (don't hyperextend with intubation)
Dx: non-caseating granulomas to multiple organs	Sarcoidosis (commonly eyes and chest, skin lesions)
What are characteristic lab abnormalities with sarcoidosis?	Elevated ACE levels, hypercalcemia
For arthrocentesis, why is the extensor surface most commonly used?	Extensor surfaces avoid neurovascular structures that typically overlie the flexor aspect of joints



Hematology & Oncology

Bizz	Buzz
Transfusion + Fever + Otherwise well	Febrile non-hemolytic transfusion reaction; give tylenol, hold for 30min, likely restart
Transfusion + Urticaria + Otherwise well	Simple Allergic Reaction, give benadryl (premedicate in future) but don't need to stop transfusion
Transfusion + Shock + AKI	Acute Hemolytic Transfusion Reaction, often 2/2 ABO incompatibility, fever, flank pain, shock; send Coombs, stop transfusion, give IVF, treat hyperK; Alternate Dx SEPSIS
Transfusion + Shock + Angioedema + Normal CXR	Severe Allergic Reaction (Anaphylactic), stop transfusion, epinephrine, benadryl, steroids
Transfusion + Pulmonary Edema without other signs of heart failure	Transfusion Related Acute Lung Injury (TRALI)- ARDS after transfusion, typically FEVER, stop transfusion, supportive, NO furosemide
Transfusion + Pulmonary Edema WITH other signs of heart failure	Transfusion-Associated Circulatory Overload (TACO)- HTN, inc JVD, peripheral edema, high bnp, NO Fever; Tx stop transfusion, lasix, supportive
What patients are higher risk for developing TRALI?	those with existing systemic inflammation- Sepsis, Trauma, requiring massive transfusion
What is the most common infection transmitted by blood transfusion?	Hepatitis B
What is the most common inherited bleeding disorder	Von Willebrand's Disease
What is the underlying pathology in Hemophilia A and B	Bleeding disorder due to lack of Factor 8 (A- 85%) or Factor 9 (B), X-linked recessive, dx by factor activity levels, will also have abnormal PTT
What is the appropriate dosage of factor replacement for a pt with Hemophilia A and Minor, Moderate and Severe Bleeding?	Minor (hemarthrosis)- 20-30% factor required, give 12.5U/kg of Factor VIII; Moderate (epistaxis, GI bleed)- 50% factor required, give 25U/kg of Factor VIII; Severe (CNS, RBP)- 100% factor required, give 50U/kg of Factor VIII (Required Level : Factor Dose is 2:1)
What is the appropriate dosage of factor replacement for a pt with Hemophilia B and Minor, Moderate and Severe Bleeding?	Minor (hemarthrosis)- 20-30% factor required, give 25U/kg of Factor VIII; Moderate (epistaxis, GI bleed)- 50% factor required, give 50U/kg of Factor VIII; Severe (CNS, RBP)- 100% factor required, give 100U/kg of Factor VIII (Required Level : Factor Dose is 1:1)
What are alternative treatments if Factor is not available for bleeding hemophiliac patient?	FFP (1U F8 / 1cc FFP), Cryo (1 bag = 100U F8), DDAVP (0.3 mcg/kg IV/SQ, 150 vs 300mcg nasally) increases F8 activity and vWF (carries F8)
What does Von Willebrand Factor (vWF) do during hemostasis	promotes platelet adhesion and activation, protects Factor 8
Dx and Tx of Von Willebrand's Disease	Epistaxis, bleeding lacs, bleeding gums, hematomas, easy bruising 2/2 platelet dysfunction; Platelet count normal, prolonged bleeding time; Tx DDAVP (increases release of vWF), non-recombinant F8, Cryo, Can also give Amicar, Tranexamic acid (inhibit clot breakdown)
Dx and Tx of Polycythemia Vera	proliferation of rbc/increased rbc mass; causes HTN, plethora, thrombosis, hepatosplenomegaly; Tx serial phlebotomy
How does heparin work and how can it be reversed?	activates antithrombin III (inactivates F10 and Thrombin), monitored with PTT; reverse with Protamine Sulfate 1mg per 100U heparin, give slowly to avoid anaphylactoid reaction



Hematology & Oncology

Bizz	Buzz
How does LMWH work and how can it be reversed?	activates antithrombin III (inactivates only F10), monitored with Xa level; 60% reversal with Protamine Sulfate (dose based on timing since last LMWH injection)
How does coumadin work and how can it be reversed?	inhibits vitamin K clotting factors (2, 7, 9, 10, proteins C & S), monitored with INR; Reversal with FFP/VitK (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 and no bleeding- hold single dose; INR 5-9 and no bleeding- skip 2 doses, +/- Vit K 5mg PO, pmd f/u; INR > 9 and no bleeding- hold med until tx range INR, give Vit K 5-10mg PO; Any serious bleeding regardless of INR- hold med, give 5-10mg IV Vit K, give FFP or PCC; Life Threatening bleeding- hold med, give 10mg IV Vit K, give PCC or F7a
How does tPA work and how can it be reversed?	converts plasminogen to plasmin to breakdown clots; nothing specifically reverses, give large amount of everything (prbcs, cryo, FFP, platelets, PCC, amicar, transexamic acid)
How does clopidogrel work and how can it be reversed?	blocks glycoprotein 2b/3a, prevents platelet activation (crosslinking with fibrin); nothing specifically reverses, can give platelets
How does Dabigatran (Pradaxa) work and how can it be reversed?	direct thrombin inhibitor, associated with GIB; no specific reversal but can do HD
How does Rivaraxaban (Xarelto) work and how can it be reversed?	Oral factor 10a inhibitor; no specific reversal, NOT dialyzable, can try thrombin activation with PCC, FFP, cryo
Elderly with chronic back pain, lytic lesions on XR	Multiple Myeloma (vs mets), SPEP and UPEP with monoclonal IG (Bence-Jones Protein), rouleaux blood smear, causes anemia, kidney failure, hypercalcemia
What symptoms suggest aggressive Lymphoma?	"B symptoms"- fever, night sweats, lymphadenopathy
What distinguishes Non-Hodgkins from Hodgkins Lymphoma?	NHL- more common, more widespread, less curable; HL- less common, related to viral infection, often presents with B symptoms and local spread, bx shows Reed-Sternberg cell, high cure rates
What are the two most common types of Non-Hodgkins Lymphoma and what distinguishes them?	Follicular Lymphoma- indolent, slow growing, widespread at dx, no cure; Diffuse Large B cell Lymphoma- aggressive and symptomatic, rapid spread, 50% cured
What is the difference between Acute and Chronic Leukemia?	Acute- rapid increase in blasts, MC in children; Chronic- mature abnormal WBCs, slow growing, MC in elderly
What is the difference between Lymphocytic and Myelogenous Leukemia?	Lymphocytic- B and T cells; Myelogenous- RBCs, platelets and other WBCs
What is the difference between the presentation of ALL vs AML?	BOTH with bony pain, big liver/spleen, anemia, bleeding, thrombocytopenia, infection and blasts in blood; ALL has lymphadenopathy, AML without LAD, + gingival infiltration, with Auer rods on blood smear
What is the difference between CLL and CML?	BOTH with slow onset, elevated WBCs but CML with high platelets
Dx and Tx of Leukostasis/Hyperviscosity	(AML or CML in blast crisis) WBC > 100, plugs circulation causing hypoxia, headache, vision changes, AMS; Tx with emergent induction chemotherapy, leukapheresis, allopurinol (prevent TLS), hydroxyurea



Hematology & Oncology

Bizz	Buzz
Dx and Tx of Tumor Lysis Syndrome	can occur with aggressive heme malignancies or large solid tumors after start of treatment, caused by death of many cells, inflammation, metabolic derangements (HIGH Uric Acid, Phosphate, Potassium and LOW Calcium), renal failure; Tx monitor arrhythmia, IVF, correct lytes (High UA- Allopurinol, Rasburicase; High Phos- Aluminum hydroxide, Renagel, HD; High K- calcium, insulin/glucose, biarb, kayexalate, HD; Low Ca- 2/2 high phos, treat phos first, only treat if symptomatic)
Thrombocytopenia, otherwise normal labs, well patient	Idiopathic Thrombocytopenic Purpura (ITP)- may be post infectious and self-limited (kids), decreased platelet production and autoimmune destruction; Tx with steroids, if very sick consider platelets or splenectomy
Thrombocytopenia, Hemolytic Anemia, Neuro symptoms	Thrombotic Thrombocytopenic Purpura (TTP)- unstable platelet plugs and hemolytic anemia, primarily causing CNS changes, may have fever and renal failure, symptoms wax and wane, high mortality; Dx with decreased ADAMTS-13 activity, increased vWF; Tx FFP, **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, drugs (Quinine, Clopidogrel)
Kid with thrombocytopenia, hemolytic anemia, renal failure	Hemolytic Uremic Syndrome (HUS)- often after diarrheal illness (O157:H7-shiga-like toxin), labs with eo hemolysis (schistocytes, high unconj bili, high LDH), supportive care, transfuse prbcs Hb <6, DO NOT GIVE PLATELETS OR ANTIBIOTICS
What defines Heparin Induced Thrombocytopenia (HIT) and what is the treatment?	platelets <150K or >50% drop after starting heparin (less often LMWH); autoimmune reaction causing platelet plugs and CLOTTING (thrombosis, skin reactions, PE, CVA, MI); Dx with HIT antibody; Tx stop heparin, NO platelets, change to direct thrombin inhibitor prn (Argatroban, Dabigatran)
Dx and Tx of Disseminated Intravascular Coagulation (DIC)	microvascular thrombosis and consumptive coagulopathy causing multi organ failure, related to underlying severe illness and massive inflammation; Labs with Low platelets, High Ddimer, High PT/INR, Low Fibrinogen; Tx underlying cause, only give platelets if <10 or bleeding
In what thrombocytopenic disorders are platelets contraindicated?	TTP, HIT, HUS
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 with low retic, low ferratin, low iron, high TIBC	Iron Deficiency Anemia
Anemia with high retic, nl/high ferratin, nl/high iron and PBS target cells	Thalassemia- deffective Hb chains (A- Africa, B- India)
Anemia with Headache, abdominal pain, PBS with basophilic stippling	Chronic Lead Poisoning, may also see Burton's line (blue line on gums)
Anemia with low retic, low iron, normal ferratin, normal TIBC	Anemia of Chronic Disease- microcytic or normocytic



Hematology & Oncology

Bizz	Buzz
Anemia, Hypersegmented neutrophils and Neurologic changes	B12 deficiency, PBS with hypersegmented neutrophils
What patients are at higher risk for B12 deficiency?	Crohns, on PPI, vegan diet
Anemia, Hypersegmented neutrophils and NO neurologic changes	Folate Deficiency
What patients are at higher risk for Folate deficiency?	alcoholics, tea and toast elderly
What are the most common causes of pancytopenia?	Infection, HIV, meds, leukemia
Most common initial presentation of sickle cell in infants?	Acute Dactylitis- pain and swelling of hands and feet 2/2 vasoocclusive crisis, 2/2 infarction NOT infection; Tx supportive?
Treatment of Sickle Cell pt with Priapism?	low-flow venous/ischemic, causes erect penis with soft glans; Tx aspirate corpus, intra-cavernous phenylephrine, surgical drainage prn
Treatment of Sickle Cell pt with Stroke?	emergent exchange transfusion
Dx and Tx of Acute Chest Syndrome	sickle cell pt with fever, SOB and infiltrate on CXR, HIGH mortality, caused by infection, VOC, fat embolism; Tx antibiotics for CAP, IVF, pain control, O2, if SICK exchange transfusion
Kid with sickle cell and non-traumatic rapid drop in Hb	Aplastic Crisis, may be related to Parvo, low retic count, transfuse prn, usually self-limited
Kid with sickle cell, abdominal pain and rapid drop in Hb	Splenic Sequestration; Tx IVF, transfuse prn, splenectomy
What infections are more common in sickle cell patients?	encapsulated organisms (S. pneumo, H.flu)
What are potential G6PD triggers?	Fava beans, TMP-SMX, Pyridium, Chloroquine, Nitrofurantoin



Endocrine & Metabolic

Bizz	Buzz
Review expected bicarb and pCO2 levels for Metabolic Acidosis, Metabolic Alkalosis, Respiratory Acidosis, Respiratory Alkalosis	M.Acid- low bicarb, low pCO2 (hypervent); M.Alk- high bicarb, high pCO2 (hypovent); R.Acid- high CO2, high bicarb (inc renal reabsorption); R.Alk- low CO2, low bicarb (dec renal reabsorption)
What is the appropriate metabolic compensation for Respiratory Acidosis and Alkalosis?	(Delayed metabolic compensation) Acid/Alk : 1:2 : Acute/Chronic; R.Acid: for every increase of pCO2 by 10, bicarb should increase by 1 (Acute) and 3 (Chronic); R.Alk: for every decrease in pCO2 by 10, bicarb should decrease by 2 (Acute) and 5 (Chronic); If NOT true then a mixed disorder is present
What is the appropriate respiratory compensation for Metabolic Acidosis and Alkalosis	(Immediate respiratory compensation) Acidosis- Rule of 15s; Alkalosis- 0.7; M.Acid- $HCO_3 + 15 = PCO_2 (+/-2)$ and last two digits of pH (+/-2); M.Alk- for every increase of bicarb by 1, pCO2 should increase by 0.7; If NOT true then a mixed disorder is present
What is the differential for an anion-gap metabolic acidosis?	MUDPILES- Methanol, Uremia, DKA/AKA, Paraldehyde, Isoniazid, Lactic acidosis, Ethylene Glycol, Salicylate
What are the most common causes of non-anion-gap metabolic acidosis?	diarrhea and spironolactone
What are the most common causes of metabolic alkalosis?	vomiting, diuretics
What is the primary difference between Type I and Type II diabetes?	I- insulin deficiency (auto-immune), II- insulin resistance
What are the criteria for diagnosis of diabetes?	Fasting blood sugar >126, Random glucose >200 with symptoms, Glucose >200 after oral glucose tolerance test, HbA1c > 6.5%
Suspected DKA and coffee-ground emesis	erosive esophagitis and hemorrhagic gastritis in up to 9% of DKA, rarely need treatment/endoscopy
What are the keys to diagnosis of DKA?	polyuria, polydipsia, abd pain, vomiting, acetone smell, may have unstable vitals/shock, AMS, possible coffee-ground emesis; Labs with glucose >250, pH < 7.3 (VBG ok), bicarb <18, AG >10, BHB +, urine ketones; **workup should include eval for cause of DKA (infection rule out) and EKG due to lyte abnormalities
What lab value is critical to know prior to giving insulin for DKA?	Serum potassium- patients have an overall deficiency of K (initial labs may show high K), if initial low K and pt given insulin they will become too hypokalemia and code
What is the appropriate approach to fluid resuscitation in DKA?	give 2L NS IVF bolus (kids- 10-20cc/kg), when glucose <250 switch to D5 1/2 NS gtt
What is the appropriate approach to electrolyte repletion in DKA?	POTASSIUM deficient, know level before insulin, if low K replete before insulin, if normal K can give insulin, supplement K with IVF, if high K ok to give insulin, no need to treat high K; Only give BICARB if severe DKA and intubated; MAGNESIUM- replete with K; SODIUM- falsely low, abnormal Na will typically correct with fluids



Endocrine & Metabolic

Bizz	Buzz
What is the appropriate approach to insulin administration in DKA?	Eval K level first, then give 0.1 U/kg/hr gtt (double if glucose not down by 50 after first hour); initial bolus not necessary; can also follow SQ regimen; **Transition to regular insulin SQ when gap closed and pH >7.3, dose 5U per 50 over 150 (max 20U), stop insulin gtt 1hr after pt given SQ insulin
How do you correct sodium for hyperglycemia (pseudo hyponatremia)?	add 1.6 to Na for each glucose value of 100 over 100 mg/dL
Treatment for DKA followed by new AMS or seizure	Cerebral edema, more common in kids and new onset type I, Tx give 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 gluconeogenesis (does not cause hypoglycemia), can cause GI upset, lactic acidosis
What is the mechanism of action and possible adverse effect of Thiazolidenediones (TZDs- Actos, Avandia)	increase sensitivity to insulin; can cause hepatitis and edema
What distinguishes Hyperosmolar Coma from DKA?	occurs in Type II DM, normal pH, no ketoacids, severe dehydration (8-12L deficit), very high glucose, more likely to have neuro ssx; Tx IVF and insulin
What lab test can help identify factitious hypoglycemia (exogenous administration)?	C-peptide (low, 2/2 suppression of endogenous insulin)
What is the rule to calculate MIVF rate?	4cc/kg for first 10kg, 2cc/kg for second 10kg, 1cc for each additional kg to max of 120cc/hr total
What are typical causes and appropriate treatment for Hypervolemic, Euvolemic and Hypovolemic Hyponatremia?	HyperV- CHF, ESRD, cirrhosis, Tx water restriction and diuretics; EuV- trauma, SIADH, adrenal insufficiency, Tx water restrict; HypoV- vomiting, diarrhea, third spacing, diuretics, Tx NS vs 1/2 NS
What is the approach to correction of hyponatremia?	Overall goal correction rate 0.5 mEq/hr or 10-20 mEq/day (*rapid correction risks central pontine myelinolysis/demyelination) If asymptomatic and Na >120- no emergent treatment; If Na <120 and +neuro symptoms, give 3% NaCl (100cc over 10m, additional 100cc over 50m)
What is the approach to treatment of hypernatremia?	Overall goal correction rate 1-2 mEq/hr (*rapid correction risks cerebral edema); Calculate Free Water Deficit (0.6 x wt(kg) x (Na/140 - 1)) and replace with normal saline until euvolemic (then D5W vs D5 1/2 NS), give 50% over 12h, remainder over the next 24hr
What is the most common cause of hyperkalemia?	lab error, resend lab
What EKG changes are seen in hyperkalemia?	peaked TW, PR long, loss of P wave, wide QRS, sine wave VT/VF



Endocrine & Metabolic

Bizz	Buzz
What is the general approach to treatment of hyperkalemia?	potassium shifters (insulin/glucose, bicarb is acidotic, albuterol), potassium excretion (lasix, kayexylate, HD), cardioprotection (Calcium Gluconate or Chloride ONLY if Wide QRS)
Dx and Tx of hypokalemia?	due to GI loss or diuretics, causes cramps, weakness, arrhythmias; Tx with K repletion 100 mEq K for every 0.3 below normal, give 10-20 mEq/hr; **also supplement with Magnesium (increases absorption)
What is the most specific EKG change associated with hypokalemia?	U waves; can also see TW flattening, STD, long QT
Dx and Tx of Hypercalcemia	often 2/2 hyperparathyroid, malignancy; causes bones (bone pain), stones (renal, biliary), groans (abd pain n/v), Thrones (polyuria) and psychiatric overtones (depression, anxiety, insomnia); EKG may show short QT; Tx immediate if Ca > 14 (12-14 per ssx) with IVF, Calcitonin (increases excretion, inhibits osteoclasts), Bisphosphonates (inhibits osteoclasts, requires days to work), Steroids (dec GI absorption), Lasix if volume overload
Dx and Tx of Hypocalcemia	often 2/2 hypoparathyroid, Vit D deficiency, high phos, low or high Mg; causes tetany, Chvostek's sign, Trousseau's sign, seizure, EKG with QT prolongation; Tx with IV calcium (if <7.5 and severe ssx), give Vit D and Mg as needed
Alcoholic with AMS, ataxia, nystagmus	Wernicke's Encephalopathy 2/2 Thiamine (B1) deficiency; Tx Thiamine 500 mg IV, improvement in hours
Alcoholic with short term memory loss	Korsakoff's Psychosis 2/2 Thiamine deficiency, irreversible
Poor nutrition and high output cardiac failure	"Wet" Beriberi 2/2 chronic thiamine deficiency, Tx Thiamine 100mg IV
Diarrhea, Dermatitis, Dementia	Pellagra 2/2 Niacin (B3) deficiency
Crohn's patient with macrocytic anemia and paresthesias	Cobalamin (B12) deficiency; high risk include Crohns, vegans, alcoholics, PPIs, pernicious anemia (antibody to intrinsic factor); causes neuro deficits
Alcoholic with macrocytic anemia	Folic Acid deficiency, high risk are alcoholics, elderly, pt's on phenytoin; no neuro changes
Child with poor diet and bowed legs	Rickets 2/2 Vitamin D deficiency (Calcium absorption); Osteomalacia-adult equivalent, normal height
Bad skin, bleeding gums and poor wound healing	Scurvy caused by Vitamin C deficiency (collagen formation)
What vitamins are toxic in overdose?	Fat soluble KADE; A OD causes blurry vision, vomiting, vertigo; D OD causes hypercalcemia
What hormones are secreted from the pituitary?	GOAT FLAP: Growth Hormone, Oxytocin (post), ACH (post), TSH, FSH, LH, ACTH, Prolactin; all but Oxy and ACH from anterior pituitary
What are potential causes of hypopituitarism?	mass lesions, bleeding, hypothalamic disease, Sheehan's syndrome; Dx by checking hormone levels
Low cortisol but normal aldosterone	ACTH deficiency, causes secondary adrenal insufficiency
Inability to lactate post-partum	Sheehans syndrome causing prolactin deficiency (and panhypopit)
Visual field deficits, headache, hormonal abnormalities	Pituitary adenoma (macro if >1cm), tx transsphenoidal surgery



Endocrine & Metabolic

Bizz	Buzz
What is the treatment for prolactinoma?	Bromocriptine (does not require surgery); Dx Prolactin >200
Dx and Tx of Cushing's syndrome	ACTH secreting pituitary adenoma or exogenous steroids, causes weight gain, obesity, moon faces, sweating, striae, hirsutism; Tx surgery
Headache and tunnel vision in oversized person	Growth Hormone secreting pituitary adenoma, will have high GH and insulin-like GF 1, often recognized late with acromegaly; Tx surgery
What hormones are produced by the adrenal glands?	medulla produced epinephrine and norepinephrine; cortex produces cortisol, androgens, aldosterone
Identify the key differences between primary and secondary adrenal insufficiency	Primary (Addison's) presents with shock, hypoglycemia, hypoNa with hyperK (dec mineralocorticoid), hyperpigmentation (buccal, 2/2 high ACTH); Secondary with hyponatremia, hypoglycemia, NO hyperpigmentation
young child with mass in abdomen and HTN	Neuroblastoma (adrenal medulla tumor)
HTN, 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 (Ant Pituitary) -> T4 (inactive from thyroid gland), converted to active form T3 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 hyperthyroid	Graves (young person), Toxic nodular goiter (elderly), iodine-induced (amiodarone), Thyroiditis
Review common symptoms and diagnosis of hyperthyroid	anxiety, weight loss, low K, tremor, heat intolerance, sweating, thin hair, arrhythmias, hyperreflexia, exophthalmos; Labs show low TSH, high free T3/T4
What is the appropriate treatment for Thyrotoxicosis?	1) Antihormone treatment with PTU or Methimazole (blocks new hormone synthesis), Potassium Iodine (AFTER above, blocks release of preformed hormone); 2) Block systemic effects with Propranolol and Steroids (prevents peripheral conversion T4->T3); 3) Treat precipitant; 4) Prevent Decompensation (IVF, tylenol, cool pm)
What are common causes of hypothyroid	Hashimoto's (MCC US, autoimmune), meds, postpartum, Iodine deficiency (MCC worldwide)
Review common symptoms, diagnosis and treatment of hypothyroid	fatigue, weight gain, cold intolerance, brittle hair and nails, constipation, periorbital edema, slow reflexes, edema; Labs with high TSH, low T3/T4; Tx with synthroid
Dx and Tx of Thyroid Ca	5% thyroid nodules are cancerous, common CA overall but low mortality, dx FNA; Tx thyroidectomy, radioactive iodine-131, thyroid supplementation
Dx and Tx of Hyperparathyroidism	high PTH causes high CA and symptoms of hypercalcemia (bone pain, renal stones, abd pain, n/v, polyuria, depression/anxiety, short QT); Tx lower Ca with IVF, calcitonin, bisphosphonates, steroids
Dx and Tx of Hypoparathyroidism	low PTH and low Ca, may be 2/2 thyroid surgery; symptoms of hypoCa, Tx replacement of Ca and Vit D
What are the symptoms and treatment of hyperMg?	weakness, loss of reflexes dysrhythmias and respiratory depression; Tx with calcium gluconate



Dermatology

Bizz	Buzz
What is the difference between Stevens Johnson Syndrome and Toxic Epidermal Necrolysis?	BOTH with mucosal involvement, most often caused by drugs, have target lesions, +Nikolsky's, painful rash, flu-like prodrome; SJS is <10% TBSA, TEN is >30% TBSA; Tx for both is supportive, remove trigger
What distinguishes Staph Scalded Skin Syndrome (SSSS) from SJS/TEN?	SSSS without mucosal involvement, most often in kids or immunosuppressed, caused by infection and treated with antibiotics (Nafcillin/Dicloxacillin), NO STEROIDS; Both syndromes with painful rash, bullae, + Nikolsky
Dx and Tx of Necrotizing Fasciitis?	pain out of proportion, hemorrhagic bullae, crepitance, rapid progression, dirty dishwater discharge, La Belle Indifference (pt unconcerned); Likely polymicrobial in DM (Nec Fasc Type I); Tx surgery, broad spectrum abx, clinda (halts toxin production)
Dx and Tx of Urticaria	Transient pruritic edematous plaques, red border with central clearing, NOT symmetric, Tx remove trigger, benadryl/steroids/epi prn
Dx and Tx of Erythema Multiforme	Fixed target lesions that are symmetric, includes Palms and Soles, NO mucosal involvement; Tx remove trigger, supportive
What is the most common cause of Erythema Multiforme?	Infection, namely HSV
What drugs are most commonly associated with Erythema Multiforme?	Sulfa, Oral hypoglycemics, Anticonvulsants, penicillin, NSAIDS
Dx and Tx of Rocky Mountain Spotted Fever?	blanching maculopapular rash starting at wrists/ankles and spreads centrally, includes Palms/Soles; Tx Doxycycline; *Note, caused by Rickettsia rickettsii via tick bite but tick must be attached for at least 6 hours to transmit
College kid with petechiae->purpura presents in shock	Meningococemia; seen in college kids, military barracks (close quarters), caused by N. Men (requires airborne precautions); Tx with ceftriaxone, supportive, **treat exposed contacts with Rifampin, cipro or ceftriaxone
What is the difference between Pemphigus Vulgaris and Bullous Pemphigoid?	PV (more superficial)- flaccid bullae that break and crust, +Mucosal involvement, +Nikolsky, Tx steroids; BP (deeper)- tense bullae, NO mucosa, Neg Nikolsky, Tx steroids
Shock + Erythroderma and possible foreign body	Toxic Shock Syndrome; >3 organ systems involved, desquamating erythroderma with +Mucosal Involvement, often triggered by tampon, packing, surgical wound; Tx- remove source, broad antibiotics (MCC Staph)
Gunmetal gray pustules on palms	Disseminated Gonococemia; associated with tenosynovitis, septic arthritis, rash from pustules/vesicles with necrotic center, Dx with genital and throat culture; Tx ceftriaxone
Dx and Tx of Impetigo	most often in kids, facial vesicles rupture and become "honey-crusted", + contagious, Staph more common cause than strep, Tx topical mupirocin (if small area) vs systemic keflex (more extensive or bullous)
What is the characteristic rash and cause of Erysipelas?	beefy red sharply demarcated cellulitis, raised borders, caused by Group A Strep
Obese woman with red macular rash under breasts, noted satellite lesions	Candida; also associated with immunocompromised state; Tx Oral nystatin for thrush and Topical azoles for rashes, dry skin care



Dermatology

Bizz	Buzz
What is the difference between Candida and Tinea rashes?	Candida- seen in babies, immunocompromised, DM, fat adults (intertriginous), rash is red and macular with characteristic satellite lesions, Tx Oral nystatin for thrush and Topical azoles for rashes, dry skin care; Tinea- sharply marginated, annular scaly lesions with centra clearing, pruritic, Tx topical azoles for everything except scalp and nails (griseofulvin)
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, Tx acyclovir); HPV- cauliflower-like and painless (anogenital warts)
Vesicle or ulcer noted on tip of nose or ear?	Herpes Zoster (shingles), tip of nose (Hutchinson sign) for herpes ophthalmicus (V1), ear (Ramsay-Hunt) if CN 7/8; Tx with acyclovir, steroids
What is the characteristic rash Molluscum Contagiosum?	dome-shaped fleshy papule with central umbilication; most common in kids in daycare or adults with HIV; caused by MCV (pox virus), self-limited
Compare the rashes of Scabies and Pediculosis	Scabies- linear burrows in interdigital web space and intertriginous areas with exreme pruritis; Pediculosis (lice)- erythematous macules/wheals, extreme pruritis, nits visible; BOTH treated with decontamination, Permethrin cream (often repeat 1wk, esp lice)
Compare atopic dermatitis and psoriasis	Atopic dermatitis- usually kids <5, allergy/asthma history, dry pruritis skin with lichenification in flexural areas, Tx emollients and topical steroids; Psoriasis- silvery scales/plaques in extensor areas, nail pitting, Tx emollients, topical steroids
Dx and Tx of Seborrheic Dermatitis	yellow greasy or dry white scales to scalp, face, axilla, groin; Tx topical antifungals, steroids
What is associated with seborrheic dermatitis in adults?	HIV
Dx and Tx of Contact Dermatitis	discrete, well-defined or demarcated rash (papules/vesicles/bullae) 2/2 direct irritant vs allergic reaction; Tx remove trigger, steroids
What is the duration of steroid treatment for poison oak/ivy?	3wks
What are the distinguishing features of Basal Cell vs Squamous Cell Carcinoma?	BCC- pink, pearly papules with telangectasia, more common; SCC- ulcerated center with firm-raised border; BOTH referred for biopsy
What characteristics are concerning for melanoma?	ABCDE: Asymmetric, Borders irregular, Color (mottled or irregular), Diameter >6mm, Elevated (or enlarged/rapid change); must be biopsied
Purple papule on gums	Kaposi Sarcoma; lesions most commonly oral, also GI and pulm, they are painless and nonpruritis, seen in HIV/AIDS patients, Tx to treat underlying HIV
Blanching strawberry lesion on infants head	Hemangioma; 50% resolve by 5yrs; head > trunk > extremity
What distinguishes a Lipoma from a Sebaceous Cyst?	Lipoma- well-circumscribed, mobile and painless, "Slippage sign" with normal overlying skin; SC- central punctum and cottage cheese discharge, no slippage, may have secondary infection; Tx for both is referral for excision



Dermatology

Bizz	Buzz
What defines the stages of decubitus ulcers?	I- nonblanching erythma but intact skin; II- partial thickness to dermis; III- full thickness with SQ fat; IV- exposed bone/tendon/muscle
Painful red nodules on tibia	Erythema Nodosum, associated with IBD, malignancy, infection (strep MC); Tx supportive
Characteristic rash of Pityriasis?	Herald patch followed by Christmas-tree rash to trunk, may be itchy, self-limited; should 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 pt is immunocompromised or possible disseminated infection then airborne + contact precautions are required; if pt is immunocompetent with localized zoster then standard precautions can be followed
What rashes are associated with palmar lesions?	Syphilis (secondary), RMSF, Scabies, Erythema Multiforme
What rashes are associated with + Nikolsky sign?	SJS, TEN, SSSS, Pemphigus Vulgaris
What rashes are associated with vesicles/bullae?	Bullous pemphigoid, Pemphigus Vulgaris, Necrotizing fasciitis, Disseminated Gonorrhea
What rashes are associated with Petechiae/Purpura?	RMSF, Meningococcemia, DIC, Endocarditis
What rashes are associated with target lesions?	Lyme disease, Erythema Multiforme, SJS



Grab Bag

Bizz	Buzz
What is the difference between an Emergency Medical Responder, Emergency Medical Technician, Advanced EMT and Paramedic?	EMR- immediate life-saving care including hemorrhage control and AED use; EMT- emergency care including BLS, O2, pt's own meds and patient transport; Advanced EMT- add limited advanced life support including some meds, airway management, EKGs and IVF; Paramedic- (licensed) advanced care including ACLS meds, advanced airway
What is the difference between Off-line and On-line medical control for EMS providers?	Physician input and surveillance; Off-line/Indirect- develops protocols and standing orders by situation, training and education, quality review; On-line/Direct- direct orders while in field, direct observations
When can a patient refuse care/transport by EMS?	Any 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; can assist with treatment in line with existing EMS protocols without assuming legal responsibility; 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 health care 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; 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?	usually color coded system, divide injured people into groups of 1) BLACK- Hopelessly injured (no breathing despite repositioning airway, no resuscitation, palliative care ok), 2) RED- Severe/First Priority- seriously injured with abnormal respirations/perfusion/mental status, require immediate treatment/stabilization, 3) YELLOW- Moderate/Second Priority- seriously injured but delayed treatment ok without loss of life or limb (stable respirations/perfusion/mental status; 4) GREEN- Mild/Walking Wounded- minor injuries
What is the exception to the typical Primary Triage "BLACK" (hopelessly injured, no resuscitation) rule?	Lightening 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	Communication



Grab Bag

Bizz	Buzz
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 ID and stabilize life-threatening conditions; once ambulance on hospital property the hospital is obligated to eval the patient; if the facility can not 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 MD (EMTALA does not apply to stable patients)
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
Describe adequate CPR prior to placement of a definitive airway	chest compressions at 100/min; 30 compressions: 2 BVM breaths; rhythm check every 2 min
What are possible reversible causes of cardiac arrest?	Hypoxia, Acidosis, Hyperkalemia, Hypothermia, Hypovolemia/hemorrhage, Tamponade, Tension Pneumothorax, Thrombosis (ACS or PE), Tablets (tox ingestion), Trauma
Are pads or paddles better for defibrillation?	Pads- better skin contact and safety
What rhythms during cardiac arrest should be defibrillated and at what dose?	Shock VFib or VTach; 360J for monophasic, 150-200J for biphasic
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 IVP (esp if torsades), Calcium chloride 1amp (esp if possible hyperkalemia), Bicarb (esp if prolonged arrest)
What are general indications for endotracheal intubation?	unable to protect airway, refractory hypoxia, hypercarbia, hypoventilation, respiratory failure or impending demise
What factors predict difficulty with BVM ventilation?	Obesity (or pregnancy), Beard, Elderly (>55), Potential airway obstruction, Edentulous
Review the LEMON Rule for predicted difficult intubation	Look externally, Evaluate 3-3-2, Mallampati Score, Obstruction, Neck 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; Mallampati III and IV are high risk for difficult airway
What meds may be given as pretreatment prior to intubation and what are the theoretical benefits of each?	Lidocaine- can be given to blunt increased ICP and bronchospams; Fentanyl- thought to blunt sympathetic response to intubation; Atropine- often given in kids to prevent reflex bradycardia with intubation
For what patient types is Succinylcholine contraindicated?	known hyperkalemia, preexisting myopathy, Burns/Denervating injury/Severe crush/severe infection > 5 days
What are the potential benefits of ultrasound guided central lines?	Increases rate of success on initial attempt, decreases number of attempts but 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



Grab Bag

Bizz	Buzz
What are general criteria for Therapeutic Hypothermia after cardiac arrest?	VFib/VTach arrest with ROSC < 60m, consider if PEA with ROSC < 30m, comatose or GCS < 9, MAP >80, no contraindications
What are contraindications to Therapeutic Hypothermia?	DNR order, sepsis, cancer with brain mets, active bleeding, advanced dementia
What is the temp goal with Therapeutic Hypothermia?	33 deg C
What are the indications for ED Thoracotomy for Penetrating and Blunt trauma?	Penetrating- loss of signs of life in the ED, no signs of life but echo with tamponade OR loss of vitals en route with CPR < 10min, Blunt with similar guidelines
What should specifically avoided when entering the pericardium during ED Thoracotomy?	Injury to the phrenic nerve (incise pericardium anterior and parallel)
Patients with what ASA classes are likely inappropriate for procedural sedation in the ED?	Class III (severe systemic disease) or worse
What are the rules regarding oral intake prior to procedural sedation?	No oral intake > 3hr (may accept small clear liquids)
What defines Minimal, Moderate, Deep sedation vs 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 deep pain, likely depressed breathing; General- no response, requires support of breathing and vitals
What volume of fluid/bleeding is required for positive FAST?	250ml
Dispo for unstable patient and positive FAST	OR
What traumatic injuries would NOT be identified on FAST?	bowel perforation/hollow-viscous, diaphragmatic, solid organ injuries without significant bleeding, retroperitoneal injuries
What are generally normal values for gallbladder wall thickness and CBD thickness?	GB wall < 3mm, CBD < 6mm (up to 1cm in elderly)
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- pt informed of risks/ benefits/ consequences/ 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 MD 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 MD documentation of discussion in the note may be of equal or greater use



Grab Bag

Bizz	Buzz
How is implied consent used in emergent conditions with an unconscious patient?	MD 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 obtain consent) but under EMTALA MD 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 (etoh or drugs), psychotic, confused, disoriented or unconscious
When can parents NOT refuse care for their child?	they can not forbid life saving treatment (this include religious freedom arguments); if parents withhold consent under such circumstances the MD can take temporary protective custody of the child
When can MDs commit patients with mental illness?	If they are deemed a threat to themselves or others
What 4 elements are required in a malpractice suit to prove negligence/liability?	Duty to treat (according to the standard of care), Breach of duty, Causation, Compensable injury
What takes precedence, a Living Will or decisions made by the Durable Power of Attorney (POA)?	POA decisions override those in a living will (when the patient lacks medical decision making capacity) or those expressed by family members
For what patients are MDs mandatory reporters for abuse?	Children/Minors and Elders (>60) (true in most states)
True or False- Emergency MDs 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; Analytic- Processing error; Post- after results complete, incorrect reporting or interpretation; Preanalytic errors are most common
What factors specific to emergency medicine hinder physician wellness?	shift work, 12hr 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- proportion of ppl with +Disease who also have +Test (True Pos / TP + False Neg); Specificity- proportion of patients with -Disease who also have -Test (True Neg / TN + False Pos)
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)



Grab Bag

Bizz	Buzz
What is the difference between Positive Predictive Value (PPV) and Negative Predictive Value (NPV)?	PPV- proportion of ppl with +Test who also have +Disease (True Pos / TP + False Pos); NPV- proportion of ppl 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
What are exceptions to confidentiality rules?	Public safety threat, 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?	when the death was unexpected, cause was unclear or a law was potentially broken
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
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 HIPAA, under what scenarios can a patient's PHI (protected health information) be shared without explicit consent?	another medical provider with direct patient care responsibilities, pt's insurance for billing purposes
What components of a chart are required for Level 5 billing?	4 descriptors in HPI, 2 PMH/FHx/SH, 10 ROS, 8 PE
What patients are appropriate for disposition to an ED Observation Unit?	unclear diagnosis in the ED and require a limited amount of further evaluation (completed within 24hr)
How do you calculate a Positive Likelihood Ratio?	Sensitivity divided by (1 – specificity)
What complication of fentanyl can not be reversed with Narcan?	Chest wall rigidity (rare complication)
What is the risk with not using "sync" mode during cardioversion with appropriate rhythms?	Risk VFib if shocked during repolarization period; most relevant for Atrial tachycardias and SVT; not needed in pulseless VT or VF



Grab Bag

Bizz	Buzz
What is the appropriate energy level for pediatric cardioversion and defibrillation?	0.5-1 J/kg for cardioversion 2 J/kg for defibrillation
What is the maximum dose of lidocaine and lido + epi?	Plain lido 4mg/kg; Lido + Epi 7mg/kg
What finding in CSF is pathognomonic for Subarachnoid Hemorrhage?	xanthochromia (may have yellow tinge), can be found from a few hours post bleed up to 4 weeks
What are potential side effects of the following agents used for procedural sedation: Etomidate, Ketamine, Fentanyl/Midazolam?	Etomidate- myoclonus, adrenal suppression, respiratory depression; Ketamine- emergence reaction, laryngospasm, vomiting; Fentanyl/Midazolam- respiratory depression, cardiac depression
What is the appropriate depth for placement of right and left internal jugular and subclavian lines?	R IJ- 13cm, R SC- 15cm, L SC- 17cm, L IJ- 15cm; all +/-2cm
What level of ETCO ₂ indicates adequate chest compressions during resuscitation?	10-20 mmHg; maintaining level >15 is associated with better outcomes; less than 15 rarely with ROSC; waveform will abruptly increase with ROSC
What volume of pericardial fluid can be identified on bedside US?	15mL
What is the appropriate first step when performing a emergent cricothyroidomy?	2-3cm *vertical incision over the cricothyroid membrane