

BOARD REVIEW PRACTICE #2

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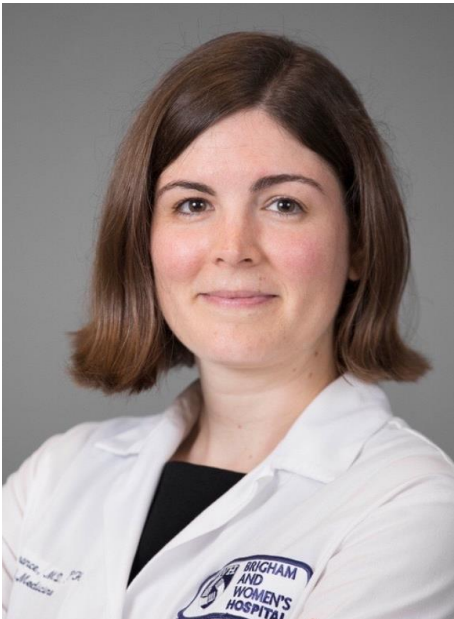
Harvard Medical School

**CONTINUING MEDICAL EDUCATION
DEPARTMENT OF MEDICINE**

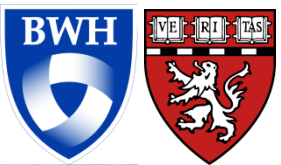


**HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL**

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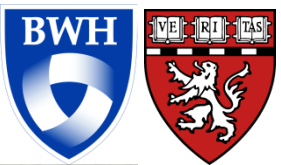


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Disclosures

- None



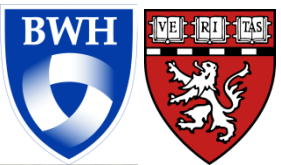
Case 1

A 23-year-old gentleman with a history of mild asthma presents for evaluation of intermittent dysphagia with solid foods. He denies heartburn. He has not lost weight. He reports that one year ago he underwent an upper endoscopy for removal of pieces of steak. He has taken omeprazole 40 mg BID for the last two months, but his symptoms have persisted.

His physical examination is unremarkable. An upper endoscopy reveals circular rings in the mid esophagus. A biopsy shows a dense eosinophilic infiltrate.

Which of the following is the most appropriate next line therapy?

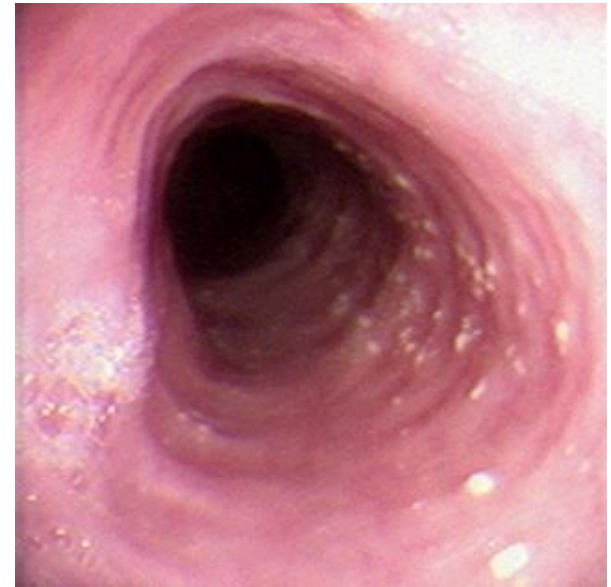
- A. Esophageal dilation
- B. Oral nifedipine
- C. Topical swallowed fluticasone
- D. Botulinum toxin injection into the lower esophageal sphincter



Case 1 – The correct answer is C

Eosinophilic esophagitis

- Diagnostic criteria:
 - Symptoms of esophageal dysfunction (dysphagia, food impaction)
 - Biopsy: ≥ 15 eosinophils/HPF
 - Exclusion of other causes of symptoms or esophageal eosinophilia
- Diagnosis more common in men > women
- First line therapy:
 - High-dose PPI x 8 weeks or
 - Topical corticosteroids (fluticasone or budesonide) x 4-8 weeks
- Other therapies: elimination diets
- Dilation reserved for fixed strictures failing medical therapy



Endoscopic View of Eosinophilic Esophagitis
UpToDate.com, courtesy of Dr. Eric Libby

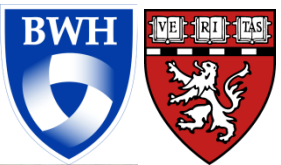
Case 2

A 22-year-old woman sustained a compound tibial fracture during a motor vehicle accident requiring surgery. Her hospital course was complicated by a lower extremity deep venous thrombosis. She has no personal or family history of PE/DVT and a hyper-coagulable work up is negative. She is not taking any medication.

She is started on rivaroxaban 15 mg BID for 21 days followed by 20 mg once daily.

How long should she be anticoagulated?

- A. 1 month
- B. 3 months
- C. 12 months
- D. Lifelong anticoagulation



Case 2 – The correct answer is B

Anticoagulation duration for VTE:

- Provoked:
 - OCP use, surgery / prolonged immobilization, trauma, pregnancy
 - 3 months
- Unprovoked or recurrent:
 - Extended or lifelong therapy
 - Duration depends on patient history and preference



Ann Intern Med. 2007;146(3):211-222

**Phlegmasia
cerulea dolens**



**Thrombolytics +/-
thrombectomy**

Case 3

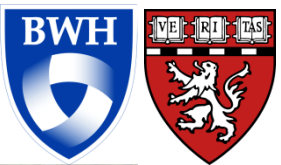
A 64-year-old woman presents to primary care visit with complaints of increasing dyspnea on exertion and fatigue.

On physical examination, the patient appears pale. She has no jugular venous distention or heart murmurs. Her lungs are clear. Liver and spleen are not palpable, and she has no lower extremity edema.

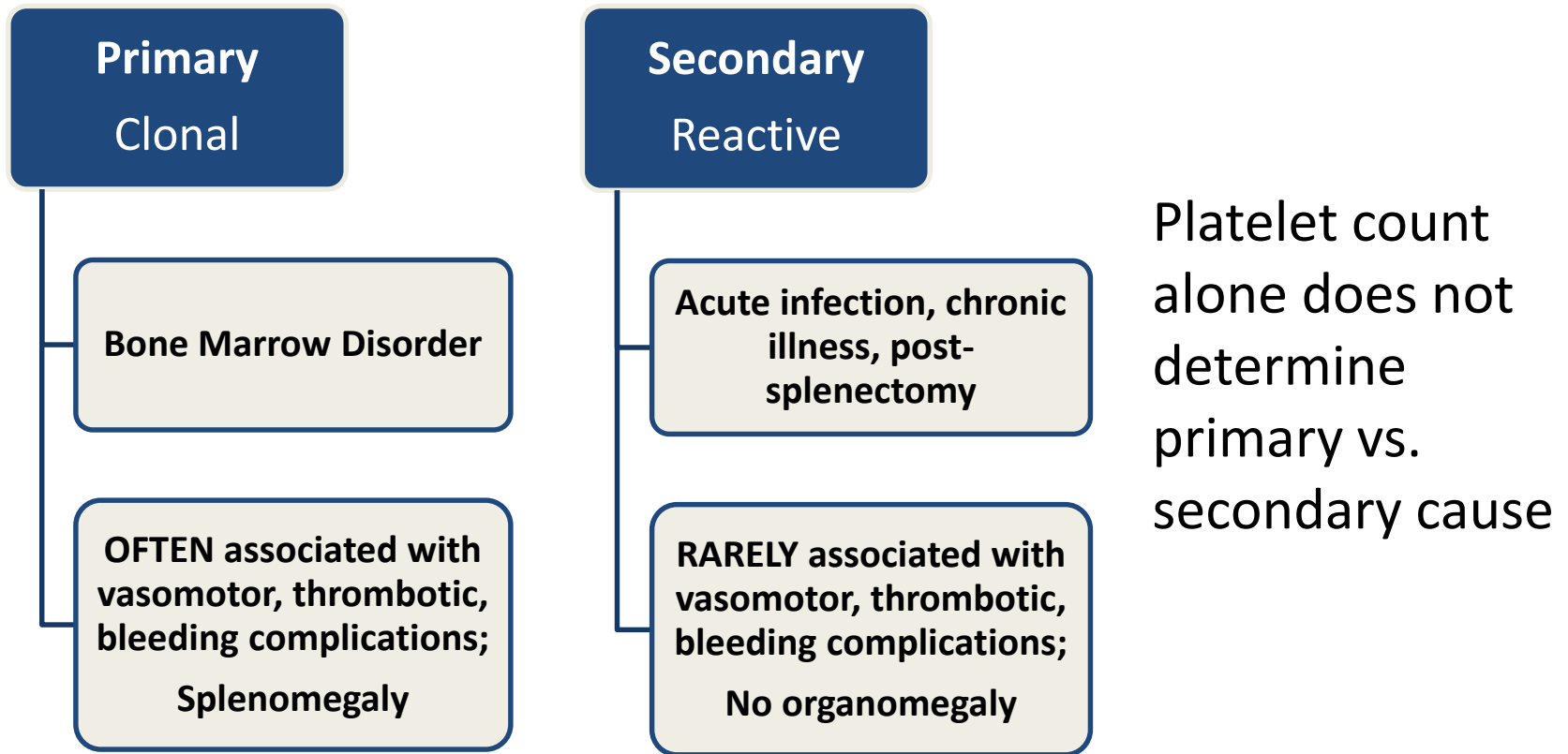
Laboratories include WBC count 10,000/ml, HCT 23%, MCV 65 fL, RDW 20%, Plts 1,006,000/ml, LDH 158, ESR 24.

What is the most likely cause of the thrombocytosis?

- A. Iron deficiency
- B. Subacute bacterial endocarditis
- C. Acute myocardial infarction
- D. Autoimmune hemolytic anemia
- E. Essential thrombocythemia



Case 3 – Correct Answer is A Thrombocytosis



Iron deficiency causes thrombocytosis due to stimulation of platelet precursors by EPO

Case 4

A 42-year-old gentleman with HIV infection (CD4+ cell count 188/ul) presents with new headaches.

CT scan of the head reveals two ring-enhancing lesions with mass effect.

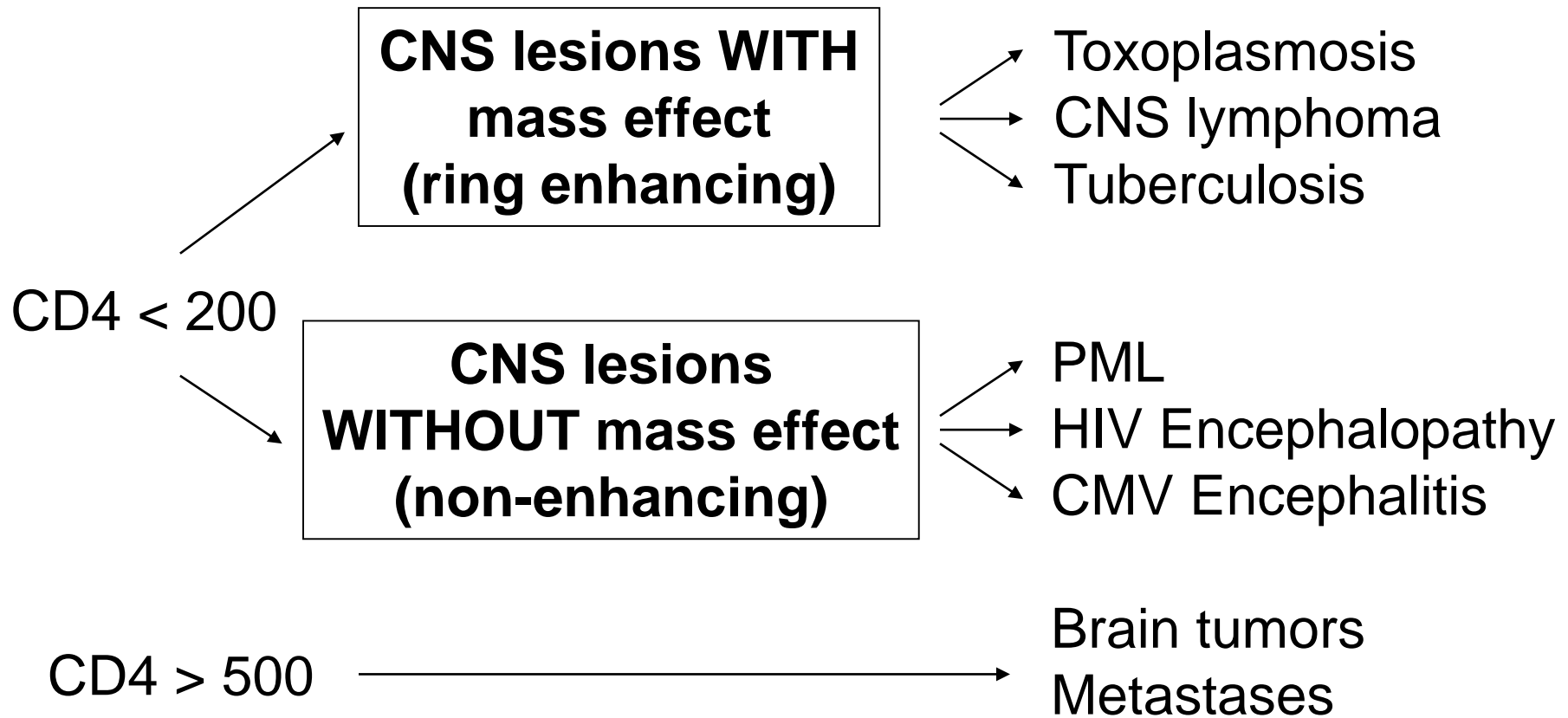
Which of the following is LEAST likely to be the etiology of this finding?

- A. Toxoplasmosis
- B. Primary central nervous system lymphoma
- C. Progressive multifocal leukoencephalopathy
- D. Tuberculosis
- E. Staphylococcus



Case 4 – The correct answer is C

CNS Lesions in Patients with HIV Infection



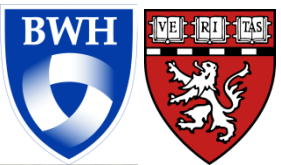
Case 5

A 55-year-old gentleman with HCV cirrhosis presents for follow-up after an upper endoscopy reveals medium-sized esophageal varices. He has no history of GI bleeding.

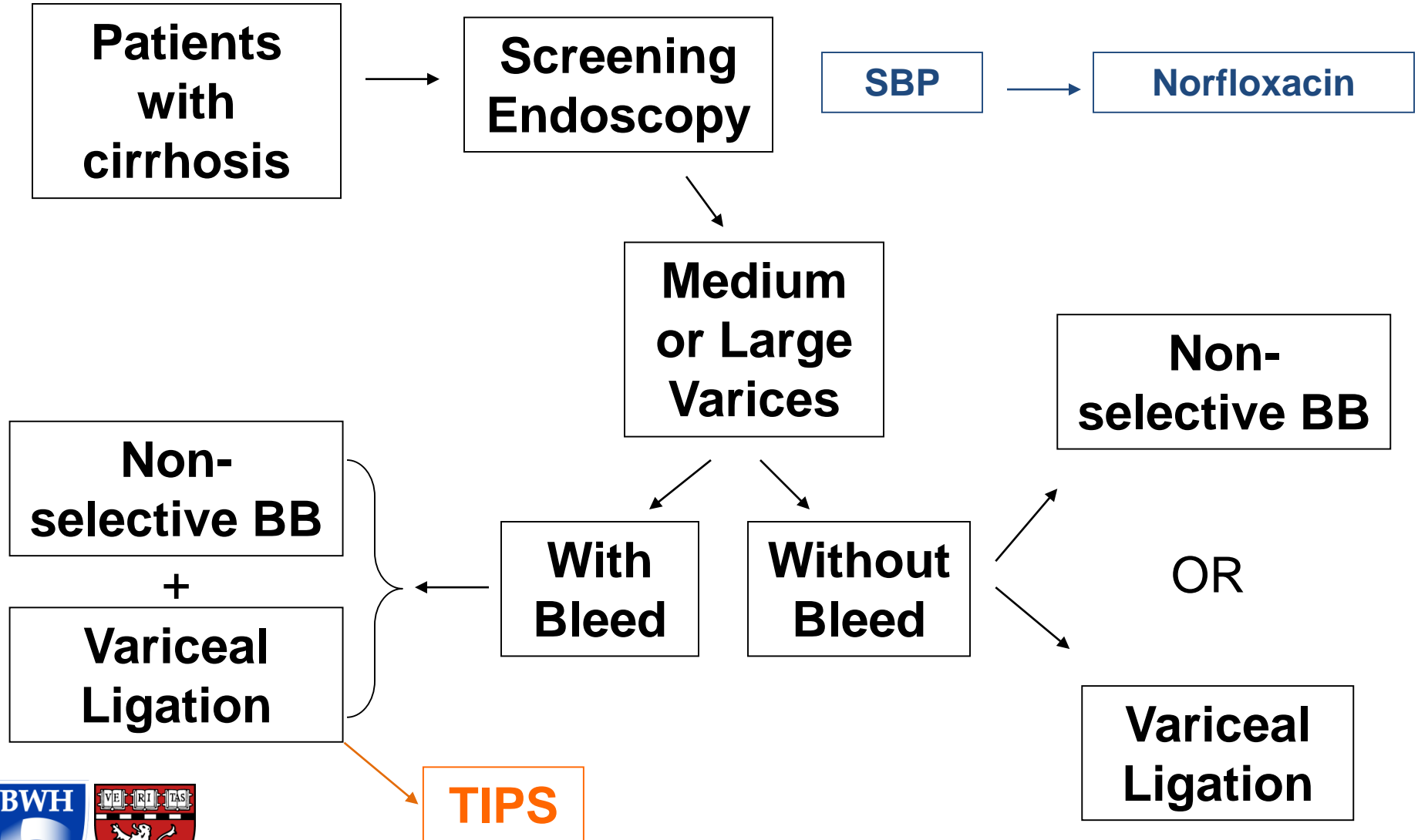
On examination, his blood pressure is 110/55 mmHg with a pulse of 85 bpm. His abdominal examination reveals splenomegaly. No shifting dullness or fluid wave is present.

Which of the following is indicated for primary prophylaxis?

- A. Norfloxacin
- B. Nadolol
- C. Trans-jugular intrahepatic portosystemic shunt (TIPS)
- D. Nadolol and variceal banding
- E. Isosorbide mononitrate

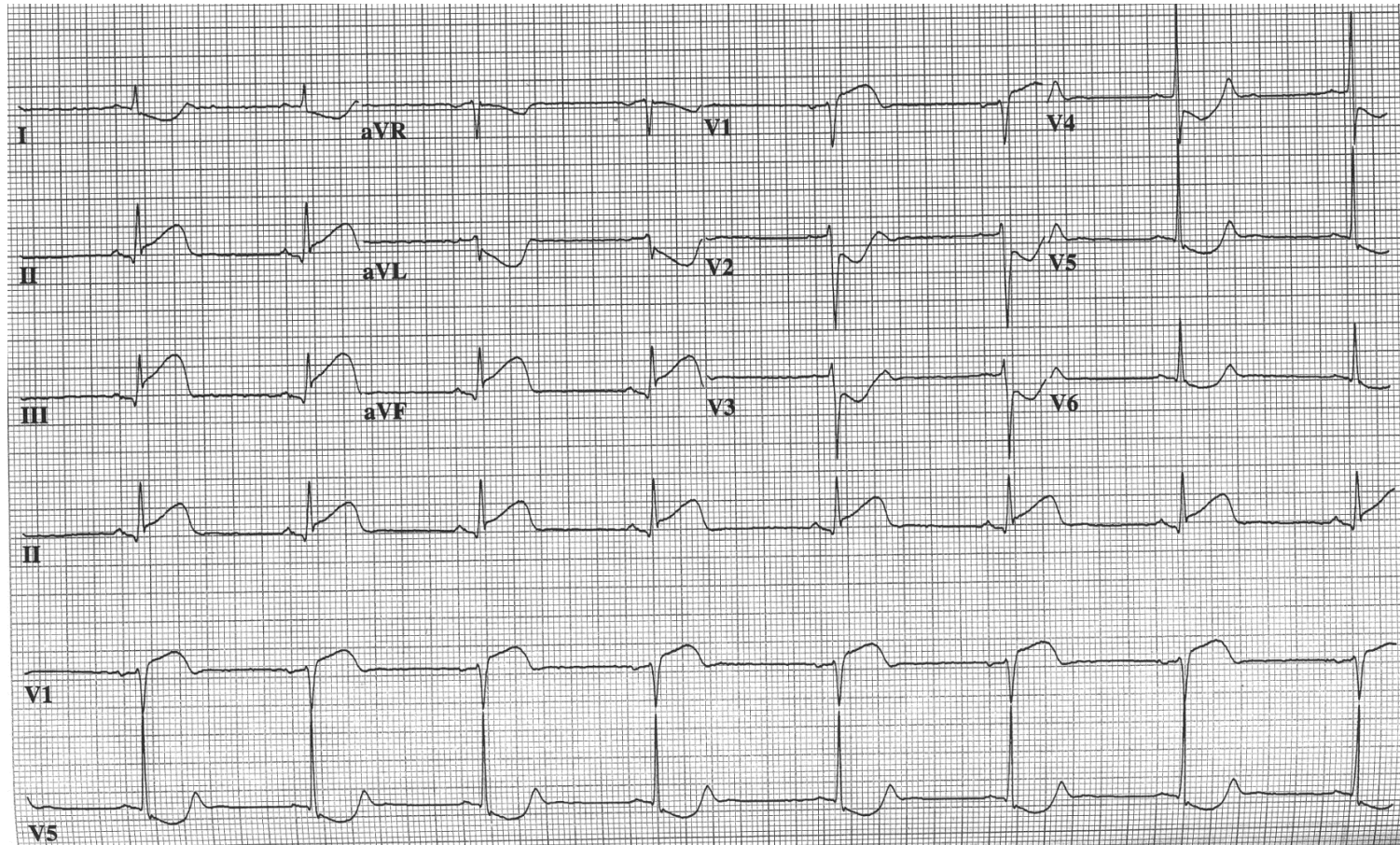


Case 5 – The correct answer is B
Primary variceal bleeding prophylaxis



Case 6

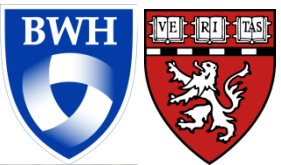
A 50-year-old woman with Marfan syndrome presents with substernal chest pain radiating to her back. Physical exam reveals a II/VI early diastolic murmur. An ECG is obtained:



Case 6

What diagnostic study would you obtain first?

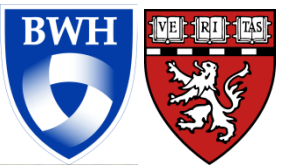
- A. Transthoracic echocardiogram
- B. Computed tomography angiography of the chest
- C. Cardiac catheterization
- D. Lung ventilation-perfusion (V/Q) scan
- E. Vasodilator SPECT



Case 6 – The correct answer is B

Imaging of Acute Aortic Dissection

- **Aortic dissection**
 - Substernal chest pain, radiating to back
 - New diastolic murmur
- **Risk factors**
 - Connective tissue disease
 - Hypertension
 - Smoking
 - Atherosclerosis
 - Pregnancy
 - Trauma
 - Preexisting aortic aneurysm
- **Dissection can cause STEMI** due to extension of the dissection flap into the coronary arteries, typically the RCA
- **Diagnostic tests**
 - CTA chest / aorta
 - Trans-esophageal echocardiogram (TEE)
 - MRA
- **Vasodilator SPECT** → evaluates myocardial ischemia, not dissection



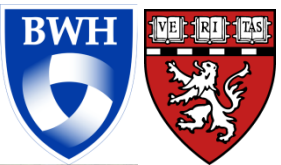
Case 7

A 58-year-old woman with HTN on HCTZ and atenolol presents with RLQ abdominal pain. Abdominal CT reveals a low-attenuation, homogenous adrenal mass (2.7 cm).

Her abdominal pain resolves without intervention after several hours and she has no further complaints.

What is the next best step for evaluating her adrenal mass?

- A. Fine needle biopsy
- B. Magnetic resonance imaging (MRI)
- C. Repeat CT scan
- D. Plasma and urine hormone evaluation
- E. Surgical exploration and resection



Case 7 – The correct answer is D

Adrenal Incidentaloma

Adrenal Incidentaloma

- Adrenal mass >1 cm
- Prevalence: 4%
- Most are nonfunctional, benign adenomas
- But rarely can be:
 - Cortisol-secreting adenomas
 - Aldosteronomas
 - Pheochromocytomas
 - Adrenocortical carcinomas
 - Metastatic lesions

Evaluation

- First step: **hormonal testing**
- If hormonal testing is negative, **FNA** to evaluate for metastatic disease (suspicious imaging, known primary malignancy)
- Never biopsy or resect without ruling out a hormonally active tumor
- **MRI** can give clues regarding etiology, but does NOT rule out a functioning tumor

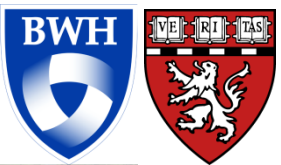


Case 8

A 54-year-old woman presents to her PCP with new-onset headache. The pain is retro-orbital, unilateral (right side only), and has been progressive over the course of three weeks with intermittent responsiveness to acetaminophen. She denies visual changes, fevers, chills, jaw claudication, or weakness. Her exam is normal, including a thorough neurological exam.

What is the most appropriate next step in management?

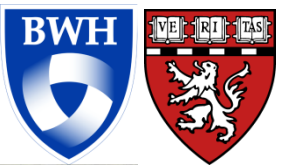
- A. Oxycodone
- B. Head MRI/MRA
- C. Amitriptyline
- D. Sumatriptan
- E. Referral to physical therapy



Case 8 – The correct answer is B

Brain Imaging for Headaches

- **Headache warning signs**
 - New-onset headache after age 50
 - ‘First or worst’
 - Increased frequency, increased severity
 - New-onset with history of cancer / immunodeficiency
 - Mental status changes
 - Fever, neck stiffness, and meningeal signs
 - Focal neurologic deficits (if not migraine with aura)
- **Treatment for migraines:**
 - Abortive therapies: NSAIDs, triptans, anti-emetics
 - Prophylaxis: amitriptyline, beta blockers, antiepileptics
- **Less effective: opioids & physical therapy**



Case 9

A 31-year-old monogamous woman with no past medical history presents for routine Pap smear. The cytological result is negative for intraepithelial lesion or malignancy. Reflex DNA testing for high-risk human papillomavirus (HPV) is performed and is negative. She has no history of abnormal Pap Smears.

What is the next step in management?

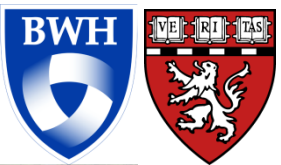
- A. Repeat cytology with HPV co-testing in one year
- B. Repeat cytology with HPV co-testing in two years
- C. Repeat cytology with HPV co-testing in three years
- D. High-risk HPV testing alone in three years
- E. High-risk HPV testing alone in five years



Case 9 – The correct answer is E

Cervical Cancer Screening Guidelines (USPSTF)

- Women age ≥ 30 years
 - Cytology (Pap smear) every **three** years **OR**
 - Primary HPV testing alone every **five** years **OR**
 - Cytology **AND** HPV co-testing every **five** years
- Women age 21-29 years
 - Cytology (Pap smear) every **three** years
 - Screening with HPV co-testing has limited utility in this population (should be **avoided**)

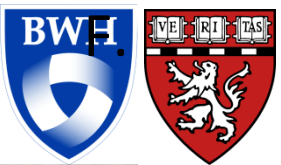


Case 10

A 56-year-old male from Western Massachusetts presents to his primary care physician with a fever and rash x 2 weeks. He has no other symptoms. His Lyme ELISA and Western Blot tests are positive.

What is the next BEST step in management?

- A. Doxycycline 200mg x1
- B. Ceftriaxone 2g IV daily x 3wks
- C. Amoxicillin 500mg TID x 2wks
- D. Doxycycline 100mg BID x 2wks
- E. Azithromycin 500mg x 1d,
then 250 mg x4d



Case 10 – The correct answer is D

Treatment of Early Lyme Disease

- **Erythema Migrans**
 - Within 7-14 days after tick detaches
 - Most have 1 lesion; 25% have multiple lesions
- **Serologic testing**
 - Not required if classic erythema migrans rash
 - Only 40% sensitive
- **Treatment of choice: Doxycycline (14-21 days)**
 - Also treats anaplasmosis; MISSES babesiosis
 - Pregnancy & pediatrics: amoxicillin or cefuroxime
- **Treatment for advanced disease: 3rd generation cephalosporin**
 - Includes advanced heart block, severe neurologic disease



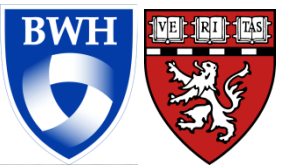
Image: Erythema Migrans

Case 11

A 68-year-old woman with asthma presents to her PCP with right foot paresthesias, progressive right foot drop, and an erythematous rash over both lower extremities. Five months prior, she had a productive cough and was found to have patchy infiltrates on her CXR, prompting treatment with antibiotics. Her labs are notable for WBC count 9,600/ml (58% neutrophils, 9% lymphocytes, and 31% eosinophils), Hct 36.2, and plts 271 K/ml.

What is the most likely cause of the patient's presentation?

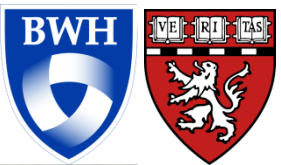
- A. Granulomatosis with polyangiitis
- B. Temporal arteritis
- C. Schistosomiasis
- D. EGPA
- E. Hodgkin's disease



Case 11 – The correct answer is D

Eosinophilic Granulomatosis with Polyangiitis

- **Classic Triad = asthma, sinus disease, peripheral eosinophilia**
- **Diagnosis:**
 - Asthma (particularly late onset)
 - Mononeuropathy (multiplex) or polyneuropathy
 - Rash: variable pattern (present in ~60%)
 - Paranasal sinus abnormalities
 - Allergic rhinitis, recurrent sinusitis, nasal polyposis
 - Eosinophilia: >10% or > 1500 eosinophils/ml
 - Migratory or transient pulmonary opacities on CXR
- **Diagnosis supported by p-ANCA or anti-MPO antibodies**
- **Biopsy may show extravascular accumulation of eosinophils / granulomas, eosinophilic pneumonia, small-vessel vasculitis**

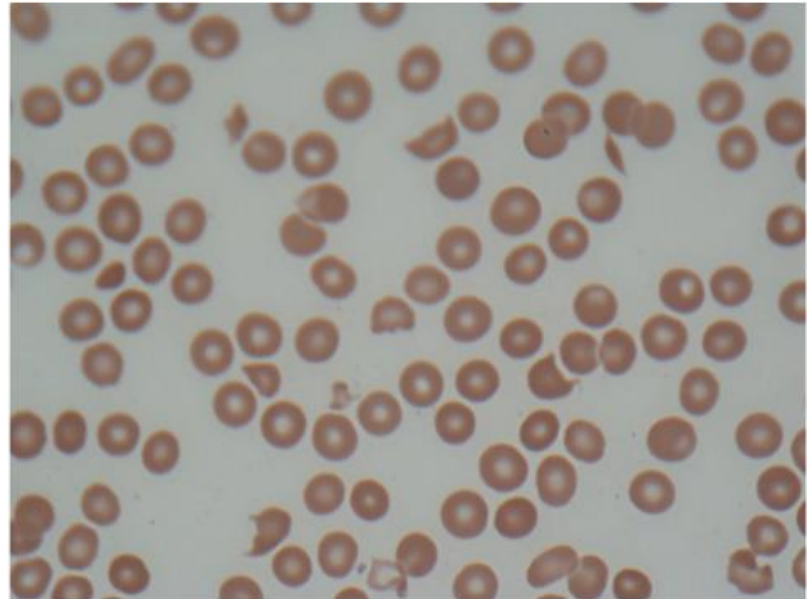


Case 12

A 34-year-old woman is seen in the ED with confusion, malaise, and nausea. Past medical history is notable for allergic rhinitis. Medications include loratadine and fluticasone. On exam, the patient is alert and oriented to self only. She is noted to have jaundice and bilateral lower extremity petechiae.

Labs are notable for hematocrit 21, platelets 45,000/ml, reticulocyte count 15%, and LDH 1,500 U/L. Coagulation studies are normal.

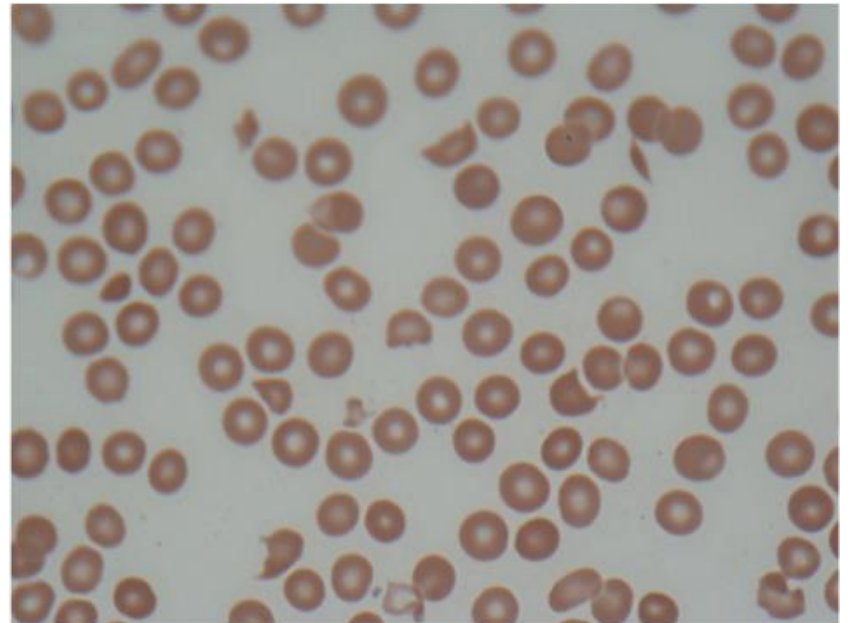
Peripheral smear shows:



Case 12

Which of the following is the BEST next step?

- A. Perform direct antiglobulin (Coombs) test
- B. Check ANA
- C. Obtain transthoracic echocardiogram
- D. Give Intravenous immune globulin
- E. Initiate plasma exchange

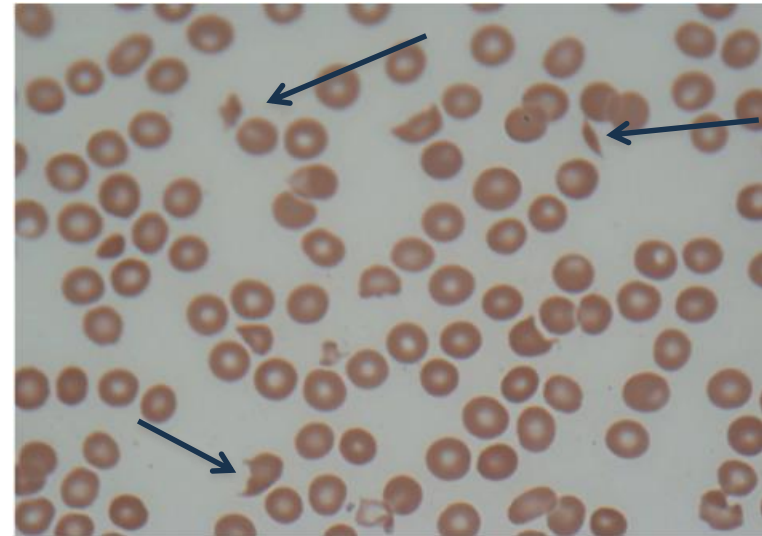


Case 12 – The Correct Answer is E

Management of primary TMA syndromes

Smear: microangiopathy (schistocytes >5/hpf), rare platelets

- Primary TMA syndromes include TTP, HUS, and others
- Clinical features:
 - MAHA
 - Thrombocytopenia
 - Neurologic abnormalities
 - GI symptoms
 - AKI (less common with TTP)
- Low ADAMST13 activity (<10%) is hallmark of TTP
- Early empiric initiation of **plasma exchange** to treat presumptive TTP is critical to decrease morbidity and mortality



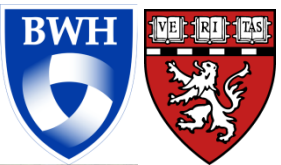
Peripheral blood smear with schistocytes (arrows)

Case 13

A 45-year-old man with a history of dyspepsia presents to the office with new dysphagia. He initially developed dyspepsia with occasional heartburn several years ago and these symptoms responded to omeprazole 20 mg daily. Two years ago, his symptoms recurred so his omeprazole dose was increased to 40 mg daily, which again helped his symptoms. He now presents with difficulty swallowing solid foods.

Which of the following is the next best step?

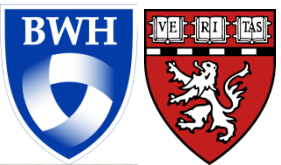
- A. Change the proton pump inhibitor to twice per day
- B. Add a night-time dose of an H₂ blocker
- C. Refer for a barium swallow study
- D. Refer for an upper endoscopy
- E. Treat for *Helicobacter pylori* infection



Case 13 – The correct answer is D

Endoscopy for Dyspepsia

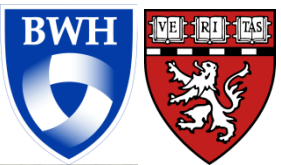
- **Dyspepsia: chronic / recurrent upper abdominal pain**
- **Alarm symptoms → need early endoscopy**
 - Family history of upper GI cancer
 - Unintentional weight loss
 - GI bleeding or unexplained iron-deficiency anemia
 - Progressive dysphagia or odynophagia
 - Persistent vomiting
 - Palpable mass or lymphadenopathy
- **If younger than 60 years and no alarm features:**
 - H. pylori test and treat, PPI therapy if still symptomatic
- **If older than 60 years or alarm features:**
 - Early endoscopy with biopsy for H. pylori
 - Low positive predictive value, high negative predictive value for cancer



Case 14

A 24-year-old man presents for an annual physical. On exam, he is noted to have a harsh III/VI systolic crescendo-decrescendo murmur best appreciated at the LLSB. The murmur does not radiate to the carotids and is increased with Valsalva maneuver. A prominent S4 is heard. What is the most likely underlying pathology?

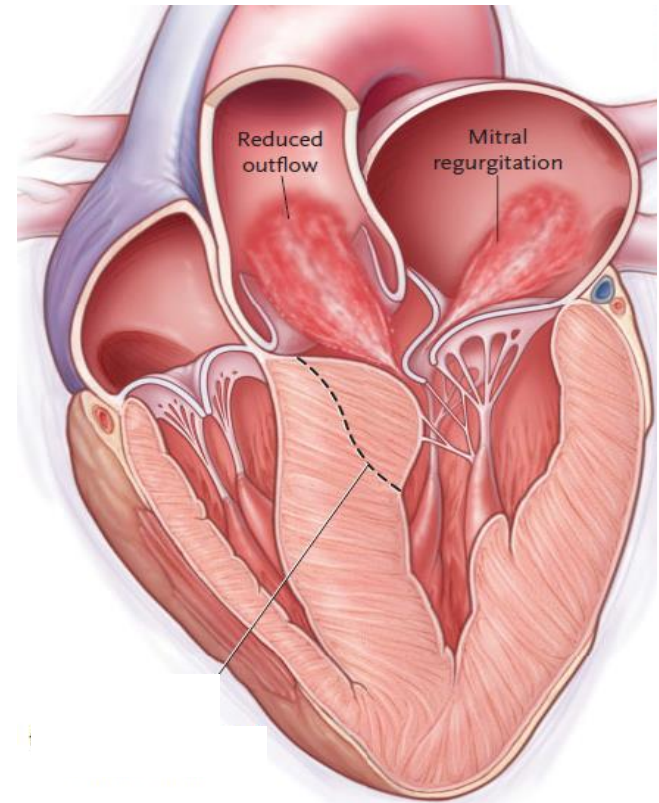
- A. Congenital aortic stenosis
- B. Marfan syndrome
- C. Hypertrophic cardiomyopathy
- D. Early-onset hypertension
- E. Rheumatic heart disease



Case 14 – The correct answer is C

Differentiating systolic murmurs on exam

- **Hypertrophic cardiomyopathy**
 - Systolic crescendo-decrescendo murmur related to LVOT obstruction and mitral regurgitation
 - Generally does not radiate to carotids, and is increased with Valsalva
 - HCM is an autosomal dominant disorder of the cardiac sarcomere with variable penetrance
 - Increased risk of sudden cardiac death
- **Aortic Stenosis**
 - Systolic crescendo-decrescendo murmur, radiates to carotids, decreased with Valsalva
 - Can be related to bicuspid, calcific, or rheumatic heart disease



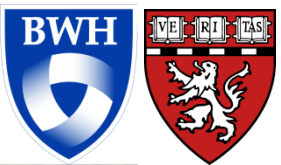
Hypertrophic cardiomyopathy

Case 15

A 22-year-old male college football player with no PMH presents to the emergency room for evaluation of a small abscess on his neck. The collection is incised and drained, and gram stain demonstrates gram positive cocci in clusters.

What treatment would you prescribe?

- A. Oral vancomycin
- B. Oral dicloxacillin
- C. Oral trimethoprim-sulfamethoxazole
- D. Oral penicillin
- E. Intravenous nafcillin



Case 15 – The correct answer is C

Treatment of community-associated MRSA

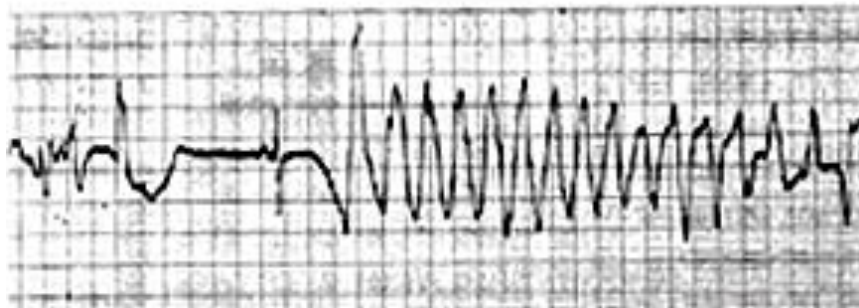
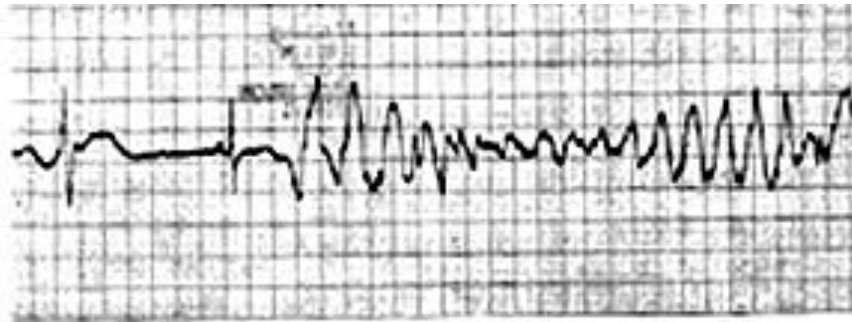
- **Community-associated MRSA (CA MRSA)**
 - Most common cause of skin and soft tissue infections in ED
 - Outbreaks reported in athletes, military, IVDU, MSM
- **CA MRSA is NOT susceptible to penicillins**
 - Cannot use penicillin, dicloxacillin, or nafcillin
- **Treatment in stable patients (oral agents):**
 - Clindamycin, trimethoprim-sulfamethoxazole, long-acting tetracycline (minocycline or doxycycline)
- **Treatment of severe infections (parenteral agents):**
 - IV vancomycin, daptomycin

No role for oral vancomycin besides treatment of *C. difficile*



Case 16

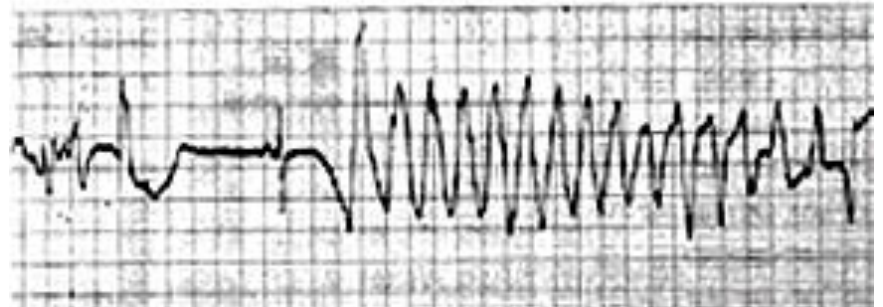
A 56-year-old man with heart failure with reduced ejection fraction is admitted with cough, fever, and a RLL infiltrate on CXR. He is diagnosed with community acquired pneumonia and started on levofloxacin. On hospital day 2, the following rhythm is seen on telemetry and the patient is unresponsive.



Case 16

What is the next best step in management?

- A. Defibrillation
- B. Synchronized cardioversion
- C. Intravenous magnesium
- D. Amiodarone
- E. Isoproterenol

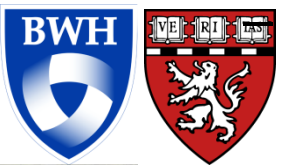


Case 16 – The correct answer is A

Management of Torsades de Pointes (TdP)

- TdP: Polymorphic VT in setting of prolonged QT
 - Congenital (LQTS genetic variants)
 - Acquired
 - Drugs (e.g. fluoroquinolones, macrolides, antipsychotics)
 - Electrolyte abnormalities (e.g. hypokalemia, hypomagnesemia)
 - Bradyarrhythmias (long-short sequences)
- Treatment for unstable VT/VF: immediate defibrillation
- Intravenous magnesium
 - Treats and prevents recurrent TdP
 - Not useful for terminating hemodynamically unstable TdP
- Isoproterenol and RV pacing
 - Prevents bradycardia, QT dispersion, and early afterdepolarizations (EADs) that predispose to TdP

Not useful for terminating hemodynamically unstable TdP



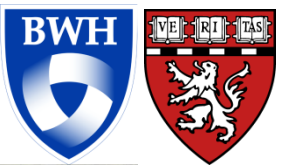
Case 17

A 42-year-old man with alcohol use disorder presents to the emergency department with nausea and vomiting after several days of heavy drinking.

Lab studies reveal an anion gap metabolic acidosis and urine ketones. Blood glucose is 100 mg/dl.

What is the appropriate first step in management?

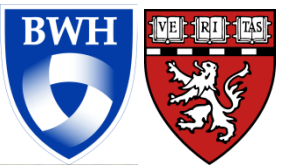
- A. Intravenous insulin
- B. Intravenous steroids
- C. Intravenous dextrose
- D. Intravenous normal saline
- E. Intravenous folate



Case 17 – The correct answer is D

Alcoholic ketoacidosis (AKA)

- **AKA is caused by:**
 - Decreased carbohydrate intake
 - Alcohol-induced inhibition of gluconeogenesis
 - Alcohol-induced stimulation of lipolysis
- **Presents as AGMA** with ketonemia/ketonuria in patients with alcoholic use without diabetes
- **Initial treatment is IV fluid resuscitation**
 - Insulin not given because glucose not elevated
 - Dextrose given only after thiamine administration to avoid Wernicke's encephalopathy
 - Folate repletion is important for malnourished or alcoholic patients, but not for acute treatment of AKA

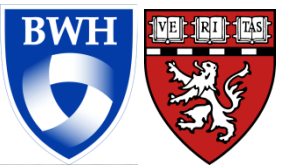


Case 18

A 52-year-old man is seen in urgent care after he was found to have 2+ blood on a urinalysis performed as part of a life insurance evaluation. He is a former smoker but has no other PMH, prior chemical exposures, or a family history of cancer. A urinalysis and urine sediment shows 6 RBCs per high-powered field, which are normal-appearing.

What is the most appropriate evaluation?

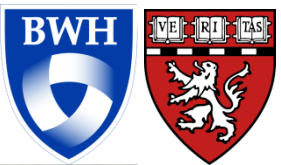
- A. Check IgA level
- B. Obtain CT urogram
- C. Refer to nephrology for a renal biopsy
- D. Refer to urology for cystoscopy
- E. Obtain CT urogram AND refer for cystoscopy



Case 18 – The correct answer is E

Evaluation of microscopic hematuria

- Microscopic hematuria: ≥ 3 RBCs / HPF
- If dysmorphic RBCs or RBC casts are present:
 - Suspect glomerular source
 - Consider renal biopsy
- If RBCs are normal-appearing:
 - Suspect non-glomerular source
 - Ureteral bleeding (e.g. nephrolithiasis)
 - Bladder bleeding (e.g. bladder cancer or cystitis)
 - Obtain CTU and cystoscopy if age > 35 or at risk for bladder cancer



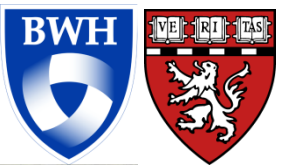
Case 19

A 50-year-old woman presents to the ED complaining of a sore throat and concern that a fish bone is stuck in her throat. She had a URI three weeks prior but is now feeling well. Her vitals signs are stable with a heart rate of 80 and blood pressure 126/76 mmHg. Her anterior neck is tender on exam. Direct laryngoscopy is normal.

Labs are notable for a TSH 0.03 mIU/L and ESR 80 mm/hr.

What is the most appropriate treatment?

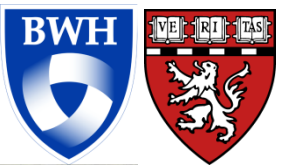
- A. Propylthiouracil 150 mg BID
- B. Atenolol 50 mg daily
- C. No treatment, recheck TSH in 4-6 weeks
- D. ^{131}I ablative therapy
- E. Methimazole 10 mg TID



Case 19 – The correct answer is C

Management of subacute thyroiditis

- **Pain or tenderness** of the thyroid on exam helps distinguish different forms of thyroiditis
- **Painless thyroiditis** is an autoimmune process
 - Includes Hashimoto's, postpartum, drug-induced thyroiditis
 - Often results in a chronically hypothyroid state
- **Painful subacute thyroiditis** often follows a URI
 - Beta blockers are useful only for symptoms or tachycardia
- **^{131}I ablative therapy** is reserved for Graves disease, toxic multinodular goiter, or thyroid cancer



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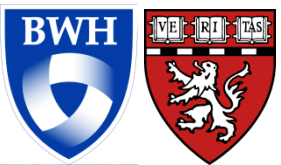
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Case 20

A 35-year-old man presents to his PCP for a routine physical exam. His only PMH includes seasonal allergies for which he uses fluticasone nasal spray. He does not smoke cigarettes or drink alcohol. There is no family history of colorectal cancer although his mother did have two documented sessile polyps (one ≥ 1 cm) at age 55.

When should he undergo his first screening colonoscopy?

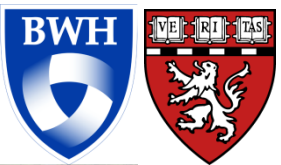
- A. Now
- B. Age 40 years
- C. Age 45 years
- D. Age 50 years



Case 20 – The correct answer is B

Colorectal cancer screening

- For average risk patients:
 - Colonoscopy beginning at age 45
 - If documented history of advanced adenoma or serrated lesion in a first degree relative:
 - Screening colonoscopy beginning at age 40*
 - OR
 - Screening colonoscopy 10 years before the diagnosis of adenomatous polyps in a first-degree relative*
- (*whichever comes first)



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