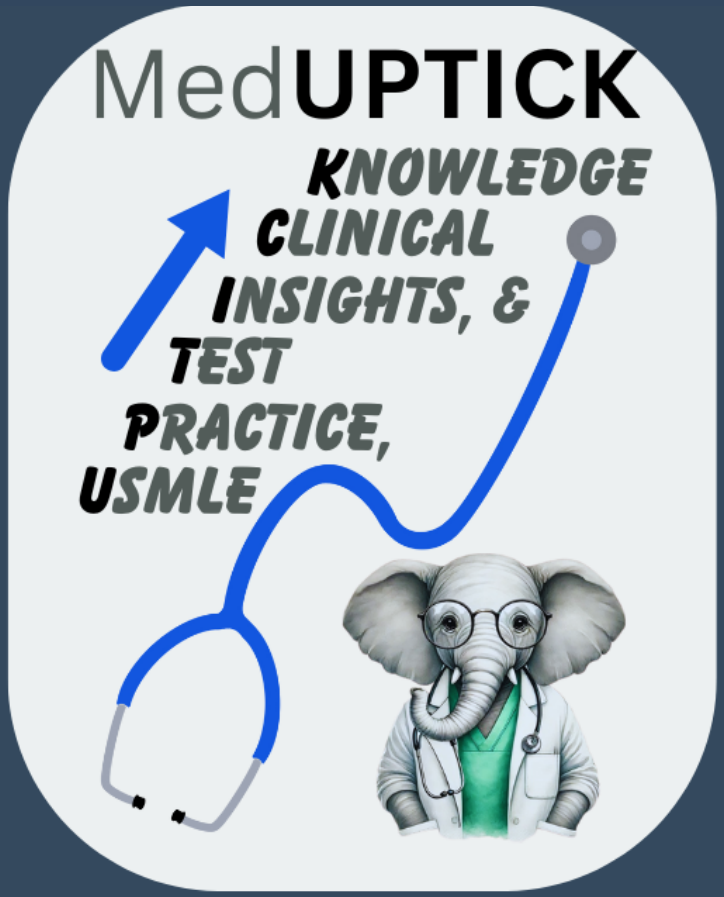
USMLE Daily High-Yield Drill Questions Quiz 0001



1:30

MedUPTICK -
Elevate Your Clinical Mastery.

QUESTION 1

A 35-year-old male presents to the emergency department with severe chest pain and dyspnea after a bout of heavy vomiting. The pain started suddenly and is localized to his lower chest and upper abdomen. He reports feeling a sharp, stabbing pain that worsens with deep breathing. His vital signs include a temperature of 101°F (38.3°C), blood pressure of 120/78 mmHg, heart rate of 115 bpm, and respiratory rate of 24 breaths per minute. Physical examination reveals crepitus on palpation of the chest and subcutaneous emphysema around the neck. Chest X-ray shows mediastinal air. The patient is otherwise healthy, with no significant medical history. He is not taking any medications. What is the most likely diagnosis?

A. Acute pancreatitis
B. Acute myocardial infarction
C. Boerhaave syndrome
D. Pneumomediastinum
E. Pulmonary embolism

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QUESTION 1 - ANSWER

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A. Acute pancreatitis
B. Acute myocardial infarction
C. Boerhaave syndrome
D. Pneumomediastinum
E. Pulmonary embolism

Correct Answer: C. Boerhaave syndrome - Boerhaave syndrome is a spontaneous esophageal rupture that typically occurs after forceful vomiting or retching, as seen in this patient. The classic triad includes:

1. **Severe chest pain**, typically following vomiting, with sudden onset.
2. **Dyspnea** and **subcutaneous emphysema**, due to air leaking into the mediastinum and surrounding tissues.
3. **Mediastinal air on imaging** (chest X-ray or CT scan), confirming the presence of a pneumomediastinum.

This patient's presentation of acute chest pain following vomiting, the characteristic physical examination finding of subcutaneous emphysema, and mediastinal air on chest X-ray strongly point to Boerhaave syndrome. This is a surgical emergency requiring immediate intervention to prevent sepsis and multiorgan failure. Prompt diagnosis with imaging, typically a contrast-enhanced esophagography or CT scan, is essential for management. Surgical repair is the definitive treatment.

Incorrect Answers:

A. Acute pancreatitis - Acute pancreatitis typically presents with severe epigastric pain radiating to the back, often associated with nausea, vomiting, and elevated serum lipase and amylase levels. While vomiting may be a triggering factor for both pancreatitis and Boerhaave syndrome, the hallmark of pancreatitis is the nature and location of pain, which is usually relieved by sitting forward, unlike Boerhaave syndrome where pain worsens with breathing. Additionally, acute pancreatitis does not present with subcutaneous emphysema or mediastinal air.

B. Acute myocardial infarction - Although chest pain can be a feature of both Boerhaave syndrome and myocardial infarction, myocardial infarction is typically associated with risk factors such as hypertension, hyperlipidemia, and smoking, none of which are mentioned in this patient's history. Additionally, myocardial infarction usually presents with pain that is more central and may radiate to the left arm, neck, or jaw. There are no reports of cardiovascular symptoms such as shortness of breath, diaphoresis, or hypotension. Chest X-ray would not show mediastinal air in myocardial infarction.

D. Pneumomediastinum - Pneumomediastinum can present with subcutaneous emphysema and chest pain, but it is usually secondary to trauma or other causes like asthma, spontaneous lung rupture, or mechanical ventilation. It is a sign of air leakage into the mediastinum and typically presents without the severe vomiting that is characteristic of Boerhaave syndrome. While pneumomediastinum can be seen on imaging, it does not explain the esophageal rupture seen in Boerhaave syndrome. Boerhaave syndrome specifically involves a full-thickness esophageal tear.

E. Pulmonary embolism - Pulmonary embolism (PE) can present with chest pain and dyspnea, but it is typically accompanied by symptoms such as hemoptysis, tachypnea, and hypoxia. Additionally, PE would not explain the presence of subcutaneous emphysema or mediastinal air on imaging. Chest X-ray in PE typically shows a normal appearance or signs of a lung infarct, but not air in the mediastinum or subcutaneous emphysema, which are hallmark signs of Boerhaave syndrome.

Educational Takeaway: The classic findings of Boerhaave syndrome include severe chest pain after vomiting, subcutaneous emphysema, and mediastinal air on imaging. This condition is a surgical emergency and requires prompt diagnosis and management. Surgical repair is the definitive treatment to prevent life-threatening complications.

1:30

QUESTION 2

MedUPTICK -
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A 5-year-old boy presents to the pediatric clinic with his mother, who reports that he has been experiencing recurrent infections and progressive developmental delays. The child has a history of frequent upper respiratory infections and skin abscesses. His mother mentions that he has had no response to several courses of antibiotics, and he has been experiencing increasing difficulty with motor coordination. On physical examination, the child has pale skin, light-colored hair, and a few hypopigmentation areas. Neurological examination reveals mild ataxia and decreased deep tendon reflexes. Blood tests show mild anemia and a peripheral blood smear reveals large, abnormally shaped neutrophils with giant granules. Which of the following is the most likely diagnosis?

A. Chronic granulomatous disease
B. Chediak-Higashi syndrome
C. Hyper-IgE syndrome
D. X-linked agammaglobulinemia
E. DiGeorge syndrome

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QUESTION 2 - ANSWER

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B. Chediak-Higashi syndrome
C. Hyper-IgE syndrome
D. X-linked agammaglobulinemia
E. DiGeorge syndrome

Correct Answer: B. Chediak-Higashi syndrome - Chediak-Higashi syndrome is a rare autosomal recessive disorder caused by mutations in the LYST gene, which encodes a protein involved in lysosomal trafficking. This disorder leads to defective intracellular trafficking of lysosomes and results in the formation of giant lysosomal granules in various cell types, especially neutrophils, as seen on the peripheral blood smear.

Key features in this patient that support the diagnosis of Chediak-Higashi syndrome include:

- Recurrent infections: Due to defective phagocyte function, these patients are prone to infections, especially by pyogenic bacteria.
- Developmental delay and motor coordination difficulties: Neurological involvement, such as ataxia and neuropathy, is common in Chediak-Higashi syndrome.
- Hypopigmented skin and light-colored hair: Oculocutaneous albinism is a hallmark of this syndrome due to defective melanosome transport.
- Giant granules in neutrophils: The characteristic finding on peripheral blood smear.
- Mild anemia: Anemia is often present due to chronic infection and dysfunction in granulocyte activity.

Patients with Chediak-Higashi syndrome are also at risk for developing a "lymphohistiocytosis" or hemophagocytic lymphohistiocytosis (HLH), which can be fatal without appropriate intervention.

Incorrect Answers:

A. Chronic granulomatous disease - Chronic granulomatous disease (CGD) is a disorder caused by defects in the NADPH oxidase complex, leading to impaired phagocytosis of certain bacteria and fungi. This results in recurrent infections, but CGD is not associated with the formation of giant granules in neutrophils, and the hypopigmentation seen in Chediak-Higashi syndrome is not present in CGD. Additionally, CGD is more commonly associated with granulomatous inflammation and the formation of abscesses rather than the systemic issues seen in Chediak-Higashi syndrome.

C. Hyper-IgE syndrome - Hyper-IgE syndrome, also known as Job syndrome, is characterized by elevated IgE levels and a predisposition to recurrent skin and lung infections. Patients often have eczema, elevated IgE levels, and a distinctive facial appearance. However, the giant neutrophil granules seen in Chediak-Higashi syndrome are not present in hyper-IgE syndrome, and this syndrome does not typically present with the neurological findings, developmental delays, or hypopigmentation that are seen in Chediak-Higashi syndrome.

D. X-linked agammaglobulinemia - X-linked agammaglobulinemia (also known as Bruton's disease) is an immunodeficiency disorder due to a defect in B-cell development, leading to a lack of immunoglobulin production. This results in recurrent infections, particularly with encapsulated bacteria. However, this condition is not associated with giant granules in neutrophils, hypopigmentation, or neurological symptoms. The lack of B cells on flow cytometry would help distinguish this disorder from Chediak-Higashi syndrome.

E. DiGeorge syndrome - DiGeorge syndrome is characterized by thymic hypoplasia, leading to T-cell deficiency, along with congenital heart defects and hypocalcemia. While DiGeorge syndrome can result in recurrent infections, it does not cause the giant neutrophil granules seen in Chediak-Higashi syndrome, nor is it associated with developmental delay, ataxia, or hypopigmentation. The hallmark of DiGeorge syndrome is the absence of T cells, which would be detected on flow cytometry, not the neutrophil abnormalities seen in Chediak-Higashi syndrome.

Educational Takeaway: Chediak-Higashi syndrome presents with recurrent infections, developmental delay, and the hallmark finding of giant granules in neutrophils. Hypopigmentation of the skin and hair is also a key feature. Early diagnosis and management are crucial to prevent severe complications like hemophagocytic lymphohistiocytosis (HLH).

1:30

QUESTION 3

MedUPTICK -
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A 22-year-old woman presents to the clinic for a routine check-up. She has a history of intermittent abdominal pain and has been experiencing episodes of nausea and vomiting for the past few months. She mentions that she also has a history of multiple episodes of bowel obstruction. Upon further questioning, she notes that her father had a history of colorectal cancer diagnosed at age 45, and her mother had a history of ovarian cancer. The patient denies any significant weight loss or blood in her stool.

On physical examination, the patient appears well-nourished, and there are no signs of acute distress. Her skin exam reveals multiple dark-colored macules on her lips, buccal mucosa, and fingers. Her abdominal examination is unremarkable, but she is slightly tender in the lower abdomen. Which of the following is the most likely diagnosis?

A. Familial adenomatous polyposis
B. Peutz-Jeghers syndrome
C. Lynch syndrome
D. Crohn's disease
E. Irritable bowel syndrome

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B. Peutz-Jeghers syndrome
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Correct Answer: B. Peutz-Jeghers syndrome - Peutz-Jeghers syndrome (PJS) is an autosomal dominant genetic disorder caused by mutations in the STK11 gene. It is characterized by:

- Gastrointestinal polyposis: The most distinctive feature of PJS is the presence of hamartomatous polyps in the gastrointestinal tract, which are often associated with recurrent episodes of bowel obstruction and abdominal pain.
- Pigmented macules: These are commonly seen on the lips, buccal mucosa, and fingers (as seen in this patient), and are a hallmark of PJS. The pigmentation may be present at birth or develop during childhood.
- Cancer risk: PJS increases the risk of several cancers, including colorectal, breast, ovarian, pancreatic, and gastric cancers, which aligns with the patient's family history of colorectal and ovarian cancers.

The patient's combination of gastrointestinal symptoms (e.g., bowel obstruction) and characteristic skin findings (e.g., pigmented macules) points to Peutz-Jeghers syndrome.

Incorrect Answers:

A. Familial adenomatous polyposis - Familial adenomatous polyposis (FAP) is an autosomal dominant disorder characterized by the development of hundreds to thousands of adenomatous polyps in the colon and rectum, typically starting during adolescence. Unlike PJS, FAP does not feature the characteristic skin pigmentation seen in this patient. Additionally, while FAP is strongly associated with colorectal cancer, it does not cause the recurrent episodes of bowel obstruction seen in Peutz-Jeghers syndrome due to hamartomatous polyps.

C. Lynch syndrome - Lynch syndrome, also known as hereditary nonpolyposis colorectal cancer (HNPCC), is an inherited condition caused by mutations in mismatch repair genes (MLH1, MSH2, MSH6, etc.), leading to an increased risk of colorectal, endometrial, and other cancers. Although Lynch syndrome shares a family history of colorectal cancer, it does not cause gastrointestinal polyposis or the characteristic pigmented macules seen in Peutz-Jeghers syndrome.

D. Crohn's disease - Crohn's disease is an inflammatory bowel disease characterized by chronic, relapsing inflammation of the gastrointestinal tract, often presenting with abdominal pain, diarrhea, weight loss, and sometimes blood in the stool. While abdominal pain and bowel obstruction can occur in Crohn's disease, it lacks the characteristic pigmented lesions seen in Peutz-Jeghers syndrome. Additionally, the patient's family history is more suggestive of a hereditary cancer syndrome, not an inflammatory disease.

E. Irritable bowel syndrome - Irritable bowel syndrome (IBS) is a functional gastrointestinal disorder characterized by abdominal pain, bloating, and changes in bowel habits (e.g., diarrhea, constipation). IBS does not cause gastrointestinal polyposis, bowel obstruction, or the characteristic pigmented macules seen in Peutz-Jeghers syndrome. The absence of any red flags for organic disease (e.g., weight loss, blood in stool) makes IBS an unlikely diagnosis in this case.

Educational Takeaway: Peutz-Jeghers syndrome presents with gastrointestinal polyposis, pigmented macules, and a family history of cancer, with a significantly elevated lifetime cancer risk. Identifying these features early can guide appropriate surveillance and management.

1:30

QUESTION 4

MedUPTICK -
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A 45-year-old woman presents to the clinic with complaints of recurrent episodes of vertigo, tinnitus, and hearing loss in her right ear. These episodes have been progressively worsening over the past 6 months, with the vertigo lasting for several hours. She describes the sensation of "whirling" and reports that the episodes are associated with fullness in her ear. The tinnitus is described as a constant ringing. Her medical history is unremarkable, and she is not currently on any medications. She denies any recent head trauma or ear infections. She is a nonsmoker and drinks alcohol occasionally. Family history is notable for her mother having similar symptoms, which were diagnosed as "inner ear problems."

On examination, she has normal vital signs and no signs of acute distress. Neurologic examination reveals no focal deficits, and her hearing is diminished on the right side. The Dix-Hallpike test is negative, and Romberg test is normal. Pure-tone audiometry confirms sensorineural hearing loss in the right ear. Which of the following is the most likely diagnosis?

A. Acoustic neuroma
B. Vestibular neuritis
C. Benign paroxysmal positional vertigo
D. Labyrinthitis
E. Meniere’s disease

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Correct Answer: E. Meniere's disease - Meniere's disease is a disorder of the inner ear characterized by a combination of:

- Recurrent episodes of vertigo, lasting for hours and often associated with nausea and vomiting.
- Tinnitus (ringing in the ear), which is often described as fluctuating or pulsatile.
- Sensorineural hearing loss, which tends to be progressive but may fluctuate initially.
- A feeling of fullness or pressure in the affected ear.

This patient's history of recurrent vertigo, tinnitus, hearing loss, and ear fullness is highly suggestive of Meniere's disease. The fact that she has a family history of similar symptoms further supports the diagnosis, as Meniere's disease has a genetic component. Audiometry showing sensorineural hearing loss in the right ear is another hallmark of this condition.

Meniere's disease results from an abnormal accumulation of endolymph in the cochlear and vestibular structures of the inner ear, leading to the symptoms seen in this patient. The episodes of vertigo are often spontaneous and can last from minutes to hours, as described by this patient.

Incorrect Answers:

A. Acoustic neuroma - Acoustic neuroma (vestibular schwannoma) typically presents with unilateral sensorineural hearing loss and tinnitus. However, vertigo is not usually a prominent symptom, and the episodes of vertigo in Meniere's disease are much more prolonged, lasting several hours, while in acoustic neuroma, vertigo is often mild or absent. Additionally, acoustic neuromas tend to present more insidiously and do not cause recurrent, episodic vertigo, as seen in this case.

B. Vestibular neuritis - Vestibular neuritis presents with acute, severe vertigo without hearing loss, typically lasting for days, and is often preceded by an upper respiratory infection. While the patient in this vignette has vertigo, she also has significant sensorineural hearing loss and tinnitus, which are not seen in vestibular neuritis. The patient's chronic, episodic nature of vertigo also distinguishes Meniere's disease from vestibular neuritis, which typically has a more acute onset.

C. Benign paroxysmal positional vertigo (BPPV) - BPPV is characterized by brief episodes of vertigo triggered by specific head movements, such as tilting the head or rolling over in bed. The episodes typically last less than a minute and are associated with positional changes rather than being spontaneous. The patient's description of hours-long episodes of vertigo with tinnitus and sensorineural hearing loss is not consistent with BPPV. Additionally, the Dix-Hallpike test is negative in this patient, which would have been positive if BPPV were present.

D. Labyrinthitis - Labyrinthitis involves inflammation of the labyrinth, often following a viral infection, and typically presents with acute onset of vertigo, hearing loss, and sometimes tinnitus. However, the vertigo in labyrinthitis is usually more intense and continuous, lasting days to weeks, and is often accompanied by fever and a history of an upper respiratory tract infection. This patient's more chronic, episodic symptoms, particularly the fluctuating hearing loss and tinnitus, are not consistent with labyrinthitis.

Educational Takeaway: Meniere's disease presents with recurrent vertigo, tinnitus, and sensorineural hearing loss, often accompanied by a sensation of fullness in the ear. Family history may be a clue, and the diagnosis is supported by audiometry showing hearing loss in the affected ear. Management typically involves symptomatic treatment and lifestyle modifications.

1:30

QUESTION 5

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A 32-year-old man with a history of HIV presents to the emergency department with a 5-day history of fever, dry cough, and progressive shortness of breath. He is a known HIV patient with a CD4+ T-cell count of 150 cells/mm³ and has not been adherent to his antiretroviral therapy (ART) for the past several months. On physical examination, his temperature is 101.3°F (38.5°C), heart rate is 110 bpm, blood pressure is 110/70 mmHg, and respiratory rate is 22 breaths per minute. He appears moderately ill and is using accessory muscles for breathing. On auscultation, there are fine crackles in both lungs. Chest X-ray shows diffuse bilateral interstitial infiltrates with a characteristic hazy appearance. Laboratory findings include a normal white blood cell count and a mild hypoxia (SpO2 of 90% on room air). Which of the following is the most likely diagnosis?

A. Tuberculosis
B. Acute bacterial pneumonia
C. Pneumocystis pneumonia
D. Cytomegalovirus pneumonia
E. Idiopathic pulmonary fibrosis

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QUESTION 5 - ANSWER

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Correct Answer: C. Pneumocystis pneumonia (PCP) - Pneumocystis pneumonia (PCP) is a common opportunistic infection in immunocompromised individuals, particularly those with HIV and CD4+ T-cell counts less than 200 cells/mm³, as seen in this patient. The classic presentation of PCP includes:

- Fever, dry cough, and progressive shortness of breath.
- Diffuse bilateral interstitial infiltrates on chest X-ray with a characteristic "ground-glass" appearance.
- Mild hypoxia (as evidenced by the patient's SpO2 of 90% on room air).
- Crackles on lung auscultation.

PCP is caused by *Pneumocystis jirovecii*, a fungal pathogen. Diagnosis is confirmed by bronchoalveolar lavage (BAL) or induced sputum showing cysts of *P. jirovecii*, typically visualized with special staining (e.g., silver stain). Treatment typically involves trimethoprim-sulfamethoxazole (TMP-SMX) and may require adjunctive corticosteroids in cases of severe hypoxia.

Incorrect Answers:

A. Tuberculosis - Tuberculosis (TB) is a possibility in HIV-infected individuals, especially those with a history of exposure or residing in areas with a high prevalence of TB. However, the presentation of TB is usually more insidious with a chronic cough, hemoptysis, weight loss, and night sweats. Chest X-ray in TB typically shows upper lobe infiltrates, often with cavitary lesions, which is distinct from the diffuse bilateral interstitial infiltrates with a "ground-glass" appearance seen in PCP.

B. Acute bacterial pneumonia - Acute bacterial pneumonia generally presents with a sudden onset of fever, productive cough, and localized findings on chest auscultation (e.g., egophony, dullness to percussion). The chest X-ray typically shows lobar consolidation, not the diffuse interstitial infiltrates seen in PCP. While this patient's cough is dry, bacterial pneumonia often causes a productive cough, and the radiologic pattern does not match the classic presentation of bacterial pneumonia.

D. Cytomegalovirus pneumonia - Cytomegalovirus (CMV) pneumonia is a possibility in HIV patients, especially those with CD4+ counts below 50 cells/mm³. CMV typically presents with fever, cough, and hypoxia, but it more often causes focal pneumonia with patchy infiltrates on chest X-ray rather than the diffuse ground-glass appearance seen in PCP. CMV also tends to have a more subacute course compared to the relatively rapid onset of symptoms in PCP.

E. Idiopathic pulmonary fibrosis - Idiopathic pulmonary fibrosis (IPF) presents with progressive shortness of breath and a dry cough, often in older adults (typically over 60 years old). The chest X-ray in IPF shows reticular opacities and honeycombing, which is very different from the ground-glass appearance seen in PCP. Additionally, IPF is not commonly associated with a significant immunocompromised state or opportunistic infections like PCP.

Educational Takeaway: PCP in HIV-infected patients presents with fever, dry cough, progressive dyspnea, and ground-glass infiltrates on chest X-ray. Early treatment with TMP-SMX is critical. The classic radiologic pattern of PCP distinguishes it from other causes of pneumonia.