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Item 1 of 40
Question Id: 2666

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A 63-year-old man comes to the emergency department due to left leg pain. The patient typically has pain in both legs after walking a couple of blocks, but several hours ago, severe left leg pain suddenly developed while he was resting. He reports numbness in the left leg, and he is also experiencing intermittent palpitations. Medical history includes hypertension and hyperlipidemia. The patient has smoked a pack of cigarettes daily for 45 years. Blood pressure is 130/80 mm Hg, and pulse is 116/min and irregular. On examination, hair is sparse on both legs. Distal pulses are absent on the left and diminished on the right. Sensation to light touch is decreased on the dorsum of the left foot and leg, and ankle dorsiflexion is weaker on the left. Which of the following is the best first step in management of this patient?

A. Ankle-brachial index
B. CT angiography of the lower extremities
C. Intravenous heparin infusion
D. Surgical bypass grafting
E. Transthoracic echocardiography

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Item 1 of 40
Question Id: 2666

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- A. Ankle-brachial index (35%)
- B. CT angiography of the lower extremities (19%)
- ✓ C. Intravenous heparin infusion (36%)
- D. Surgical bypass grafting (3%)
- E. Transthoracic echocardiography (4%)

Omitted
Correct answer
C

36%
Answered correctly

28 secs
Time Spent

01/29/2020
Last Updated

Explanation

Acute limb ischemia	
	• Cardiac/arterial embolus (eg, AF, LV thrombus, IE)

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Acute limb ischemia	
Etiology	• Cardiac/arterial embolus (eg, AF, LV thrombus, IE) • Arterial thrombosis (eg, PAD) • Iatrogenic/blunt trauma
Clinical features	**6 Ps** of acute limb ischemia • **P**ain • **P**allor • **P**aresthesia • **P**ulselessness • **P**oikilothermia (cool extremity) • **P**aralysis (late)
Management	• Anticoagulation (eg, heparin) • Thrombolysis vs surgery

AF = atrial fibrillation; **IE** = infective endocarditis; **LV** = left ventricular; **PAD** = peripheral artery disease.

This patient has a classic presentation of arterial occlusion leading to **acute limb ischemia** (ALI): **P**ain, **P**allor, **P**aresthesia, **P**ulselessness, **P**oikilothermia (cool extremity), and **P**aralysis **(6 Ps)**. His occlusion may be due to either embolism of a left atrial thrombus in the setting of atrial fibrillation (eg, palpitations, irregular pulse) or thrombosis following atherosclerotic plaque rupture in the setting of peripheral artery disease (PAD) (eg, claudication).

Patients with ALI diagnosed via clinical examination should be **immediately given** anticoagulation (eg, intravenous **heparin** infusion). Anticoagulation **prevents** further arterial **thrombus propagation**, as well as distal arterial and venous thrombosis (from stasis), while the patient undergoes further diagnostic imaging or awaits surgical intervention.

For some patients, anticoagulation may result in clinical improvement. However, many patients require percutaneous thrombolysis (eg, alteplase)

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For some patients, anticoagulation may result in clinical improvement. However, many patients require percutaneous thrombolysis (eg, alteplase) or surgical thrombectomy to restore perfusion to the threatened limb.

(Choices A and E) The ankle-brachial index (ABI), the ratio of systolic blood pressure in the ankle compared with that in the arm, can help confirm suspected PAD, and transthoracic echocardiography (TTE) can help identify cardiac sources of emboli (eg, left atrial thrombus due to atrial fibrillation). This patient may eventually benefit from nonurgent ABI evaluation of the right leg, given his history of claudication, and from TTE prior to hospital discharge, given his likely atrial fibrillation. However, these tests should be performed only after his emergent ALI has been treated with intravenous heparin infusion followed by thrombolysis or surgery.

(Choice B) CT angiography of the lower extremities can provide anatomic information about the location of the arterial occlusion and help guide decisions about invasive interventions. However, initiation of systemic anticoagulation (eg, intravenous heparin infusion) should occur first, as soon as the clinical diagnosis of ALI (eg, pulselessness) is made, to prevent further clot propagation while imaging is ongoing.

(Choice D) Surgical bypass grafting is typically used in the setting of chronic PAD to improve distal perfusion past an area of severe or complete atherosclerotic luminal stenosis. In this patient with acute occlusion due to embolus or thrombus, surgical thrombectomy would be more appropriate. Regardless, anticoagulation should be initiated first.

Educational objective:
As soon as acute limb ischemia is clinically diagnosed (eg, pallor, pulselessness), anticoagulation (eg, intravenous heparin infusion) should be initiated. This prevents thrombus propagation and distal thrombosis while the patient undergoes further diagnostic procedures or awaits surgical intervention.

(Choices A and E) The ankle-brachial index (ABI), the ratio of systolic blood pressure in the ankle compared with that in the arm, can help confirm suspected PAD, and transthoracic echocardiography (TTE) can help identify cardiac sources of emboli (eg, left atrial thrombus due to atrial fibrillation). This patient may eventually benefit from nonurgent ABI evaluation of the right leg, given his history of claudication, and from TTE prior to hospital discharge, given his likely atrial fibrillation. However, these tests should be performed only after his emergent ALI has been treated with intravenous heparin infusion followed by thrombolysis or surgery.

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Educational objective:

As soon as acute limb ischemia is clinically diagnosed (eg, pallor, pulselessness), anticoagulation (eg, intravenous heparin infusion) should be initiated. This prevents thrombus propagation and distal thrombosis while the patient undergoes further diagnostic procedures or awaits surgical intervention.

References

- Acute limb ischemia: an emergency medicine approach.
- Antithrombotic therapy in peripheral artery disease: antithrombotic therapy and prevention of thrombosis, 9th ed.: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines.

Surgery	Cardiovascular System	Acute limb ischemia
Subject	System	Topic

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Item 2 of 40
Question Id: 15873
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A 20-year-old man comes to the office for a follow-up after a recent shoulder dislocation. He has had multiple joint dislocations since childhood, including both shoulder joints. The patient also notes easy bruising and poor wound healing, even with small cuts. Height is 176 cm and weight is 70 kg. Blood pressure is 122/73 mm Hg and pulse is 78/min and regular. On physical examination, several wide, atrophic scars are present on the upper extremities. Echocardiogram shows normal aortic root size, normal left ventricular function, and no significant valvular abnormalities. Which of the following is the most likely diagnosis?

A. Achondroplasia
B. Ehlers-Danlos syndrome
C. Klinefelter syndrome
D. Marfan syndrome
E. Osteogenesis imperfecta

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- A. Achondroplasia (1%)
- ✓ B. Ehlers-Danlos syndrome (85%)
- C. Klinefelter syndrome (0%)
- D. Marfan syndrome (3%)
- E. Osteogenesis imperfecta (9%)

Omitted
Correct answer
B

85%
Answered correctly

01 sec
Time Spent

02/15/2020
Last Updated

Explanation

Clinical features of Ehlers-Danlos & Marfan syndromes		
	Classic Ehlers-Danlos	**Marfan**
	• Transparent & hyperextensible	

Explanation

Clinical features of Ehlers-Danlos & Marfan syndromes		
	Classic Ehlers-Danlos	**Marfan**
Skin	• Transparent & hyperextensible • Easy bruising, poor healing • Velvety with atrophy & scarring	• No features other than striae
Musculoskeletal	• Joint hypermobility • Pectus excavatum • Scoliosis • High, arched palate	• Joint hypermobility • Pectus excavatum or carinatum • Scoliosis • Tall with long extremities
Cardiac	• Mitral valve prolapse	• Progressive aortic root dilation • Mitral valve prolapse
Other	• Abdominal & inguinal hernias • Uterine prolapse	• Lens & retinal detachment • Spontaneous pneumothorax
Genetics	• *COL5A1* & *COL5A2* mutation • Autosomal dominant	• *FBN1* mutation • Autosomal dominant

This patient with multiple joint dislocations, easy bruising, poor wound healing, and wide, atrophic scars likely has **Ehlers-Danlos syndrome (EDS)**, a collection of genetic disorders marked by impaired synthesis or processing of connective tissue (eg, collagen, extracellular matrix). Although manifestations vary depending on the genetic mutation, most cases are marked by ≥1 of the following:

- Joint hypermobility/laxity, which may result in **multiple joint dislocations**
- Skin hyperextensibility, which allows skin to stretch ≥4 cm

This patient with multiple joint dislocations, easy bruising, poor wound healing, and wide, atrophic scars likely has **Ehlers-Danlos syndrome (EDS)**, a collection of genetic disorders marked by impaired synthesis or processing of connective tissue (eg, collagen, extracellular matrix). Although manifestations vary depending on the genetic mutation, most cases are marked by ≥1 of the following:

- Joint hypermobility/laxity, which may result in **multiple joint dislocations**
- Skin hyperextensibility, which allows skin to stretch ≥4 cm
- Tissue fragility, which leads to easy bruising and spontaneous organ rupture
- Poor wound healing, which leads to the formation of **wide, atrophic scars** ("cigarette paper–like")

Confirmation of EDS generally requires referral to a clinical geneticist for genetic testing (eg, *COL5A1*, *COL5A2* mutation).

(Choice A) Achondroplasia is an autosomal dominant disorder caused by mutations to fibroblast growth factor receptor 3, which leads to short stature (<120 cm), long bone shortening, and macrocephaly. Patients with achondroplasia sometimes have joint laxity and dislocations, but atrophic scars are atypical. Furthermore, this patient does not have short stature, making achondroplasia unlikely.

(Choice C) Klinefelter syndrome is seen in males with an extra X chromosome. It usually results in primary hypogonadism (eg, small testes, severely low sperm count, infertility, lessened virilization), not joint dislocations and atrophic scars.

(Choice D) Marfan syndrome is an autosomal dominant disorder caused by mutations to the fibrillin 1 gene, which results in connective tissue defects. Although patients frequently have joint laxity, most also have excessive long bone growth (leading to tall height) and aortic root disease (eg, dilation, aortic regurgitation, dissection). This patient's height, transthoracic echocardiogram with no aortic root disease, and atrophic scars make EDS more likely.

(Choice E) Osteogenesis imperfecta is a genetic disorder of type I collagen, which leads to bone fractures with minimal trauma. Repeated joint dislocation would be atypical.

Educational objective:
Ehlers-Danlos syndrome is a collection of genetic connective tissue disorders. It is usually characterized by joint hypermobility/laxity, multiple joint dislocations, tissue fragility, poor wound healing, and cigarette, paper-like scarring.

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- Tissue fragility, which leads to easy bruising and spontaneous organ rupture
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Educational objective:
Ehlers-Danlos syndrome is a collection of genetic connective tissue disorders. It is usually characterized by joint hypermobility/laxity, multiple joint dislocations, tissue fragility, poor wound healing, and cigarette, paper-like scarring.

Surgery	Cardiovascular System	Ehlers danlos syndrome
Subject	System	Topic

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Item 2 of 40
Question Id: 15873

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- Pectus excavatum

- Pectus excavatum or carinatum

Exhibit Display



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severely low sperm count, infertility, lessened virilization), hot joint dislocations and atrophic scars.

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Item 2 of 40
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A 22-year-old man comes to the office due to several small, pruritic skin pustules on his lower extremities. The patient first noticed the lesions a week ago during a trip to New Mexico, where he hiked in the mountains and swam in a heated hotel pool. He was given trimethoprim-sulfamethoxazole at an urgent care center, but the pustules have persisted despite taking the medication as prescribed for 3 days. The patient has no chronic medical conditions and takes no other medications. Temperature is 37.9 C (100.2), blood pressure is 132/68 mm Hg, and pulse is 96/min. Examination shows several small, tender papulopustules on the bilateral lower extremities. Which of the following pathogens is the most likely cause of this patient's symptoms?

A. Group A Streptococcus
B. Methicillin-sensitive *Staphylococcus aureus*
C. *Pseudomonas aeruginosa*
D. *Sporothrix schenckii*
E. *Vibrio vulnificus*

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A. Group A Streptococcus (2%)
B. Methicillin-sensitive *Staphylococcus aureus* (5%)
✓ C. *Pseudomonas aeruginosa* (76%)
D. *Sporothrix schenckii* (9%)
E. *Vibrio vulnificus* (6%)

Omitted
Correct answer
C

76%
Answered correctly

02 secs
Time Spent

04/15/2020
Last Updated

Explanation

This patient developed a tender papulopustular eruption on his lower extremities after swimming in a heated hotel pool, raising strong suspicion for ***Pseudomonas aeruginosa* folliculitis** ("hot-tub" folliculitis). Most cases develop **within hours** or a few days after swimming in an **inadequately chlorinated swimming pool** or hot tub. The rash that forms is generally tender and may appear as **papules, pustules, or nodules**. Low-grade

This patient developed a tender papulopustular eruption on his lower extremities after swimming in a heated hotel pool, raising strong suspicion for ***Pseudomonas aeruginosa* folliculitis** ("hot-tub" folliculitis). Most cases develop **within hours** or a few days after swimming in an **inadequately chlorinated swimming pool** or hot tub. The rash that forms is generally tender and may appear as **papules, pustules, or nodules**. Low-grade fever is often present. The eruption is usually **self-limited** and does not require treatment. However, patients should be advised to avoid the contaminated water that led to this condition. If lesions persist, an oral fluoroquinolone may be considered.

Although *Staphylococcus aureus* is the leading cause of purulent skin infection (and folliculitis), most cases are sensitive to trimethoprim-sulfamethoxazole (TMP-SMX) and are marked by a purulent lesion with surrounding erythema and induration. The presence of several papulopustular lesions that did not respond to TMP-SMX make this pathogen less likely **(Choice B)**.

(Choice A) Group A Streptococcus (eg, *Streptococcus pyogenes*) is the leading cause of cellulitis. Most cases present with spreading erythema, warmth, and tenderness at a site of skin breakdown (eg, fungal infection, wound). Purulent lesions are less common and generally indicate an alternate pathogen.

(Choice D) *Sporothrix schenckii* is a dimorphic fungus found in soil that can occasionally cause cutaneous infection after being introduced into the skin during gardening or other outdoor activities. However, infections usually take weeks to develop and generally present with an ulcerative papule at the site of inoculation; subsequent lesions form along the proximal lymphatic chain. This patient's bilateral papulopustular eruption on the lower extremities makes *Pseudomonas* folliculitis far more likely.

(Choice E) *Vibrio vulnificus* is a estuarine bacteria that causes cellulitis following inoculation into a wound. This organism lives in marine environments, not hotel pools, and usually causes a spreading cellulitis similar to *S pyogenes*.

Educational objective:
Pseudomonas folliculitis is a self-limited cutaneous eruption that develops within hours or a few days following exposure to inadequately chlorinated pools or hot tubs. Patients generally have tender papules, pustules, or nodules and low-grade fever. No treatment is usually necessary, but swimming in the contaminated water should be avoided.

Surgery	Infectious Diseases	Skin and soft tissue infections
Subject	System	Topic

chlorinated swimming pool or hot tub. The rash that forms is generally tender and may appear as **papules, pustules, or nodules**. Low-grade fever is often present. The eruption is usually **self-limited** and does not require treatment. However, patients should be advised to avoid the contaminated water that led to this condition. If lesions persist, an oral fluoroquinolone may be considered.

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Surgery	Infectious Diseases	Skin and soft tissue infections
Subject	System	Topic

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A 67-year-old man comes to the emergency department due to abdominal discomfort and distension. Five days ago, he began having large-volume watery stools 6-8 times daily after eating at a new restaurant. He also has had associated mild abdominal cramps and nausea but no fever, chills, vomiting, or bloody stools. His wife, who had the same food, also experienced similar symptoms. He self-treated with increased oral fluids and the stool frequency and consistency began to improve. However, his bowel movements abruptly stopped yesterday, and the diffuse abdominal discomfort and distension worsened. Medical history includes hypertension, coronary artery disease, and heart failure treated with diuretics. Temperature is 37 C (98.6 F), blood pressure is 116/72 mm Hg, and pulse is 102/min. Physical examination shows dry mucous membranes. The abdomen is distended, tympanic, and mildly tender to palpation with no guarding or rebound tenderness. Bowel sounds are decreased. Digital rectal examination reveals an empty rectal vault with no evidence of blood or melena. Abdominal CT scan shows diffuse colonic dilation with nondilated small bowels. Leukocyte count is normal and testing for *Clostridioides* (formerly *Clostridium*) *difficile* is negative. Which of the following most likely contributed to this patient's current condition?

A. Colonic endoluminal mass
B. Colonic hypoperfusion
C. Electrolyte abnormality
D. *Entamoeba* infection
E. Inflammatory bowel disease

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Question Id: 16350

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- A. Colonic endoluminal mass (13%)
- B. Colonic hypoperfusion (23%)
- ✓ C. Electrolyte abnormality (49%)
- D. *Entamoeba* infection (5%)
- E. Inflammatory bowel disease (8%)

Omitted
Correct answer
C

49%
Answered correctly

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Time Spent

06/23/2020
Last Updated

Explanation

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Acute colonic pseudoobstruction (Ogilvie syndrome)	
Etiologies	• Major surgery, traumatic injury, severe infection • Electrolyte derangement (↓ K, ↓ Mg, ↓ Ca) • Medications (eg, opiates, anticholinergics) • Neurologic disorders (eg, dementia, stroke)
Clinical findings	• Abdominal distension, pain, obstipation, vomiting • Tympanic to percussion, ↓ bowel sounds • If perforation: guarding, rigidity, rebound tenderness
Imaging	• X-ray: colonic dilation, normal haustra, nondilated small bowel • CT scan: colonic dilation without anatomic obstruction
Management	• NPO, nasogastric/rectal tube decompression • Neostigmine if no improvement within 48 hr

This patient's presentation with abdominal distension and colonic dilation on CT scan is consistent with acute colonic pseudoobstruction **(Ogilvie syndrome)**. His diuretic use and recent diarrhea (due to foodborne gastroenteritis) likely caused an **electrolyte imbalance** (eg, hypokalemia, hypomagnesemia), which can precipitate Ogilvie syndrome. The disorder may largely result from **autonomic disruption** of the colon. Accordingly, other common causes include severe trauma, severe infection, or major surgery (increased sympathetic drive relative to parasympathetic); neurologic disorders (eg, dementia, stroke, multiple sclerosis, Parkinson disease); and certain medications (eg, anticholinergics).

Patients typically have **severe abdominal distension**, pain, vomiting, and obstipation (inability to pass stool or gas). The abdomen is often tympanic and exhibits hypoactive bowel sounds on auscultation. Abdominal plain films reveal colonic dilation (usually predominantly affecting the proximal colon) with normal haustral markings and a nondilated small bowel. CT scan provides diagnostic confirmation showing **colonic dilation with no anatomic obstruction**. Management involves **bowel rest** (NPO) and placement of nasogastric and rectal tubes for **colonic**

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This patient's presentation with abdominal distension and colonic dilation on CT scan is consistent with acute colonic pseudoobstruction **(Ogilvie syndrome)**. His diuretic use and recent diarrhea (due to foodborne gastroenteritis) likely caused an **electrolyte imbalance** (eg, hypokalemia, hypomagnesemia), which can precipitate Ogilvie syndrome. The disorder may largely result from **autonomic disruption** of the colon. Accordingly, other common causes include severe trauma, severe infection, or major surgery (increased sympathetic drive relative to parasympathetic); neurologic disorders (eg, dementia, stroke, multiple sclerosis, Parkinson disease); and certain medications (eg, anticholinergics).

Patients typically have **severe abdominal distension**, pain, vomiting, and obstipation (inability to pass stool or gas). The abdomen is often tympanic and exhibits hypoactive bowel sounds on auscultation. Abdominal plain films reveal colonic dilation (usually predominantly affecting the proximal colon) with normal haustral markings and a nondilated small bowel. CT scan provides diagnostic confirmation showing **colonic dilation with no anatomic obstruction**. Management involves **bowel rest** (NPO) and placement of nasogastric and rectal tubes for **colonic decompression**. Neostigmine can be given intravenously if symptoms fail to improve after 48 hours or if the cecal diameter on imaging exceeds 12 cm (which is a strong predictor of impending perforation).

(Choice A) An endoluminal mass can lead to mechanical colonic obstruction; however, symptoms of obstipation and abdominal distension tend to develop less abruptly than in Ogilvie syndrome. In addition, this patient's CT scan would likely demonstrate a mass if it were large enough to cause obstruction.

(Choice B) Colonic hypoperfusion leads to ischemic colitis, which usually presents with hematochezia and abdominal pain; colonic dilation is not typical.

(Choices D and E) *Entamoeba histolytica* infection presents with hematochezia and liver abscesses and is rarely acquired within the United States. Ulcerative colitis tends to cause hematochezia, abdominal pain, and weight loss. Both *E histolytica* and ulcerative colitis can precipitate toxic megacolon, but one would expect signs of sepsis (eg, fever, leukocytosis) in addition to colonic dilation if this were present.

Educational objective:
Acute colonic pseudoobstruction (Ogilvie syndrome) typically presents with severe abdominal distension, pain, vomiting, and obstipation. Common causes include electrolyte imbalance (eg, hypokalemia, hypomagnesemia) and factors that lead to autonomic disruption of the colon (eg, major surgery, neurologic disease, anticholinergic medication). The diagnosis is made by CT scan showing colonic dilation without anatomic

proximal colon) with normal haustral markings and a nondilated small bowel. CT scan provides diagnostic confirmation showing **colonic dilation with no anatomic obstruction**. Management involves **bowel rest** (NPO) and placement of nasogastric and rectal tubes for **colonic decompression**. Neostigmine can be given intravenously if symptoms fail to improve after 48 hours or if the cecal diameter on imaging exceeds 12 cm (which is a strong predictor of impending perforation).

(Choice A) An endoluminal mass can lead to mechanical colonic obstruction; however, symptoms of obstipation and abdominal distension tend to develop less abruptly than in Ogilvie syndrome. In addition, this patient's CT scan would likely demonstrate a mass if it were large enough to cause obstruction.

(Choice B) Colonic hypoperfusion leads to ischemic colitis, which usually presents with hematochezia and abdominal pain; colonic dilation is not typical.

(Choices D and E) *Entamoeba histolytica* infection presents with hematochezia and liver abscesses and is rarely acquired within the United States. Ulcerative colitis tends to cause hematochezia, abdominal pain, and weight loss. Both *E histolytica* and ulcerative colitis can precipitate toxic megacolon, but one would expect signs of sepsis (eg, fever, leukocytosis) in addition to colonic dilation if this were present.

Educational objective:
Acute colonic pseudoobstruction (Ogilvie syndrome) typically presents with severe abdominal distension, pain, vomiting, and obstipation. Common causes include electrolyte imbalance (eg, hypokalemia, hypomagnesemia) and factors that lead to autonomic disruption of the colon (eg, major surgery, neurologic disease, anticholinergic medication). The diagnosis is made by CT scan showing colonic dilation without anatomic obstruction, and treatment involves bowel rest and colonic decompression, sometimes aided by intravenous neostigmine.

References

- Acute intestinal pseudo-obstruction (Ogilvie's syndrome).

Surgery	Gastrointestinal & Nutrition	Ogilvie syndrome
Subject	System	Topic

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Item 5 of 40
Question Id: 3680
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A 75-year-old man is brought to the emergency department with severe back pain that began 3 weeks ago. The pain has been significantly worse for the last 12 hours. This morning, the patient also noticed difficulty walking and urinating. He has a history of advanced prostate cancer initially treated with local radiation therapy. Temperature is 37 C (98.6 F), blood pressure is 122/83 mm Hg, and pulse is 104/min. The patient appears uncomfortable. He has point tenderness over the midline spine near T10 and T11. Upper extremity strength and reflexes are normal. Muscle strength in the lower extremities is 3/5 and deep-tendon reflexes are 3+ bilaterally. Bilateral plantar reflexes are upgoing. Straight urinary catheterization produces 800 mL of urine. Which of the following is the best initial step in management of this patient?

A. Analgesics, alpha blocker, and baclofen
B. Intravenous glucocorticoids
C. Radiation to the spine
D. Radionuclide bone scan
E. Skeletal survey

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A. Analgesics, alpha blocker, and baclofen (16%)
✓ B. Intravenous glucocorticoids (41%)
C. Radiation to the spine (6%)
D. Radionuclide bone scan (23%)
E. Skeletal survey (11%)

Omitted
Correct answer
B

41%
Answered correctly

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05/10/2020
Last Updated

Explanation

Spinal cord compression	
	• Spinal injury (eg, motor vehicle crash)

Explanation

Spinal cord compression	
Causes	• Spinal injury (eg, motor vehicle crash) • Malignancy (eg, lung, breast, prostate cancers; myeloma) • Infection (eg, epidural abscess)
Signs & symptoms	• Gradually worsening, severe local back pain • **Pain worse** in the recumbent position/at **night** • Early signs: Symmetric lower extremity weakness, hypoactive/absent deep-tendon reflexes • Late signs: Bilateral Babinski reflex, decreased rectal sphincter tone, paraparesis/paraplegia with increased deep-tendon reflexes, sensory loss
Management	• Emergency MRI • Intravenous glucocorticoids vs antibiotics • Neurosurgery ± radiation oncology consultation

This patient with advanced **prostate cancer** presents with subacute **back pain** that has now profoundly changed in severity. Examination shows **lower extremity motor weakness, hyperreflexia**, and **bladder dysfunction**, raising concern for **epidural spinal cord compression (ESCC)**. The thoracic (60%) and lumbosacral (30%) spine are the most common locations for ESCC. Cancers that often metastasize to the spine include lung, breast, and prostate, as well as multiple myeloma.

Early diagnosis of ESCC is crucial in preserving neurologic function; in fact, the primary determinant of outcome is the degree of neurologic involvement at the time of intervention. Pain is typically the first symptom, often present for 1-2 months before additional symptoms appear. Motor findings (bilateral weakness) and ataxia are common as the disease progresses. Bowel and bladder dysfunction are late findings.

Although imaging (MRI) plays an important role in the diagnosis of ESCC, **intravenous glucocorticoids** should be given without delay in a patient with suspected ESCC. Glucocorticoids decrease vasogenic edema (caused by obstructed epidural venous plexus), help alleviate pain

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Although imaging (MRI) plays an important role in the diagnosis of ESCC, **intravenous glucocorticoids** should be given without delay in a patient with suspected ESCC. Glucocorticoids decrease vasogenic edema (caused by obstructed epidural venous plexus), help alleviate pain, and may restore neurologic function. Once imaging confirms ESCC, neurosurgical consultation is typically required.

(Choice A) Analgesics and baclofen are used for muscular spasm. Alpha blockers may help relieve bladder obstruction from an enlarged prostate. This patient is manifesting signs of significant bilateral motor nerve involvement, making a muscular cause much less likely than a critical neurologic cause.

(Choice C) Radiation to the spine is a useful intervention for painful spinal metastases. It may play a role in this patient's treatment but requires imaging and scheduling. Glucocorticoids should not be delayed.

(Choices D and E) A radionuclide bone scan and skeletal survey (x-rays of major bones) can detect metastatic bone disease but do not provide useful information about compression of the thecal sac; therefore, they are not recommended for diagnosis of ESCC. In general, glucocorticoids should not be delayed for imaging in this patient as the pretest probability of ESCC is quite high (given patient's neurologic findings, history of prostate cancer, and symptoms).

Educational objective:
Epidural spinal cord compression must be suspected in any patient with a history of malignancy who develops back pain with motor and sensory abnormalities. Bowel and bladder dysfunction are late neurologic findings. Intravenous glucocorticoids should be given without delay. MRI is then recommended.

References

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Although imaging (MRI) plays an important role in the diagnosis of ESCC, **intravenous glucocorticoids** should be given without delay in a patient with suspected ESCC. Glucocorticoids decrease vasogenic edema (caused by obstructed epidural venous plexus), help alleviate pain, and may restore neurologic function. Once imaging confirms ESCC, neurosurgical consultation is typically required.

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Educational objective:
Epidural spinal cord compression must be suspected in any patient with a history of malignancy who develops back pain with motor and sensory abnormalities. Bowel and bladder dysfunction are late neurologic findings. Intravenous glucocorticoids should be given without delay. MRI is then recommended.

References

- Spinal cord compression.

Surgery	Hematology & Oncology	Spinal cord compression
Subject	System	Topic

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Item 6 of 40
Question Id: 16320

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A 35-year-old woman comes to the emergency department with headaches and recurrent epistaxis. She has been told that her blood pressure is high during employee health visits but has not followed up. The patient does not use tobacco or illicit drugs. There is no family history of hypertension. Blood pressure is 170/100 mm Hg in the right arm and 175/105 mm Hg in the left arm, pulse is 80/min, and respirations are 14/min. Examination shows no jugular venous distension, normal lung sounds, and an S4 heart sound. Left upper quadrant abdominal bruit is present. Abdominal imaging reveals a left kidney size of 8 cm and a right kidney size of 12 cm. If measured, which of the following is most likely present in this patient?

	Right renal vein renin	Left renal vein renin	Serum aldosterone
A.	↑	↑	↑
B.	↓	↑	↑
C.	↓	↓	↓
D.	↓	↓	↑
E.	↑	↑	↓
F.	↑	↓	↑

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	Right renal vein renin	Left renal vein renin	Serum aldosterone
A. (9%)	↑	↑	↑
✓ B. (73%)	↓	↑	↑
C. (0%)	↓	↓	↓
D. (1%)	↓	↓	↑
E. (0%)	↑	↑	↓
F. (14%)	↑	↓	↑

Omitted

This patient has headaches and recurrent epistaxis, which likely result from her severe, **uncontrolled hypertension**. In the setting of the unilateral abdominal bruit and renal size discrepancy, this presentation suggests **renal artery stenosis** (RAS). Most cases of RAS occur in older males with diffuse atherosclerosis; however, young women can develop RAS due to **fibromuscular dysplasia**. A lateralizing systolic-diastolic **abdominal bruit** is a highly specific examination finding.

Decreased renal perfusion in the poststenotic kidney results in **atrophy** of the affected kidney. Low perfusion pressures lead to **increased renin secretion** by the juxtaglomerular cells of the **affected kidney** and activation of the renin-angiotensin-aldosterone system (RAAS). This results in **secondary hyperaldosteronism**. Although this increases blood flow to the stenotic kidney and improves affected kidney's glomerular filtration rate, it is maladaptive and results in sodium retention, vasoconstriction, and hypertension.

In contrast, the **unaffected kidney** is exposed to high systemic pressures, leading to **suppression of local renin secretion** and pressure natriuresis. Although measurement of renal vein renin levels can help diagnose RAS, it is neither sensitive nor specific and requires an invasive procedure to obtain measurements. Less invasive approaches (eg, renal ultrasound with Doppler) are used as first-line diagnostic techniques.

(Choice A) Generalized hypoperfusion (eg, hemorrhage, severe dehydration) results in increased renin excretion from the bilateral kidneys, leading to high serum aldosterone levels.

(Choice C) Volume expansion (eg, excessive infusion of normal saline) results in suppression of the RAAS.

(Choice D) Primary hyperaldosteronism (Conn syndrome) results in hypertension and leads to elevated serum aldosterone levels with suppression of renin. However, it would not cause renal atrophy or an abdominal bruit.

(Choice E) ACE inhibitors and angiotensin-receptor blockers inhibit the effects of angiotensin II and result in elevated levels of renin (due to loss of feedback inhibition from angiotensin II) with low levels of serum aldosterone.

(Choice F) RAS affecting the right kidney results in high renin levels in the right kidney with suppression of renin in the left; however, this patient's left-sided abdominal bruit and atrophic kidney suggest that the RAS is affecting the left renal artery.

Educational objective:
Renal artery stenosis typically presents with uncontrolled hypertension. A lateralizing abdominal bruit is a highly specific examination finding;

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Educational objective:
Renal artery stenosis typically presents with uncontrolled hypertension. A lateralizing abdominal bruit is a highly specific examination finding; atrophy of the affected kidney may be seen on imaging. Hypoperfusion of the post-stenotic kidney results in increased local renin secretion, leading to activation of the renin-angiotensin-aldosterone system and secondary hyperaldosteronism. Renin secretion by the unaffected kidney is suppressed.

Surgery	Renal, Urinary Systems & Electrolytes	Renal artery stenosis
Subject	System	Topic

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Item 7 of 40
Question Id: 4558

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A 54-year-old man comes to the physician complaining of fatigue. It is difficult for him to get up in the morning and go to work. He tires easily at work and goes to bed early due to feeling tired and sleepy. He also describes recent upper abdominal pain that is constant and gnawing and interferes with his sleep. The patient's appetite is poor, and he has lost 7 kg (15 lb) during the last month. He has no other medical problems. His medications include over-the-counter ranitidine. The patient works as a police officer. Two months ago, while investigating a serious crime scene, he slipped on blood, fell, and hit his head. He is a former smoker with a 30-pack-year history. Physical examination is significant for tenderness and fullness in the epigastrium. Which of the following is the most likely diagnosis?

A. Chronic subdural hematoma
B. Duodenal ulcer
C. Major depressive episode
D. Pancreatic cancer
E. Post-traumatic stress disorder

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Question Id: 4558
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A. Chronic subdural hematoma (8%)
B. Duodenal ulcer (24%)
C. Major depressive episode (1%)
✓ D. Pancreatic cancer (63%)
E. Post-traumatic stress disorder (1%)

Omitted
Correct answer
D

63%
Answered correctly

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Time Spent

03/27/2020
Last Updated

Explanation

Pancreatic adenocarcinoma	
	• Smoking

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Pancreatic adenocarcinoma	
Risk factors	• Smoking • Hereditary pancreatitis • Nonhereditary chronic pancreatitis • Obesity & lack of physical activity
Clinical presentation	• Systemic symptoms (eg, weight loss, anorexia) (>85%) • Abdominal pain/back pain (80%) • Jaundice (56%) • Recent-onset atypical diabetes mellitus • Unexplained migratory superficial thrombophlebitis • Hepatomegaly & ascites with metastasis
Laboratory studies	• Cholestasis (↑ alkaline phosphatase & direct bilirubin) • ↑ Cancer-associated antigen 19-9 (not as a screening test) • Abdominal ultrasound (if jaundiced) or CT scan (if no jaundice)

This patient has epigastric pain/tenderness and weight loss in the setting of nonspecific systemic symptoms and a significant smoking history. This combination strongly suggests a malignancy affecting the upper gastrointestinal tract or associated solid organs, such as the liver, gallbladder, or pancreas. Among the choices listed, **pancreatic adenocarcinoma** is the most likely diagnosis.

Adenocarcinoma of the pancreas is the fourth leading cause of cancer-related death in the United States and has a mean age of 55 at diagnosis. **Smoking** is an important risk factor. Pancreatic cancer has a very high mortality rate as it is frequently diagnosed at relatively late stages (early-stage disease usually causes only mild, nonspecific symptoms).

Symptoms of pancreatic cancer vary and depend primarily on the location of the tumor. Most (60%-70%) pancreatic cancers originate in the head of the pancreas. These cancers are more likely to present with **jaundice** (common bile duct obstruction) and **steatorrhea** (inability to secrete fat-

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Symptoms of pancreatic cancer vary and depend primarily on the location of the tumor. Most (60%-70%) pancreatic cancers originate in the head of the pancreas. These cancers are more likely to present with **jaundice** (common bile duct obstruction) and **steatorrhea** (inability to secrete fat-digesting enzymes or blockage in the main pancreatic duct). However, jaundice may appear at a later stage if the tumor arises from the tail or body of the pancreas. Most patients describe epigastric **abdominal pain** that is usually insidious, gnawing, and **worse at night**. However, some patients may not have pain and simply present with **painless jaundice**. Systemic symptoms such as **weight loss and fatigue** are common. Another classic association is **migratory thrombophlebitis** (Trousseau sign).

Diagnosis is established with either ultrasound (less expensive) in patients with jaundice (head tumors) or CT scan (highly sensitive) in patients without jaundice (body and tail tumors).

(Choice A) A chronic subdural hematoma from trauma would be more likely in an elderly person and typically presents with headache, personality changes, seizures, confusion, or hemiparesis. Abdominal pain and tenderness with anorexia and weight loss are not expected. Although neurogenic gastric mucosal injury (Cushing ulcer) can be associated with traumatic brain injury, this condition is characterized by acute onset, usually with prominent gastric bleeding and obvious neurologic impairment.

(Choice B) Duodenal ulcers can also cause burning epigastric pain. However, the pain is typically periodic and relieved by food, as it is generally a result of acid secretion in the absence of a food buffer. Anorexia and weight loss are less common. Antisecretory therapy with proton pump inhibitors or H2 receptor antagonists generally provides some relief. This patient describes constant pain accompanied by anorexia, weight loss, and systemic symptoms, red flags that should raise suspicion for a malignancy.

(Choice C) A major depressive episode could be responsible for fatigue, anorexia, and weight loss, but abdominal pain and tenderness would not be typical. Even if a primary mood disorder is suspected, localized pain with weight loss usually warrants evaluation for occult malignancy.

without jaundice (body and tail tumors).

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(Choice C) A major depressive episode could be responsible for fatigue, anorexia, and weight loss, but abdominal pain and tenderness would not be typical. Even if a primary mood disorder is suspected, localized pain with weight loss usually warrants evaluation for occult malignancy.

(Choice E) Post-traumatic stress disorder (PTSD) consists of persistent reexperiencing of a previous traumatic event with recurrent attacks of anxiety, hyperarousal, nightmares, and/or flashbacks. This patient may have experienced a stressful event during his criminal investigation, but he does not describe recurrent distressing memories or nightmares related to the event. In addition, PTSD disturbs social and occupational functioning but does not typically cause anorexia, weight loss, or signs of organic disease such as abdominal pain and tenderness.

Educational objective:
Pancreatic cancer classically presents insidiously with a combination of constant and gnawing epigastric pain that is frequently worse at night, anorexia with weight loss, and jaundice due to extrahepatic biliary obstruction. A peptic duodenal ulcer typically causes periodic epigastric pain relieved by meals.

References

- Pancreatic cancer: diagnosis and management.

Surgery	Gastrointestinal & Nutrition	Pancreatic cancer
Subject	System	Topic

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Item 8 of 40
Question Id: 16019

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A 23-year-old man comes to the office for evaluation of right leg pain. The patient underwent a below-knee amputation 4 months ago following a motorcycle collision in which he sustained nonsalvageable devascularization of the right foot. The patient reports having severe postoperative pain and expresses frustration that it hasn't gone away. The pain is shooting in quality and located in the absent portion of the extremity. It is often worse on urination or defecation. Vitals signs are normal. Examination of the right lower extremity shows a well-healed surgical scar and adequate soft tissue padding over the distal bone. The distal stump is nontender to palpation and percussion. Range of motion at the spine, hip, and right knee are full and nonpainful. Which of the following is the best next step in management of this patient?

A. Duplex ultrasonography of the lower extremities
B. Injection of local anesthetic
C. MRI of the lumbar spine
D. Multimodal pain regimen
E. Surgical stump revision

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A. Duplex ultrasonography of the lower extremities (1%)
B. Injection of local anesthetic (10%)
C. MRI of the lumbar spine (10%)
✓ D. Multimodal pain regimen (73%)
E. Surgical stump revision (3%)

Omitted
Correct answer
D

73%
Answered correctly

01 sec
Time Spent

06/17/2020
Last Updated

Explanation

This patient who required below-knee **amputation** following trauma now has persistent pain in the absent portion of the limb. This presentation is most consistent with **phantom limb pain** (PLP) and should prompt initiation of a multimodal pain regimen that includes both pharmacotherapy and adjuvant therapies.

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PLP is a complex and incompletely understood pain syndrome that is extremely **common** (~50%-85%) among amputees. The pain, which is perceived in the **absent portion of the limb**, is usually **neuropathic** (eg, shooting, burning) and may have seemingly unrelated, innocuous triggers (eg, urination, defecation). Severe preoperative pain (eg, due to devascularizing trauma) and/or postoperative pain likely increase the risk of developing PLP.

Treatment of PLP is typically **multimodal** and may include:

- pharmacotherapy: antidepressants (eg, tricyclics), antiepileptics (eg, gabapentin), N-methyl-d-aspartate (NMDA) receptor antagonists (eg, ketamine), and analgesics (eg, acetaminophen, opioids).
- adjuvant therapies: biofeedback, cognitive behavioral therapy, and mirror therapy (ie, using a mirror to watch the reflection of the residual limb moving at the location of the absent limb).

(Choice A) Duplex ultrasonography of the lower extremities can evaluate for deep venous thrombosis (DVT). Although pain can be the presenting symptom of DVT, it would be located in the residual portion (vs absent portion) of the limb. In addition, leg swelling would likely be present.

(Choice B) Regrowth of transected nerve fibers into a tangled mass of unmyelinated nerve endings can cause posttraumatic neuroma with neuropathic pain. Neuroma pain would be temporarily relieved (and, therefore, diagnosed) by local anesthetic injection; however, in contrast to this patient's pain, it would be located in the distal amputation stump and exacerbated by palpation or percussion.

(Choice C) MRI can help diagnose lumbosacral radiculopathy (eg, L5, S1), which may cause shooting pain that radiates into the foot. However, radiculopathy typically has associated back pain, and range of motion testing at the hip (ie, similar to the straight leg raise test) often exacerbates symptoms.

(Choice E) Surgical stump revision may be necessary for a patient whose stump fails to heal postoperatively or cannot tolerate a prosthesis (eg, due to awkward stump shape or inadequate soft tissue padding). In contrast, this patient has a well-healed surgical scar and adequate soft tissue

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Educational objective:
Phantom limb pain is common following extremity amputation. The neuropathic pain, which is perceived in the absent portion of the limb, is best managed with a multimodal pain regimen consisting of pharmacotherapy and adjuvant therapies.

References

- Postamputation pain: epidemiology, mechanisms, and treatment.
- Recent advances in understanding and managing phantom limb pain.

Treatment of PLP is typically **multimodal** and may include:

- pharmacotherapy: antidepressants (eg, tricyclics), antiepileptics (eg, gabapentin), N-methyl-d-aspartate (NMDA) receptor antagonists (eg, ketamine), and analgesics (eg, acetaminophen, opioids).
- adjuvant therapies: biofeedback, cognitive behavioral therapy, and mirror therapy (ie, using a mirror to watch the reflection of the residual limb moving at the location of the absent limb).

(Choice A) Duplex ultrasonography of the lower extremities can evaluate for deep venous thrombosis (DVT). Although pain can be the presenting symptom of DVT, it would be located in the residual portion (vs absent portion) of the limb. In addition, leg swelling would likely be present.

(Choice B) Regrowth of transected nerve fibers into a tangled mass of unmyelinated nerve endings can cause posttraumatic neuroma with neuropathic pain. Neuroma pain would be temporarily relieved (and, therefore, diagnosed) by local anesthetic injection; however, in contrast to this patient's pain, it would be located in the distal amputation stump and exacerbated by palpation or percussion.

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Educational objective:
Phantom limb pain is common following extremity amputation. The neuropathic pain, which is perceived in the absent portion of the limb, is best managed with a multimodal pain regimen consisting of pharmacotherapy and adjuvant therapies.

References

- Postamputation pain: epidemiology, mechanisms, and treatment.
- Recent advances in understanding and managing phantom limb pain.

Settings

Item 9 of 40
Question Id: 4319

Mark | Previous | Next | Full Screen | Tutorial | Lab Values | Notes | Calculator | Reverse Color | Text Zoom | Settings

A 60-year-old man comes to the office due to a sore on his lip. He has a 3-month history of an enlarging lesion on his lower lip associated with ulceration and slight pain. Past medical history is unremarkable. The patient does not use alcohol, tobacco, or illicit drugs. He works as a farmer and has no new sexual contacts. Vital signs are normal. Examination shows a 3×7-mm partially encrusted ulcer in the vermilion zone of the lower lip, surrounded by a 6×12-mm area of induration. There are no palpable submental or submandibular lymph nodes, and the remainder of the physical examination is unremarkable. Biopsy of this lesion will most likely show which of the following?

- A. Giant cells in a Tzanck preparation
- B. Granulomatous inflammation
- C. Invasive cords of squamous cells with keratin pearls
- D. Invasive clusters of spindle cells surrounded by palisaded basal cells
- E. Shallow fibrin-coated ulceration with an underlying mononuclear infiltrate

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A. Giant cells in a Tzanck preparation (7%)
B. Granulomatous inflammation (1%)
✓ C. Invasive cords of squamous cells with keratin pearls (70%)
D. Invasive clusters of spindle cells surrounded by palisaded basal cells (18%)
E. Shallow fibrin-coated ulceration with an underlying mononuclear infiltrate (1%)

Omitted
Correct answer
C

70%
Answered correctly

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Time Spent

03/05/2020
Last Updated

Explanation

This patient, who has an outdoor occupation with significant sun exposure (farming) and who has developed a persistent, indurated, ulcerating lower lip lesion, has typical features of **squamous cell carcinoma** (SCC). SCC is the **most common** malignancy of the lip, with 95% of cases occurring in the **lower lip** vermilion, likely due to higher exposure to **sunlight**. In addition to ultraviolet (eg, sunlight) exposure, other risk factors for SCC include fair skin tone, tobacco use (smoking or chewing), heavy alcohol use, chronic inflammation or scar formation, and immunosuppression

This patient, who has an outdoor occupation with significant sun exposure (farming) and who has developed a persistent, indurated, ulcerating lower lip lesion, has typical features of **squamous cell carcinoma** (SCC). SCC is the **most common** malignancy of the lip, with 95% of cases occurring in the **lower lip** vermilion, likely due to higher exposure to **sunlight**. In addition to ultraviolet (eg, sunlight) exposure, other risk factors for SCC include fair skin tone, tobacco use (smoking or chewing), heavy alcohol use, chronic inflammation or scar formation, and immunosuppression.

Diagnosis of SCC is confirmed with **biopsy**. Typical pathologic findings include invasive cords of squamous cells with keratin pearls. Prognosis is usually very good for cutaneous SCC, with curative resection seen in >90% of patients. Most lesions do not metastasize, but untreated SCC can cause extensive local destruction and may eventually spread to local lymph nodes or distant structures. Adverse prognostic features include larger size, deeper invasion, and involvement of regional lymph nodes.

(Choice A) A Tzanck preparation of vesicular fluid can identify the characteristic giant cells of herpes simplex virus (HSV) infection. HSV can cause recurrent labial or peri-oral ulcerating lesions, but these usually resolve within 2 weeks.

(Choice B) Granulomatous ulcers can be seen in a number of disorders, such as tertiary syphilis, tuberculosis, or disseminated fungal disease. However, most patients with these conditions would have additional systemic (eg, fever, night sweats in tuberculosis) or local (eg, genital lesions in syphilis) symptoms or known immunocompromised states.

(Choice D) Basal cell carcinoma (BCC) is characterized histologically by invasive clusters of spindle cells surrounded by palisaded basal cells. Like SCC, BCC can form ulcerating lesions and is associated with sun exposure. However, BCC of the lip is much less common than SCC and typically affects the upper rather than lower lip.

(Choice E) Aphthous ulcers (canker sores) are characterized by shallow, fibrin-coated ulcerations with underlying mononuclear infiltrates. They are recurrent, self-limiting ulcerations of the oral cavity and do not affect surfaces covered by keratinized stratified squamous epithelium.

Educational objective:
Squamous cell carcinoma is the most common malignancy of the lower lip. Risk factors include sun exposure, fair skin, tobacco use, immunosuppression, and chronic inflammation. Biopsy is characterized by invasive cords of squamous cells with keratin pearls.

References

- Treatment of squamous cell carcinoma of the lip.

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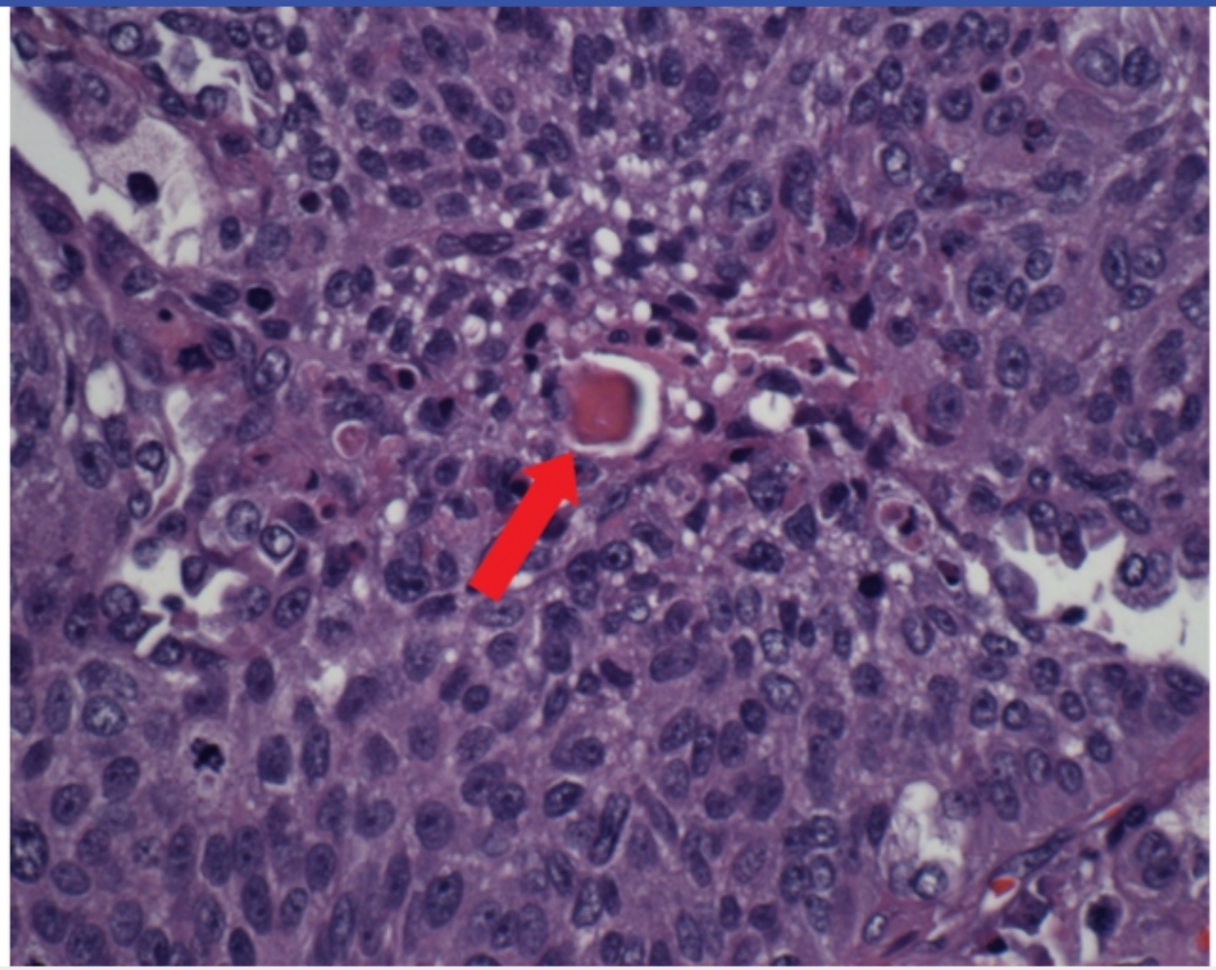
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Item 9 of 40
Question Id: 4319

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This patient, who has an outdoor occupation with significant sun exposure (farming) and who has developed a persistent, indurated, ulcerating

Exhibit Display



Zoom In | Zoom Out | Reset | Add To New Card | Existing Card

- Treatment of squamous cell carcinoma of the lip.

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Item 9 of 40
Question Id: 4319

Mark | Previous | Next | Full Screen | Tutorial | Lab Values | Notes | Calculator | Reverse Color | Text Zoom | Settings

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Exhibit Display



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- Treatment of squamous cell carcinoma of the lip.

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A 76-year-old woman comes to the emergency department with a 2-day history of lower abdominal pain. She also has mild nausea without vomiting. Her other medical problems include arthritis and constipation. Current medications include acetaminophen and docusate. Temperature is 37.9 C (100.2 F), blood pressure is 144/92 mm Hg, and pulse is 90/min. Physical examination shows left lower quadrant tenderness on deep palpation. CT scan of the abdomen shows sigmoid diverticula and perisigmoid stranding suggestive of inflammation. The patient is started on oral ciprofloxacin and metronidazole. Three days later, she returns to the emergency department due to persistent abdominal pain, nausea, and fever. Her last bowel movement was 12 hours ago. Examination shows left lower quadrant tenderness without guarding or rebound. Repeat CT scan shows a 5-cm rim-enhancing perisigmoid fluid collection. Laboratory results are as follows:

Hemoglobin	13.5 g/dL
Platelets	455,000/mm^3
Leukocytes	14,500/mm^3

Which of the following is the most appropriate next step in management of this patient?

A. Intravenous broad-spectrum antibiotics and observation
B. Laparotomy for colonic resection
C. Laparotomy for drainage and debridement
D. Oral antibiotics, bowel rest, and observation
E. Percutaneous abscess drainage under CT guidance

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Platelets	455,000/mm^3
Leukocytes	14,500/mm^3

Which of the following is the most appropriate next step in management of this patient?

A. Intravenous broad-spectrum antibiotics and observation (8%)
B. Laparotomy for colonic resection (9%)
C. Laparotomy for drainage and debridement (14%)
D. Oral antibiotics, bowel rest, and observation (3%)
✓ E. Percutaneous abscess drainage under CT guidance (63%)

Omitted
Correct answer
E

63%
Answered correctly

02 secs
Time Spent

02/09/2020
Last Updated

Explanation

This patient has acute **diverticulitis**. Diverticulitis is characterized by colonic diverticular inflammation resulting in left lower quadrant pain, fever, and leukocytosis. CT scan can show the inflammatory changes as soft-tissue stranding and colonic wall thickening. Diverticulitis can be classified as uncomplicated (75%) or complicated (25%).

- Uncomplicated diverticulitis in stable patients can be managed in the outpatient setting with bowel rest, oral antibiotics, and observation **(Choice D)**. However, hospitalization and intravenous antibiotics are recommended for patients with uncomplicated diverticulitis who are elderly, immunosuppressed, have high fever or significant leukocytosis, or have significant comorbidities **(Choice A)**.
- **Complicated diverticulitis** refers to diverticulitis associated with an **abscess** (ie, fluid collection, as seen in this patient), perforation, obstruction, or fistula formation.

For management of diverticulitis complicated by abscess:

- A fluid collection <3 cm (some references list <4 cm) can be treated with intravenous antibiotics and observation, with surgery reserved for patients with worsening symptoms.
- A fluid collection ≥3 cm (some references list ≥4 cm) should receive antibiotics and have **CT-guided percutaneous drainage**. If the symptoms are not controlled (eg, within a few days), surgical drainage and debridement are recommended **(Choice C)**.

Sigmoid resection is generally reserved for patients with fistulas, perforation with peritonitis, obstruction, or recurrent attacks of diverticulitis **(Choice B)**.

Educational objective:
CT-guided percutaneous drainage is recommended for complicated diverticulitis with abscess formation. Surgical drainage can be attempted if percutaneous drainage fails.

References

- The long-term results of percutaneous drainage of diverticular abscess.

Surgery Gastrointestinal & Nutrition Diverticular disease

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References

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Surgery	Gastrointestinal & Nutrition	Diverticular disease
Subject	System	Topic

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A 40-year-old man comes to the emergency department with a week of progressive abdominal discomfort, abdominal distension, and nausea. Over the last 2 days, he has also had several episodes of vomiting. Six weeks ago, he was hospitalized for an episode of acute pancreatitis. The patient used to drink heavily before the hospitalization but has been abstinent since then. He also has a history of emergency department visits due to alcohol intoxication and street fights. The patient does not use tobacco or illicit drugs. His temperature is 37 C (98.6 F), blood pressure is 117/84 mm Hg, pulse is 86/min, and respirations are 16/min. Examination shows epigastric fullness and tenderness. Bowel sounds are present. There is no rebound tenderness or rigidity. Cardiopulmonary examination shows no abnormalities. There is no peripheral edema. Complete blood count and serum chemistries are within normal limits. CT scan of the abdomen with intravenous contrast is shown below. Which of the following is the most appropriate next step in management?

A. Cholecystectomy
B. Endoscopic drainage procedure
C. Intravenous antibiotics
D. Nothing by mouth and expectant management
E. Pancreatic enzyme supplementation

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A. Cholecystectomy (2%)
✓ B. Endoscopic drainage procedure (75%)
C. Intravenous antibiotics (3%)
D. Nothing by mouth and expectant management (17%)
E. Pancreatic enzyme supplementation (2%)

Omitted
Correct answer
B

75%
Answered correctly

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01/13/2020
Last Updated

Explanation

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Explanation

This patient with a history of alcohol use and a recent episode of pancreatitis now has progressive abdominal distension, nausea, and vomiting, with a CT scan showing a round, well-circumscribed, encapsulated fluid collection in the pancreatic bed, consistent with a **pancreatic pseudocyst**. Pseudocysts are mature walled-off pancreatic fluid collections (usually no necrosis or solid material) surrounded by a thick fibrous **capsule** and containing enzyme-rich fluid, tissue, and debris. They can leak amylase-rich fluid into the circulation and increase serum amylase. Complications include spontaneous infection, duodenal or biliary obstruction, pseudoaneurysm (due to digestion of adjacent vessels), pancreatic ascites, and pleural effusion. Abdominal imaging usually confirms the diagnosis.

In patients with minimal or **no symptoms** and without complications (eg, pseudoaneurysm), **expectant management** (eg, symptomatic therapy, nothing by mouth) is preferred initially. **Endoscopic drainage** is typically reserved for those (such as this patient) with significant **symptoms** (eg, abdominal pain, vomiting), infected pseudocyst, or evidence of pseudoaneurysm (usually embolized before drainage procedure).

(Choice A) Cholecystectomy is performed (usually following endoscopic retrograde cholangiopancreatography) in patients who have recovered from gallstone pancreatitis, which typically presents with elevated liver function studies, amylase, lipase, and (often) serum bilirubin. This patient's normal serum chemistries make gallstone pancreatitis unlikely.

(Choice C) Intravenous antibiotics are typically given for an infected pseudocyst. The absence of fever and leukocyte count elevation in this patient makes infection less likely.

(Choice D) This patient has worsening distension, nausea, and vomiting, likely due to pseudocyst compression of surrounding structures; he would benefit from endoscopic drainage.

(Choice E) Pancreatic enzyme supplementation is usually given to patients with chronic pancreatitis and exocrine pancreatic insufficiency (eg, steatorrhea due to fat malabsorption). Although this patient has chronic alcohol use and a recent episode of acute pancreatitis, the absence of diarrhea makes pancreatic insufficiency less likely.

Educational objective:
Pancreatic pseudocyst is an encapsulated area (comprised of enzyme-rich fluid, tissue, and debris) that causes an inflammatory response. Diagnosis is confirmed by abdominal imaging. Expectant management is preferred initially in patients with minimal or no symptoms and without

abdominal pain, vomiting), infected pseudocyst, or evidence of pseudoaneurysm (usually embolized before drainage procedure).

(Choice A) Cholecystectomy is performed (usually following endoscopic retrograde cholangiopancreatography) in patients who have recovered from gallstone pancreatitis, which typically presents with elevated liver function studies, amylase, lipase, and (often) serum bilirubin. This patient's normal serum chemistries make gallstone pancreatitis unlikely.

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(Choice E) Pancreatic enzyme supplementation is usually given to patients with chronic pancreatitis and exocrine pancreatic insufficiency (eg, steatorrhea due to fat malabsorption). Although this patient has chronic alcohol use and a recent episode of acute pancreatitis, the absence of diarrhea makes pancreatic insufficiency less likely.

Educational objective:
Pancreatic pseudocyst is an encapsulated area (comprised of enzyme-rich fluid, tissue, and debris) that causes an inflammatory response. Diagnosis is confirmed by abdominal imaging. Expectant management is preferred initially in patients with minimal or no symptoms and without complications. Endoscopic drainage is typically reserved for patients with significant symptoms (eg, abdominal pain, vomiting), infected pseudocyst, or evidence of pseudoaneurysm.

References

- Classification and management of pancreatic pseudocysts
- Conservative treatment as an option in the management of pancreatic pseudocyst.

Surgery	Gastrointestinal & Nutrition	Acute pancreatitis
Subject	System	Topic

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Item 12 of 40
Question Id: 3556

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A 7-year-old girl is brought to the emergency department due to a right arm injury. While jumping on a trampoline, she slipped and fell onto her outstretched right hand. The patient had immediate pain and would not move her arm. She did not hit her head or lose consciousness. On examination, the patient is crying in pain, with significant ecchymosis and swelling just above the elbow. She is holding the right arm in flexion and winces when it is moved. X-ray reveals a supracondylar fracture with posterior displacement of the distal humerus fragment, as shown in the image below.

Which of the following is at greatest risk of injury in this patient?

A. Axillary artery
B. Axillary nerve
C. Brachial artery
D. Brachial plexus
E. Ulnar nerve

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Which of the following is at greatest risk of injury in this patient?

A. Axillary artery (1%)
B. Axillary nerve (2%)
✓ C. Brachial artery (45%)
D. Brachial plexus (0%)
E. Ulnar nerve (49%)

Omitted
Correct answer
C

45%
Answered correctly

29 secs
Time Spent

02/05/2020
Last Updated

Explanation

Supracondylar fractures of the humerus are the most common elbow fractures in children. The mechanism typically involves a fall onto an outstretched hand with a hyperextended elbow. The supracondylar area is relatively thin and weak due to physiologic remodeling during

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Supracondylar fractures of the humerus are the most common elbow fractures in children. The mechanism typically involves a fall onto an outstretched hand with a hyperextended elbow. The supracondylar area is relatively thin and weak due to physiologic remodeling during childhood, and a supracondylar fracture most commonly results in **posterior displacement** of the **distal humerus fragment**, as seen in this patient. The anteriorly displaced proximal fragment can entrap the **median nerve** and **brachial artery**, which are located anterior to the humerus.

Distal perfusion should be monitored closely because brachial artery injury results in diminished brachial and radial pulses. Motor and sensory function should also be assessed due to the risk of median nerve injury that can present with a weak "OK" sign (ie, inability to approximate tip of thumb and index finger).

Diagnosis is based on x-ray, which reveals a fracture line (red arrows) and often a posterior fat pad (blue arrows) indicative of elbow effusion. Treatment involves analgesia and immobilization. Neurovascular injury often resolves after orthopedic alignment and immobilization. Patients who are treated promptly have a good prognosis.

(Choices A and B) The axillary artery and nerve can be injured during proximal humerus fractures but not with supracondylar fractures.

(Choice D) Brachial plexus compression is a complication of neonatal clavicle fracture or high-impact trauma to the neck and shoulder area, not the elbow.

(Choice E) Ulnar nerve injury is a complication of a rare type of supracondylar fracture that occurs upon impact of a flexed (rather than hyperextended) elbow. This mechanism of injury causes anterior displacement of the distal humerus fragment, which can impinge on the ulnar nerve located posterior to the medial epicondyle of the humerus.

Educational objective:
Displaced supracondylar fractures of the humerus most commonly present after a fall onto an outstretched hand with posterior displacement of the distal humerus fragment. The anteriorly displaced proximal humerus fragment can entrap the brachial artery and median nerve, which pass anterior to the humerus.

References

- Elbow fractures overview.
- Analysis of early neurovascular complications of pediatric supracondylar humerus fractures: a long-term observation.

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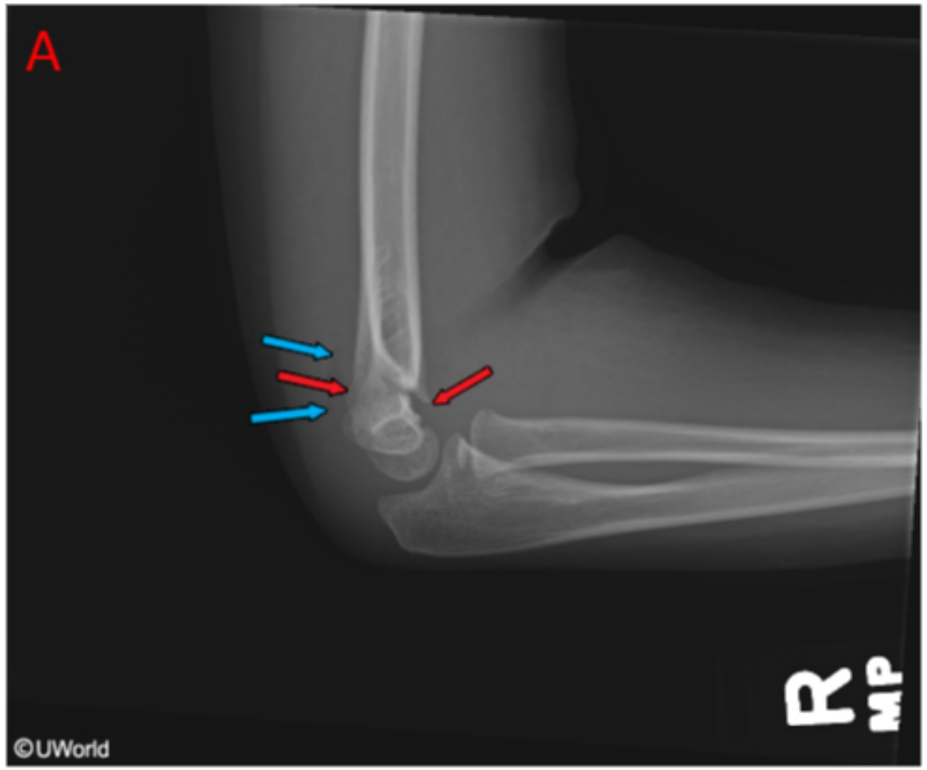
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Question Id: 3556

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Distal perfusion should be monitored closely because brachial artery injury results in diminished brachial and radial pulses. Motor and sensory function should also be assessed due to the risk of median nerve injury that can present with a weak "OK" sign (ie, inability to approximate tip of

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Item 13 of 40
Question Id: 11109

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A 38-year-old woman comes to the emergency department for right flank pain radiating to the groin. She also has hematuria but no dysuria or urinary frequency. She has no other medical problems and takes no medications. Her temperature is 36.7 C (98 F), blood pressure is 110/80 mm Hg, and pulse is 68/min. The patient has no costovertebral angle tenderness. Abdominal imaging shows a 6-mm calculus in the distal right ureter with no hydronephrosis. The patient's symptoms improve with intravenous hydration and analgesics. Which of the following medications will be most helpful in facilitating stone passage?

A. Bethanechol
B. Finasteride
C. Furosemide
D. Imipramine
E. Oxybutynin
F. Phenazopyridine
G. Tamsulosin

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Item 13 of 40
Question Id: 11109

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A. Bethanechol (16%)
B. Finasteride (2%)
C. Furosemide (20%)
D. Imipramine (1%)
E. Oxybutynin (8%)
F. Phenazopyridine (4%)
✓ G. Tamsulosin (44%)

Omitted
Correct answer
G

44%
Answered correctly

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04/25/2020
Last Updated

Explanation

This patient has ureteric colic secondary to a distal ureteral stone. Uncomplicated stones <1 cm can be managed conservatively with hydration, analgesics, and alpha blockers. Alpha receptors are found on the distal ureter, base of the detrusor, bladder neck, and urethra. Sympathetic

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This patient has ureteric colic secondary to a distal ureteral stone. Uncomplicated stones <1 cm can be managed conservatively with hydration, analgesics, and alpha blockers. Alpha receptors are found on the distal ureter, base of the detrusor, bladder neck, and urethra. Sympathetic activation stimulates alpha receptors to maintain high muscular tone for normal urinary continence. Reflex ureteral spasm secondary to stone impaction causes the typical waxing and waning pain seen in ureteral colic. Tamsulosin is an alpha 1 antagonist that relaxes ureteral muscle and decreases intraureteral pressure. This facilitates stone passage and reduces the need for analgesics.

(Choices A and E) Cholinergic receptors are found on the dome of the bladder, contraction of which facilitates voiding. These receptors are not known to be present on the ureter. Bethanechol is a cholinergic agent used to treat urinary retention or atonic bladder. Oxybutynin is an anticholinergic agent that inhibits cholinergic input during bladder filling. It helps improve bladder capacity and is used to treat overactive bladder (detrusor instability).

(Choice B) Finasteride is a 5-alpha-reductase inhibitor that blocks the conversion of testosterone to dihydrotestosterone. It is used as a second-line agent in the management of benign prostatic hyperplasia.

(Choice C) Furosemide is a loop diuretic that promotes calciuria, which can predispose to renal calculi.

(Choice D) Imipramine is an antidepressant used to treat childhood enuresis. It has anticholinergic effects and promotes urinary retention.

(Choice F) Phenazopyridine is an analgesic for urinary tract mucosa frequently used to treat the dysuria of cystitis (eg, after infection or instrumentation). It may worsen stone formation (mechanism unknown).

Educational objective:
Alpha-1 receptor blockers such as tamsulosin act on the distal ureter, lowering muscle tone and reducing reflex ureteral spasm secondary to stone impaction. These agents facilitate stone passage and reduce the need for analgesics.

References

- Tamsulosin for treatment of unilateral distal ureterolithiasis: a systematic review and meta-analysis.

Surgery	Renal, Urinary Systems & Electrolytes	Renal calculi
Subject	System	Topic

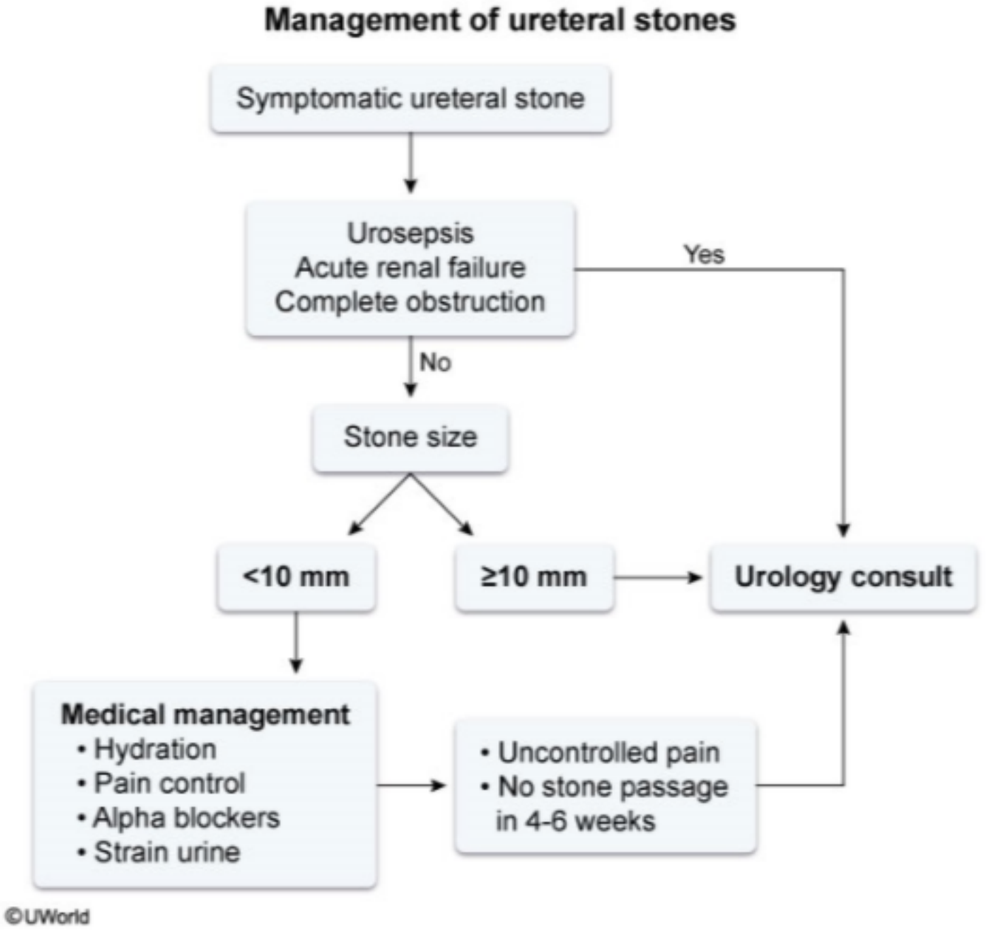
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Subject System Topic

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Item 14 of 40
Question Id: 16969

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A 26-year-old, previously healthy man is brought to the emergency department after a high-speed motor vehicle collision. He became obtunded in the field and required intubation by the paramedics. The patient also received 2 L of crystalloid on the way to the hospital. On arrival, blood pressure is 88/52 mm Hg and pulse is 128/min. Physical examination shows multiple contusions, including to the left side of the forehead, left arm, chest, abdomen, and pelvis, but there is no external hemorrhage. The trachea is midline. Breath sounds are present bilaterally and heart sounds are normal. The abdomen is nondistended and soft to palpation. Muscle tone is normal. Focused Assessment with Sonography for Trauma shows no pericardial or intraperitoneal free fluid. Which of the following is the most likely cause of this patient's hemodynamic instability?

A. Adrenal insufficiency
B. Intracranial hemorrhage
C. Pancreatic injury
D. Pelvic fracture
E. Spinal fracture

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- A. Adrenal insufficiency (10%)
- B. Intracranial hemorrhage (21%)
- C. Pancreatic injury (5%)
- ✓ D. Pelvic fracture (54%)
- E. Spinal fracture (7%)

Omitted
Correct answer
D

54%
Answered correctly

02 secs
Time Spent

04/13/2020
Last Updated

Explanation

Despite initial resuscitation (2 L of crystalloid), this patient has continued hemodynamic instability (eg, systolic blood pressure <90 mm Hg), which is consistent with shock. Because **hemorrhagic shock** is the **most common** type of shock in the **trauma** setting, particular attention is given during trauma survey to areas where **large blood loss** can occur ("blood on the floor and 4 more"):

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Despite initial resuscitation (2 L of crystalloid), this patient has continued hemodynamic instability (eg, systolic blood pressure <90 mm Hg), which is consistent with shock. Because **hemorrhagic shock** is the **most common** type of shock in the **trauma** setting, particular attention is given during trauma survey to areas where **large blood loss** can occur ("blood on the floor and 4 more"):

- External bleeding ("the floor"): up to the entire blood volume
- Chest: up to 40% of the blood volume/hemithorax
- Abdomen (ie, peritoneal cavity): up to the entire blood volume
- **Pelvis**: up to the entire blood volume; blood loss often **hidden** within the **retroperitoneum**
- Thigh: up to 1-2 L/thigh

This patient has no evidence of external bleeding or major hemorrhage into the chest (bilateral breath sounds), abdomen (nondistended, soft, no intraperitoneal free fluid), or thighs (normal muscle tone). Therefore, pelvic/retroperitoneal bleeding should be suspected. **Pelvic fracture** can cause tearing of the thin-walled **venous plexus** (presacral, lumbar), leading to life-threatening hemorrhage. For early detection of this potentially lethal injury, pelvic x-ray is typically performed as an adjunct to the trauma primary survey.

(Choice A) Adrenal crisis can be precipitated by trauma and cause shock refractory to fluid resuscitation. However, this occurs much more commonly in patients with underlying adrenal insufficiency (eg, autoimmune-mediated adrenalitis, adrenal suppression from chronic glucocorticoid use) rather than in previously healthy patients. Bilateral adrenal infarct/hemorrhage from trauma is extremely rare.

(Choices B and E) Spinal fracture can cause spinal cord injury leading to neurogenic shock. However, neurogenic shock is typically associated with flaccid paralysis (vs normal muscle tone), as well as hypotension with bradycardia (vs tachycardia) from sudden loss of sympathetic tone. Severe intracranial hemorrhage may also cause neurogenic shock or, alternately, Cushing triad (from increased intracranial pressure). However, Cushing triad is characterized by hypertension (vs hypotension), bradycardia (vs tachycardia), and irregular respiration.

(Choice C) Pancreatic injury can occur with blunt abdominal trauma, especially when the pancreas is rapidly compressed (eg, steering wheel impact) against the vertebral column. However, even severe injuries (eg, transection with pancreatic fluid leakage) do not typically cause acute hemodynamic instability. They more commonly result in symptoms similar to those of pancreatitis (eg, abdominal pain, nausea, emesis).

Educational objective:

Hemorrhagic shock is the most common type of shock in trauma patients. Areas where large amounts of blood can be lost (or hidden) are "the

intraperitoneal free fluid), or thighs (normal muscle tone). Therefore, pelvic/retroperitoneal bleeding should be suspected. **Pelvic fracture** can cause tearing of the thin-walled **venous plexus** (presacral, lumbar), leading to life-threatening hemorrhage. For early detection of this potentially lethal injury, pelvic x-ray is typically performed as an adjunct to the trauma primary survey.

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Educational objective:
Hemorrhagic shock is the most common type of shock in trauma patients. Areas where large amounts of blood can be lost (or hidden) are "the floor" (external bleeding) "and 4 more": chest, abdomen, pelvis/retroperitoneum, and thigh.

References

- Resuscitation resequenced: a rational approach to patients with trauma in shock.
- Pelvic trauma: WSES classification and guidelines.

Surgery	General Principles	Hypovolemia
Subject	System	Topic

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Item 15 of 40
Question Id: 2602

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A 50-year-old woman comes to the office due to 3 months of progressive right shoulder pain radiating to her forearm. The patient has a history of rheumatoid arthritis and takes methotrexate and naproxen, which have controlled her morning stiffness and joint tenderness. She has smoked a pack of cigarettes daily for 25 years and drinks 1 or 2 cocktails on weekends. Vital signs are within normal limits. Physical examination shows mild drooping of the right upper eyelid and right pupillary constriction. Range of motion over the right shoulder is normal and does not elicit arm pain. There are bilateral hand joint deformities with no swelling and minimal tenderness. Which of the following is the best next step in the management of this patient?

A. Acetylcholine receptor antibody testing
B. CT scan of the head
C. Nerve conduction study
D. X-ray of the chest
E. X-ray of the right shoulder

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- A. Acetylcholine receptor antibody testing (6%)
- B. CT scan of the head (11%)
- C. Nerve conduction study (3%)
- ✓ D. X-ray of the chest (74%)
- E. X-ray of the right shoulder (3%)

Omitted
Correct answer
D

74%
Answered correctly

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Explanation

Common manifestations of superior pulmonary sulcus tumor
• Shoulder pain

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Common manifestations of superior pulmonary sulcus tumor
• Shoulder pain • Horner syndrome (invasion of paravertebral sympathetic chain/stellate ganglion)   ◦ Ipsilateral ptosis, miosis, enophthalmos & anhidrosis • Neurologic symptoms in the arm (invasion of C8-T2 nerves)   ◦ Weakness/atrophy of intrinsic hand muscles   ◦ Pain/paresthesia of 4th/5th digits & medial arm/forearm • Supraclavicular lymphadenopathy • Weight loss

This patient with well controlled rheumatoid arthritis (eg, no joint swelling/minimal tenderness) has had several months of progressive right shoulder pain radiating to the arm. Although physical examination of the right shoulder is normal, the presence of ipsilateral miosis and ptosis and a long history of smoking raises strong concern for Horner syndrome due to a **superior pulmonary sulcus** (Pancoast) **tumor**.

Superior pulmonary sulcus tumors usually arise in **smokers**; most cases are caused by adenocarcinoma or squamous cell carcinoma of the lung. Because the superior sulcus is located in the lung periphery, pulmonary symptoms such as dyspnea, hemoptysis, and cough do not generally occur until late in the disease course. Therefore, most patients come to clinical attention due to symptoms related to invasion of adjacent structures, including:

- **Shoulder pain** (most common) due to invasion of the brachial plexus or adjacent bony structures
- **Horner syndrome** (**miosis**, **ptosis**, anhidrosis) due to invasion of the paravertebral sympathetic chain or cervical ganglion
- **Arm pain/hand weakness** in an ulnar distribution (eg, weakness in intrinsic hand muscles) due to invasion of the C8/T1 nerve roots

Patients with suspected superior pulmonary sulcus tumors should undergo chest imaging (eg, chest x-ray) followed by staging imaging and biopsy if a lesion is found.

(Choice A) Acetylcholine receptor antibody testing is used to diagnose myasthenia gravis, which often presents with ptosis. Although migrating muscle weakness is common, progressive shoulder and arm pain would be atypical

- Weight loss

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(Choice A) Acetylcholine receptor antibody testing is used to diagnose myasthenia gravis, which often presents with ptosis. Although migrating muscle weakness is common, progressive shoulder and arm pain would be atypical.

(Choice B) CT scan of the head could reveal a CNS lesion (eg, medullary infarction), which can sometimes cause Horner syndrome. However, this would not account for the patient's progressive arm and shoulder pain.

(Choice C) Nerve conduction studies (combined with electromyography) are often performed to help diagnose peripheral nerve disease (eg, neuropathy, nerve entrapment). However, these conditions do not typically cause Horner syndrome.

(Choice E) X-ray of the shoulder can evaluate for fracture due to trauma or lytic lesions due to malignancy. However, shoulder pathologies are not typically associated with Horner syndrome. In addition, given this patient's normal shoulder examination, x-ray of the shoulder would not be the best next test.

Educational objective:

- **Horner syndrome** (**miosis**, **ptosis**, anhidrosis) due to invasion of the paravertebral sympathetic chain or cervical ganglion
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Educational objective:
Superior pulmonary sulcus tumors are malignant lung neoplasms that arise in the superior portion of the lung. They most commonly present with shoulder pain, Horner syndrome, arm pain, and/or hand weakness.

References

- Pancoast tumors: characteristics and preoperative assessment.

Surgery	Pulmonary & Critical Care	Lung cancer
Subject	System	Topic

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This patient with well controlled rheumatoid arthritis (eg, no joint swelling/minimal tenderness) has had several months of progressive right

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Superior pulmonary sulcus tumors are malignant lung neoplasms that arise in the superior portion of the lung. They most commonly present with

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Item 16 of 40
Question Id: 2604

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A 66-year-old woman comes to the clinic for evaluation of a lesion near her left elbow. The patient first noticed the lesion 2 months ago at the margin of a scar from a prior skin wound. Her husband was diagnosed with an episode of shingles at that time. She has no associated pain or itching, but the lesion has since enlarged and developed oozing and crusting. Past medical history is notable for diet-controlled type 2 diabetes mellitus and recurrent oral herpes simplex. The patient has a 30-pack-year smoking history but does not use alcohol or illicit drugs. Physical examination of the lesion is shown below.



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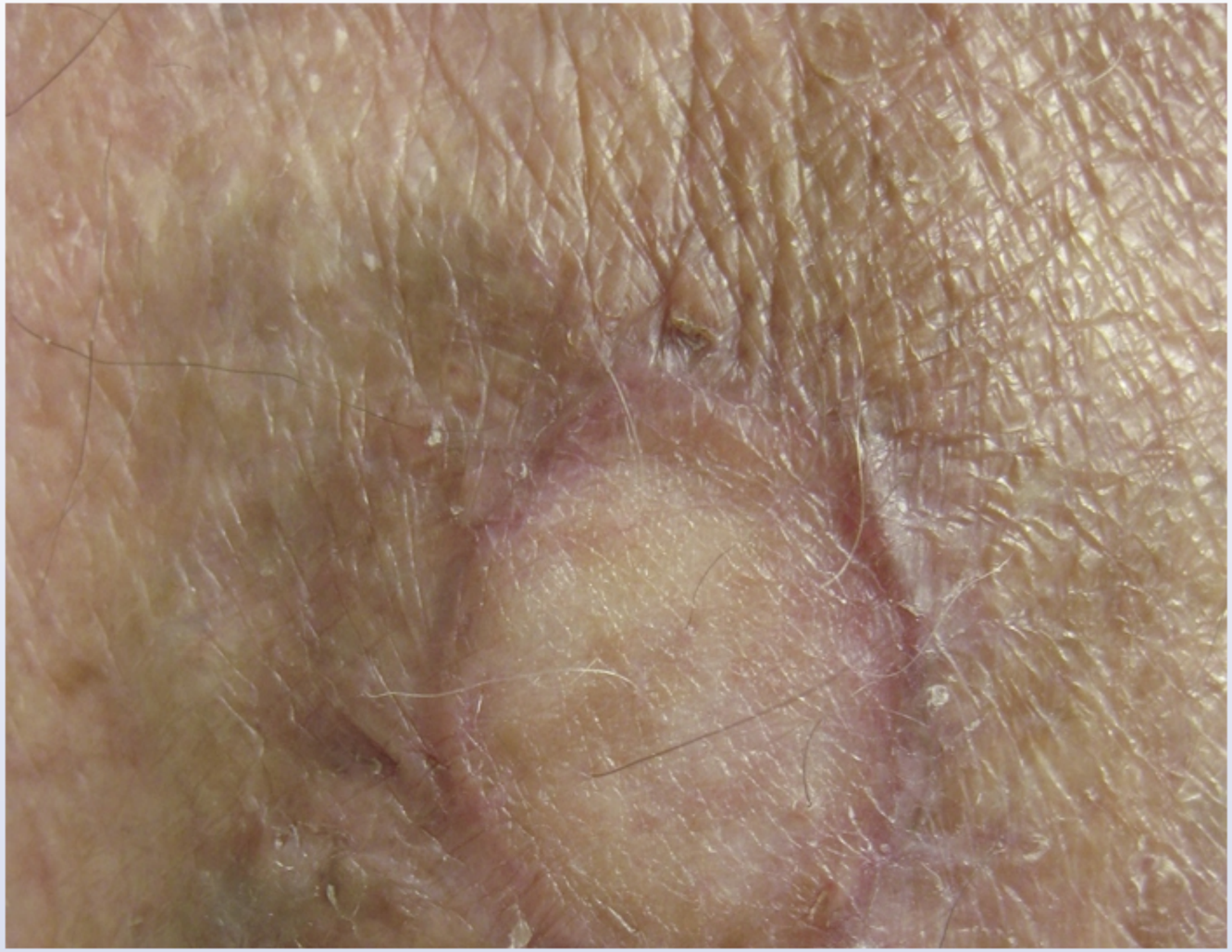
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What is the best next step in management of this patient?

A. Biopsy of lesion
B. Intralesional glucocorticoids
C. Mohs micrographic surgery
D. Oral valacyclovir
E. Reassurance and close follow-up
F. Topical antibiotics
G. Topical fluorouracil

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Item 16 of 40
Question Id: 2604

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What is the best next step in management of this patient?

- ✓ A. Biopsy of lesion (77%)
- B. Intralesional glucocorticoids (1%)
- C. Mohs micrographic surgery (6%)
- D. Oral valacyclovir (2%)
- E. Reassurance and close follow-up (6%)
- F. Topical antibiotics (3%)
- G. Topical fluorouracil (2%)

Omitted
Correct answer

77%
Answered correctly

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Time Spent

03/05/2020
Last Updated

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Explanation

Squamous cell carcinoma of skin	
Risk factors	• Sun/UV light, ionizing radiation exposure • Immunosuppression • Chronic scars/wounds/burn injuries
Clinical features	• Scaly plaques/nodules • ± Hyperkeratosis or ulceration • Neurologic signs (if perineural invasion) • SCC in situ: slow-growing, red, scaly patches/plaques
Diagnosis	• **Biopsy:** dysplastic/anaplastic keratinocytes

SCC = squamous cell carcinoma; **UV** = ultraviolet.

Squamous cell carcinoma (SCC) should be suspected in patients with a rough, scaly nodule or nonhealing, painless ulcer that develops in the setting of a scar or chronic inflammatory lesion. **Sun exposure** is the most common cause of SCC, but other risk factors include radiation exposure; immunosuppression; and **chronic wounds, burns, or scars**.

The diagnosis of SCC should be confirmed with **skin biopsy** (punch, shave, or excisional) that includes the deep reticular dermis to assess the depth of invasion. Small or low-risk lesions are usually managed with surgical excision or local destruction (eg, cryotherapy, electrodessication); lesions that are high risk or located in cosmetically sensitive areas should be referred for Mohs micrographic surgery **(Choice C)**.

If left untreated, SCC may eventually cause extensive local destruction and lymphatic or distant metastases **(Choice E)**. SCC is not usually metastatic at the time of diagnosis, but SCC arising in a wound or burn (termed a **Marjolin ulcer**) is associated with an increased risk of metastasis.

Squamous cell carcinoma (SCC) should be suspected in patients with a rough, scaly nodule or nonhealing, painless ulcer that develops in the setting of a scar or chronic inflammatory lesion. **Sun exposure** is the most common cause of SCC, but other risk factors include radiation exposure; immunosuppression; and **chronic wounds, burns, or scars**.

The diagnosis of SCC should be confirmed with **skin biopsy** (punch, shave, or excisional) that includes the deep reticular dermis to assess the depth of invasion. Small or low-risk lesions are usually managed with surgical excision or local destruction (eg, cryotherapy, electrodessication); lesions that are high risk or located in cosmetically sensitive areas should be referred for Mohs micrographic surgery **(Choice C)**.

If left untreated, SCC may eventually cause extensive local destruction and lymphatic or distant metastases **(Choice E)**. SCC is not usually metastatic at the time of diagnosis, but SCC arising in a wound or burn (termed a **Marjolin ulcer**) is associated with an increased risk of metastasis.

(Choice B) Intralesional glucocorticoids are used for symptomatic keloids, which may form in the setting of an established scar. Keloids are not usually ulcerated.

(Choice D) Valacyclovir is used to treat infections due to the herpes family of viruses (eg, varicella zoster, herpes simplex). Zoster skin lesions are often painful and characterized by vesicles that quickly ulcerate; episodes are usually of short duration and will generally resolve prior to 2 months.

(Choice F) Chronic ulcerated lesions are frequently colonized with bacteria. However, topical antibiotics are only rarely indicated. They are typically used to prevent infection in scrapes or burns.

(Choice G) Fluorouracil cream is most commonly used for actinic keratosis, dry, scaly papules on sun-exposed areas that may occasionally progress to SCC. It is also used in Bowen disease (SCC in situ) and other low-risk SCC lesions.

Educational objective:
A nonhealing, painless, bleeding skin ulcer associated with a chronic scar suggests squamous cell carcinoma (SCC). SCC arising within a scar or chronic wound carries an increased risk of metastasis. The diagnosis should be confirmed with biopsy.

References

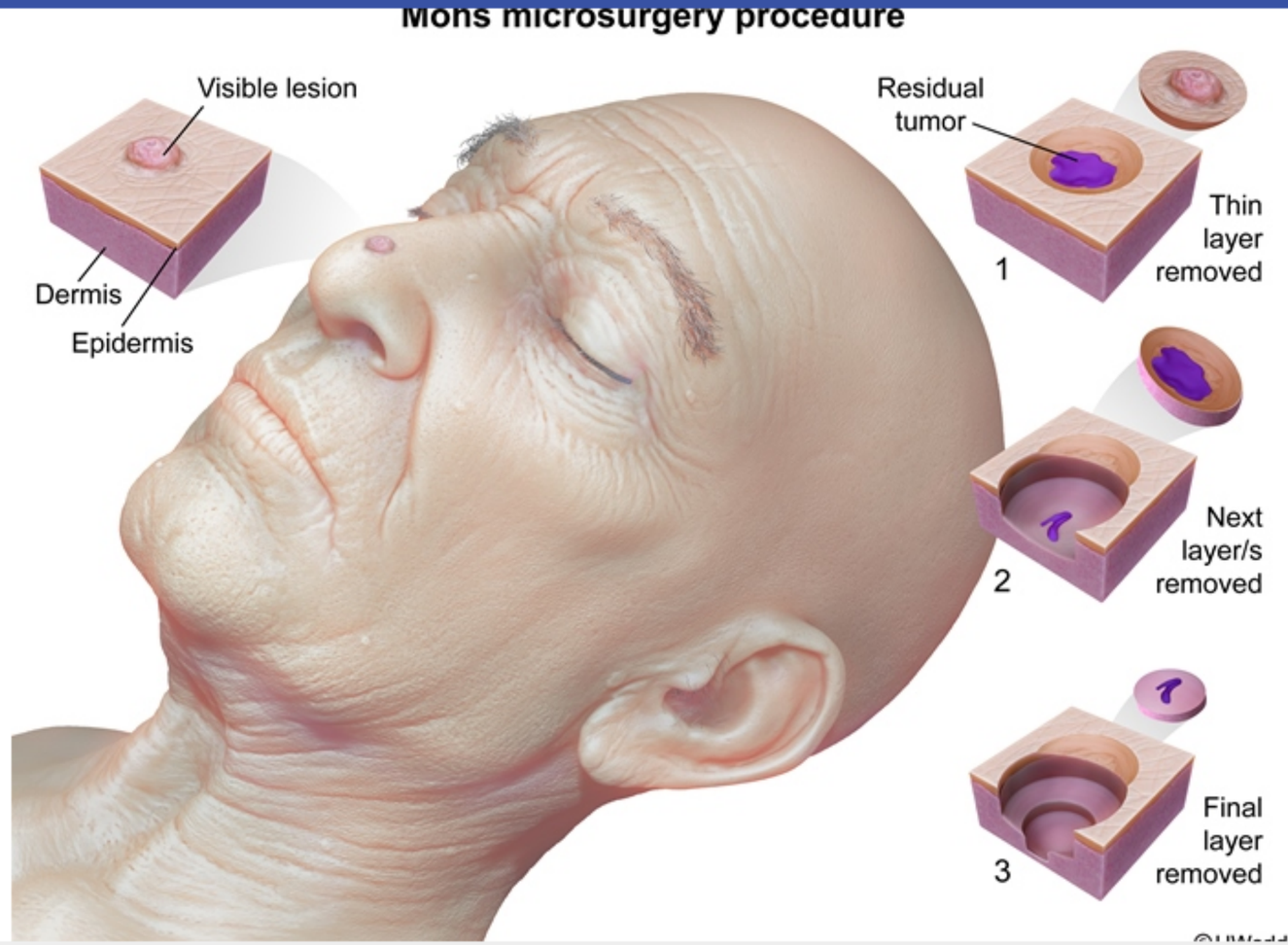
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Item 16 of 40
Question Id: 2604

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Item 16 of 40
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squamous cell carcinoma; UV ultraviolet.

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Squamous cell cancer developing on burn scar

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Item 16 of 40
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squamous cell carcinoma; UV ultraviolet.

Exhibit Display



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Squamous cell cancer developing on burn scar

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Item 17 of 40
Question Id: 16545

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A 30-year-old man comes to the office due to 2 days of right arm pain, swelling, and heaviness. The symptoms are worse with activity or arm elevation above the head and improve with rest. The patient is an avid weight lifter and plays recreational baseball. Several hours prior to the onset of symptoms, he pitched 6 innings in a baseball game. He has no prior medical conditions and takes no medications. The patient does not use tobacco, alcohol, or illicit drugs. Vital signs are normal. Examination shows swelling and redness of the right arm from the elbow to the shoulder. Capillary refill is normal. What is the most likely cause of this patient's current symptoms?

- A. Deep vein thrombosis
- B. Hypertrophic cardiomyopathy
- C. Lymphedema
- D. Medial epicondylitis
- E. Superficial thrombophlebitis

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Item 17 of 40
Question Id: 16545
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- ✓ A. Deep vein thrombosis (23%)
- B. Hypertrophic cardiomyopathy (0%)
- C. Lymphedema (28%)
- D. Medial epicondylitis (23%)
- E. Superficial thrombophlebitis (25%)

Omitted
Correct answer
A

23%
Answered correctly

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Explanation

Upper extremity deep venous thrombosis	
Risk factors	• Central venous catheters • Repetitive arm motions (eg, baseball pitching)

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Upper extremity deep venous thrombosis	
Risk factors	• Central venous catheters • Repetitive arm motions (eg, baseball pitching) • Weight lifting • Malignancy
Manifestations	• Acute arm edema, heaviness, pain & erythema • Dilated subcutaneous collateral veins in chest/upper extremity • Pulmonary embolism
Diagnosis	• Duplex or doppler ultrasonography
Treatment	• 3 months of anticoagulation • Thrombolysis (non–catheter-related)

This young patient with acute right arm pain, swelling, and heaviness likely has **upper extremity deep venous thrombosis** (DVT). Although the vast majority of upper extremity DVTs arise in the setting of central catheters (eg, peripherally inserted central catheter), otherwise healthy patients can occasionally develop **spontaneous** DVT due to thoracic outlet abnormalities that compress or injure the axillosubclavian vein. Young, **athletic men** are at greatest risk because most cases are linked to hypertrophy of the scalene/subclavius muscles from **weight lifting** or damage to the vein from repetitive overhead arm motions (eg, **baseball** throwing, rowing). Congenital abnormalities of the thorax (eg, cervical rib) can also occasionally lead to spontaneous DVT.

Manifestations tend to arise in the dominant arm within hours of strenuous activity (eg, pitching a baseball game). Patients usually have acute upper extremity **swelling**, heaviness, and pain. The pain often improves with rest and arm elevation to the level of the heart; arm elevation above the head typically worsens symptoms (as in this patient). Diagnosis is generally made with Doppler or duplex ultrasonography. Thrombolysis and/or 3 months of anticoagulation are generally required; surgical thoracic outlet decompression may also be necessary.

(Choice B) Hypertrophic cardiomyopathy is a genetic disorder associated with mutations to sarcomere genes. Most patients are asymptomatic but risk of sudden cardiac death, heart failure, and stroke are increased. Although low ejection fraction hypertrophic cardiomyopathy can cause

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(Choice B) Hypertrophic cardiomyopathy is a genetic disorder associated with mutations to sarcomere genes. Most patients are asymptomatic but risk of sudden cardiac death, heart failure, and stroke are increased. Although low ejection fraction hypertrophic cardiomyopathy can cause edema, most patients have lower extremity edema and other signs of cardiac congestion (eg, dyspnea).

(Choice C) Upper extremity lymphedema causes unilateral arm swelling, but most cases arise following surgical resection of axillary lymph nodes (eg, lymph node dissection for breast cancer). Lymphedema is usually chronic, not acute.

(Choice D) Medial epicondylitis ("golfers elbow") can sometimes occur in pitchers. Although it often results in arm pain, the pain is localized to the medial elbow; it would not cause arm edema and erythema from the elbow to the shoulder.

(Choice E) Superficial thrombophlebitis is generally marked by localized pain and swelling along the path of the vein. This patient with arm edema, heaviness, and pain that is worse with exertion more likely has DVT.

Educational objective:
Spontaneous upper extremity deep venous thrombosis most often occurs in young, athletic men who lift weights or engage in activities that have repetitive overhead arm motions (eg, pitching a baseball game). It is marked by acute arm swelling, heaviness, and pain. Treatment generally requires thrombolysis and/or 3 months of anticoagulation.

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Surgery	Hematology & Oncology	Venous thromboembolism
Subject	System	Topic

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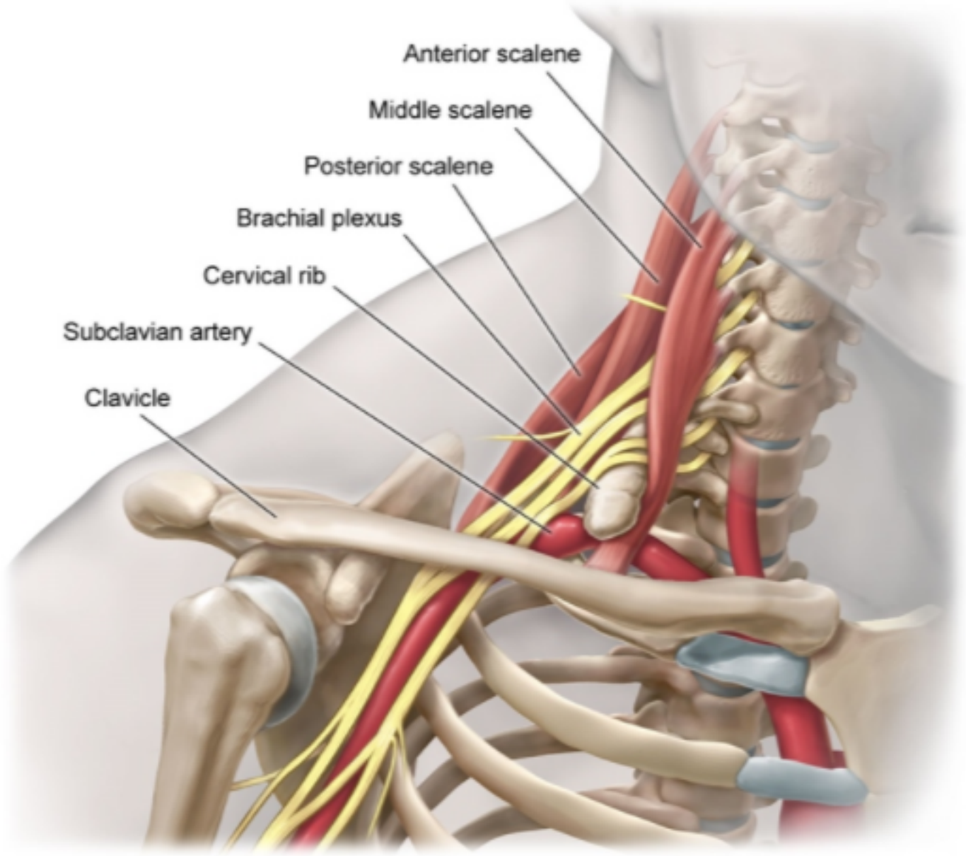
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- Weight lifting

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Thoracic outlet syndrome



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(Choice D) Medial epicondylitis ("golfer's elbow") can sometimes occur in pitchers. Although it often results in arm pain, the pain is localized to

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A 33-year-old woman comes to the office due to a dull, aching pain in the right upper quadrant of the abdomen for several weeks. Her medical history is unremarkable. She takes no medications except an oral contraceptive, which she has used for the past 12 years. The patient drinks 1 or 2 glasses of wine on social occasions but does not use tobacco or illicit drugs. Temperature is 36.7 C (98 F), blood pressure is 120/80 mm Hg, pulse is 78/min, and respirations are 14/min. BMI is 27 kg/m^2. Examination shows hepatomegaly with moderate discomfort on deep palpation in the right upper quadrant. There is no jaundice or ascites. Cardiopulmonary examination shows no abnormalities. Laboratory results are as follows:

Albumin	4.1 g/dL
Total bilirubin	0.9 mg/dL
Alkaline phosphatase	215 U/L
Aspartate aminotransferase (AST, SGOT)	45 U/L
Alanine aminotransferase (ALT, SGPT)	40 U/L
Gamma glutamyl transpeptidase	92 U/L (normal 5-55 U/L)

Abdominal ultrasonogram reveals a solitary hyperechoic 7-cm lesion in the right lobe of the liver. Which of the following is the most likely diagnosis in this patient?

A. Hepatic adenoma
B. Hepatocellular carcinoma
C. Hydatid cyst
D. Metastatic adenocarcinoma
E. Regenerating liver nodule

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Abdominal ultrasonogram reveals a solitary hyperechoic 7-cm lesion in the right lobe of the liver. Which of the following is the most likely diagnosis in this patient?

- A. Hepatic adenoma (88%) ✓
- B. Hepatocellular carcinoma (2%)
- C. Hydatid cyst (5%)
- D. Metastatic adenocarcinoma (1%)
- E. Regenerating liver nodule (1%)

Omitted
Correct answer

88%
Answered correctly

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Solid liver masses	
Focal nodular hyperplasia	• Associated with anomalous arteries • Arterial flow & central scar on imaging
Hepatic adenoma	• Women on long-term oral contraceptives • Possible hemorrhage or malignant transformation
Regenerative nodules	• Acute or chronic liver injury (eg, cirrhosis)
Hepatocellular carcinoma	• Systemic symptoms • Chronic hepatitis or cirrhosis • Elevated alpha-fetoprotein
Liver metastasis	• Single/multiple lesions • Known extrahepatic malignancy

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This young woman has a large, painful hepatic mass. She has elevated alkaline phosphatase and gamma glutamyl transpeptidase (GGT) levels, suggesting biliary compression or obstruction, but otherwise relatively normal liver markers. In light of her minimal alcohol consumption and long-term use of **oral contraceptives**, this likely represents a hepatic adenoma. **Hepatic adenomas** are benign epithelial tumors that are most common in young and middle-age **women**. Additional risk factors include anabolic androgen use and pregnancy.

Initial diagnosis is based on the clinical presentation and imaging studies. Ultrasound most commonly shows **well-demarcated, hyperechoic lesions**, and contrast-enhanced CT can show early peripheral enhancement. Needle biopsy is not recommended for suspected hepatic adenoma due to the risk of bleeding, and surgical excision is preferred. Possible long-term complications include progressive growth, rupture, and

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Hepatic adenoma can clinically resemble focal nodular hyperplasia (FNH), a common mass lesion in young women caused by hyperperfusion from anomalous arteries. However, FNH is not associated with oral contraceptives, and imaging will show evidence of increased arterial flow and sometimes a central scar.

(Choice B) Hepatocellular carcinoma is characterized by a rapidly enlarging liver mass, often with satellite lesions. It usually occurs in patients with cirrhosis or chronic hepatitis (especially hepatitis B) and would be unusual in a young patient without these risk factors.

(Choice C) Hydatid cysts are caused by *Echinococcus* tapeworm infections. In the United States, most cases are seen in immigrants, although occasional cases may be seen in individuals from the Southwest who have been exposed to sheep and dogs. It causes cystic, not solid, liver lesions.

(Choice D) Most patients with metastatic liver disease will have a known extrahepatic primary malignancy (eg, colon, pancreas). Although the liver lesions may occasionally be found prior to the primary tumor, most patients are older, have systemic symptoms (eg, weight loss), and often have multiple liver lesions.

(Choice E) Acute or chronic liver injury can lead to nodular regeneration. This is usually multifocal and occurs most commonly in the setting of cirrhosis.

Educational objective:
Hepatic adenoma is a benign tumor most often seen in young and middle-age women who take oral contraceptives. Possible long-term

malignant transformation.

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Educational objective:
Hepatic adenoma is a benign tumor most often seen in young and middle-age women who take oral contraceptives. Possible long-term complications include progressive growth, rupture, and malignant transformation.

References

- Hepatocellular adenoma: an update.

Surgery	Gastrointestinal & Nutrition	Hepatic adenomas
Subject	System	Topic

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A 65-year-old man who underwent right total knee replacement 6 months ago comes to the emergency department due to a 3-week history of dull pain in his right knee. He has had no recent respiratory illness, diarrhea, or urinary symptoms. Medical history is notable for osteoarthritis, hypertension, and hyperlipidemia. The patient drinks a beer every night and does not use tobacco or illicit drugs. Temperature is 37.3 C (99.1 F), blood pressure is 120/60 mm Hg, and pulse is 90/min. Examination shows mild swelling and tenderness at the knee with full range of motion. The skin over the joint is intact. The synovial fluid is sampled. Laboratory results are as follows:

Complete blood count	
Platelets	300,000/mm^3
Leukocytes	9,000/mm^3
Synovial fluid	
Leukocytes	10,000/mm^3
Neutrophils	80%

Which of the following is the most likely cause of this patient's current condition?

A. Atypical mycobacteria
B. *Borrelia burgdorferi*
C. *Chlamydia trachomatis*
D. *Neisseria gonorrhoeae*
E. *Pseudomonas aeruginosa*
F. *Salmonella* species

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F. *Salmonella* species
G. *Staphylococcus aureus*
H. *Staphylococcus epidermidis*

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Leukocytes	9,000/mm^3

Synovial fluid

Leukocytes	10,000/mm^3
Neutrophils	80%

Which of the following is the most likely cause of this patient's current condition?

- A. Atypical mycobacteria (1%)
- B. *Borrelia burgdorferi* (0%)
- C. *Chlamydia trachomatis* (0%)
- D. *Neisseria gonorrhoeae* (1%)
- E. *Pseudomonas aeruginosa* (2%)
- F. *Salmonella* species (0%)
- G. *Staphylococcus aureus* (39%)
- ✓ H. *Staphylococcus epidermidis* (54%)

Omitted
Correct answer

54%
Answered correctly

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Prosthetic joint infection			
	Early onset	**Delayed onset**	**Late onset**
Time to onset after surgery	<3 months	3-12 months	>12 months
Presentation	• Acute pain • Wound infection or breakdown • Fever	• Chronic joint pain • Implant loosening • Sinus tract formation	• Acute symptoms in previously asymptomatic joint • Recent infection at distant site
Most common organisms	• *Staphylococcus aureus* • Gram-negative rods • Anaerobes	• Coagulase-negative staphylococci • *Propionibacterium* species • Enterococci	• *Staphylococcus aureus* • Gram-negative rods • Beta-hemolytic streptococci

This patient has subacute pain in his prosthetic knee 6 months after arthroplasty. The synovial fluid analysis shows a mildly elevated leukocyte count with a predominance of neutrophils. This is consistent with an inflammatory process, most likely a **prosthetic joint infection** (PJI). The leukocyte count in the synovial fluid in PJI is usually elevated to >1000/mm^3 but is often lower than in septic native joints (usually >50,000/mm^3).

PJI can be acquired by **perioperative contamination** of the joint or by extension from an overlying wound infection:

- Infections due to **virulent organisms** (eg, *Staphylococcus aureus*, *Pseudomonas aeruginosa*) typically present within the **first 3 months** after surgery (early onset infection) with acute pain, fever, leukocytosis, and overt local signs of infection (eg, erythema, purulent drainage), not seen in this patient **(Choices E and G)**.
- Infections due to less virulent organisms (eg, **coagulase-negative staphylococci**, *Propionibacterium* species), as in this patient, are likely to have a **delayed onset** (3-12 months) and present with chronic pain, implant loosening, gait impairment, or sinus tract formation. Fever and leukocytosis are usually absent. ***Staphylococcus epidermidis*** is a coagulase-negative staphylococcus commonly implicated in delayed-onset PJI.
- Late-onset infections presenting >12 months after surgery are unlikely to have been acquired perioperatively and are usually due to

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- Late-onset infections presenting >12 months after surgery are unlikely to have been acquired perioperatively and are usually due to hematogenous spread of a distant infection (eg, urinary tract infection).

(Choice A) Atypical mycobacteria are a rare cause of PJI. They usually cause late-onset infections and are most commonly seen in patients with immunosuppressive disorders (eg, HIV) or local trauma.

(Choice B) *Borrelia burgdorferi* causes Lyme disease. Late Lyme disease can present with acute intermittent attacks of monoarticular or oligoarticular arthritis, but PJI with chronic, persistent joint pain is rare.

(Choices C and F) *Chlamydia trachomatis* and *Salmonella* species can be associated with reactive arthritis following an initial genitourinary or gastrointestinal infection. Reactive arthritis is characterized by asymmetric oligoarthritis with urethritis/enteritis and conjunctivitis. Subacute PJI is an uncommon presentation.

(Choice D) Disseminated *Neisseria gonorrhoeae* infection most commonly causes a syndrome characterized by migratory polyarthritis, tenosynovitis, and rash. Acute septic monoarthritis can also be seen, but synovial fluid cell counts are usually higher (>50,000/mm^3).

Educational objective:

Prosthetic joint infections can be acquired by perioperative contamination or by extension from an overlying wound infection. Infections due to

to have a **delayed onset** (3-12 months) and present with chronic pain, implant loosening, gait impairment, or sinus tract formation. Fever and leukocytosis are usually absent. ***Staphylococcus epidermidis*** is a coagulase-negative staphylococcus commonly implicated in delayed-onset PJI.

- Late-onset infections presenting >12 months after surgery are unlikely to have been acquired perioperatively and are usually due to hematogenous spread of a distant infection (eg, urinary tract infection).

(Choice A) Atypical mycobacteria are a rare cause of PJI. They usually cause late-onset infections and are most commonly seen in patients with immunosuppressive disorders (eg, HIV) or local trauma.

(Choice B) *Borrelia burgdorferi* causes Lyme disease. Late Lyme disease can present with acute intermittent attacks of monoarticular or oligoarticular arthritis, but PJI with chronic, persistent joint pain is rare.

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(Choice D) Disseminated *Neisseria gonorrhoeae* infection most commonly causes a syndrome characterized by migratory polyarthritis, tenosynovitis, and rash. Acute septic monoarthritis can also be seen, but synovial fluid cell counts are usually higher (>50,000/mm^3).

Educational objective:
Prosthetic joint infections can be acquired by perioperative contamination or by extension from an overlying wound infection. Infections due to virulent organisms (eg, *Staphylococcus aureus*) present within the first 3 months with acute pain, fever, and local signs of infection. Infections due to less virulent organisms (eg, coagulase-negative staphylococci) have a delayed onset and present with chronic pain, implant loosening, gait impairment, or sinus tract formation.

Surgery	Infectious Diseases	Septic arthritis
Subject	System	Topic

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A 40-year-old woman comes to the office due to worsening gait disturbances over the past several months. The patient has had difficulty taking steps, as if her feet were stuck to the floor, and she feels unsteady while walking. She has had no falls, headache, vertigo, vision loss, or focal weakness or numbness. Three years ago, the patient had subarachnoid hemorrhage (SAH) from ruptured posterior communicating artery aneurysm, which was treated with endovascular coiling; she has had no recurrent bleeding. She has no other medical conditions and takes no medications. Vital signs are within normal limits. Physical examination shows flat affect and psychomotor retardation. The pupils are equal and reactive to light. The cranial nerves and funduscopic examination are unremarkable. Muscle strength, deep tendon reflexes, and sensation are normal throughout. The gait is slow and wide-based with small steps. MRI of the head is shown in the exhibit. Lumbar puncture reveals normal opening pressure, and the cerebrospinal fluid cell counts and laboratory studies are within normal limits. Which of the following is the most likely cause of this patient's gait disturbance?

A. Aqueductal stenosis
B. Cerebellar degeneration
C. Normal pressure hydrocephalus
D. SAH-induced cerebral ischemia
E. Secondary parkinsonism

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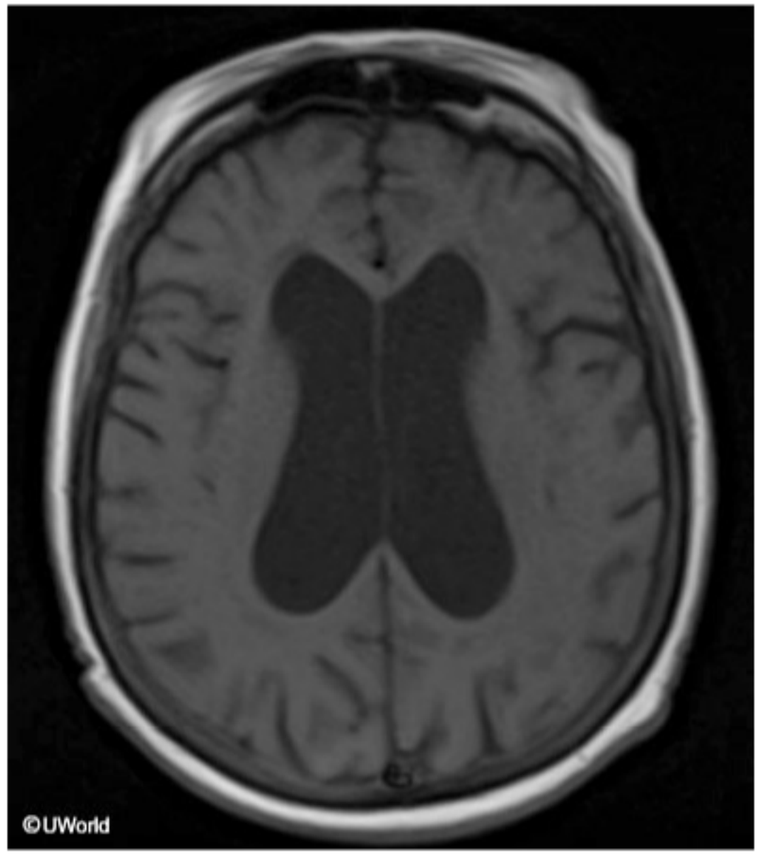
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Item 20 of 40
Question Id: 15950

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A. Aqueductal stenosis (11%)
B. Cerebellar degeneration (2%)
✓ C. Normal pressure hydrocephalus (76%)
D. SAH-induced cerebral ischemia (0%)
E. Secondary parkinsonism (9%)

Omitted
Correct answer
C

76%
Answered correctly

01 min, 55 secs
Time Spent

03/08/2020
Last Updated

Explanation

Normal pressure hydrocephalus	
Clinical features	• Gait instability (wide-based) with frequent falls • Cognitive dysfunction • Urinary urgency/incontinence • Depressed affect (frontal lobe compression) • Upper motor neuron signs in lower extremities
Diagnosis	• Marked improvement in gait with spinal fluid removal: Miller Fisher (lumbar tap) test • Enlarged ventricles out of proportion to the underlying brain atrophy on MRI
Treatment	• Ventriculoperitoneal shunting

Normal pressure hydrocephalus is characterized by the accumulation of cerebrospinal fluid (CSF) leading to **ventriculomegaly** with **normal opening pressure** on lumbar puncture. Most cases are idiopathic and occur in the elderly; however, **secondary** disease can occur in those with prior neurologic insults (eg, **subarachnoid hemorrhage** [SAH], trauma, meningitis) that result in scarring and destruction of the arachnoid granulations responsible for CSF resorption.

Symptoms are classically described as a triad of **incontinence**, **cognitive impairment** (eg, psychomotor retardation, apathy), and **gait abnormalities**; however, all symptoms may not be present in early disease. A **magnetic gait** with slow, wide-based steps that appear as though the patient's feet are stuck to the ground is characteristic and typically appears early in the disease process. Upper motor neuron signs (eg, spasticity, hyperreflexia) may also occur. The diagnosis is confirmed with improvement of symptoms with large-volume lumbar puncture; ventriculoperitoneal shunt placement is the definitive therapy.

(Choice A) Aqueductal stenosis can also occur after SAH and causes ventricular enlargement; however, symptoms of elevated intracranial pressure (eg, headache, nausea/vomiting) predominate.

(Choice B) Cerebellar degeneration (eg, alcoholic cerebellar degeneration) can cause a wide-based, shuffling gait, but it is also commonly

Normal pressure hydrocephalus is characterized by the accumulation of cerebrospinal fluid (CSF) leading to **ventriculomegaly** with **normal opening pressure** on lumbar puncture. Most cases are idiopathic and occur in the elderly; however, **secondary** disease can occur in those with prior neurologic insults (eg, **subarachnoid hemorrhage** [SAH], trauma, meningitis) that result in scarring and destruction of the arachnoid granulations responsible for CSF resorption.

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(Choice A) Aqueductal stenosis can also occur after SAH and causes ventricular enlargement; however, symptoms of elevated intracranial pressure (eg, headache, nausea/vomiting) predominate.

(Choice B) Cerebellar degeneration (eg, alcoholic cerebellar degeneration) can cause a wide-based, shuffling gait, but it is also commonly associated with dysarthria and postural instability. Neuroimaging may show cerebellar atrophy, but ventriculomegaly is unexpected.

(Choice D) Vasospasm is a common complication of SAH and results in cerebral ischemia and stroke, but this characteristically occurs within 8 days of the primary bleed. Symptoms develop acutely, correspond to the location of the stroke, and would not progress over a period of months.

(Choice E) Secondary parkinsonism can rarely result from cerebrovascular disease that interferes with the striatonigral pathway. Although gait disturbances are common, they are classically described as shuffling or festinating (quick, short steps). Rigidity, bradykinesia, and pill-rolling tremors are also expected, but ventricular enlargement is not common.

Educational objective:
Normal pressure hydrocephalus (NPH) is characterized by ventriculomegaly with normal opening pressure on lumbar puncture. It classically presents with a triad of incontinence, cognitive impairment, and gait abnormalities; however, all symptoms may not be present in early disease. NPH can be idiopathic or occur secondary to neurologic insults (eg, subarachnoid hemorrhage, trauma, meningitis) that result in scarring of the arachnoid granulations responsible for cerebrospinal fluid resorption.

Symptoms are classically described as a triad of **incontinence**, **cognitive impairment** (eg, psychomotor retardation, apathy), and **gait abnormalities**; however, all symptoms may not be present in early disease. A **magnetic gait** with slow, wide-based steps that appear as though the patient's feet are stuck to the ground is characteristic and typically appears early in the disease process. Upper motor neuron signs (eg, spasticity, hyperreflexia) may also occur. The diagnosis is confirmed with improvement of symptoms with large-volume lumbar puncture; ventriculoperitoneal shunt placement is the definitive therapy.

(Choice A) Aqueductal stenosis can also occur after SAH and causes ventricular enlargement; however, symptoms of elevated intracranial pressure (eg, headache, nausea/vomiting) predominate.

(Choice B) Cerebellar degeneration (eg, alcoholic cerebellar degeneration) can cause a wide-based, shuffling gait, but it is also commonly associated with dysarthria and postural instability. Neuroimaging may show cerebellar atrophy, but ventriculomegaly is unexpected.

(Choice D) Vasospasm is a common complication of SAH and results in cerebral ischemia and stroke, but this characteristically occurs within 8 days of the primary bleed. Symptoms develop acutely, correspond to the location of the stroke, and would not progress over a period of months.

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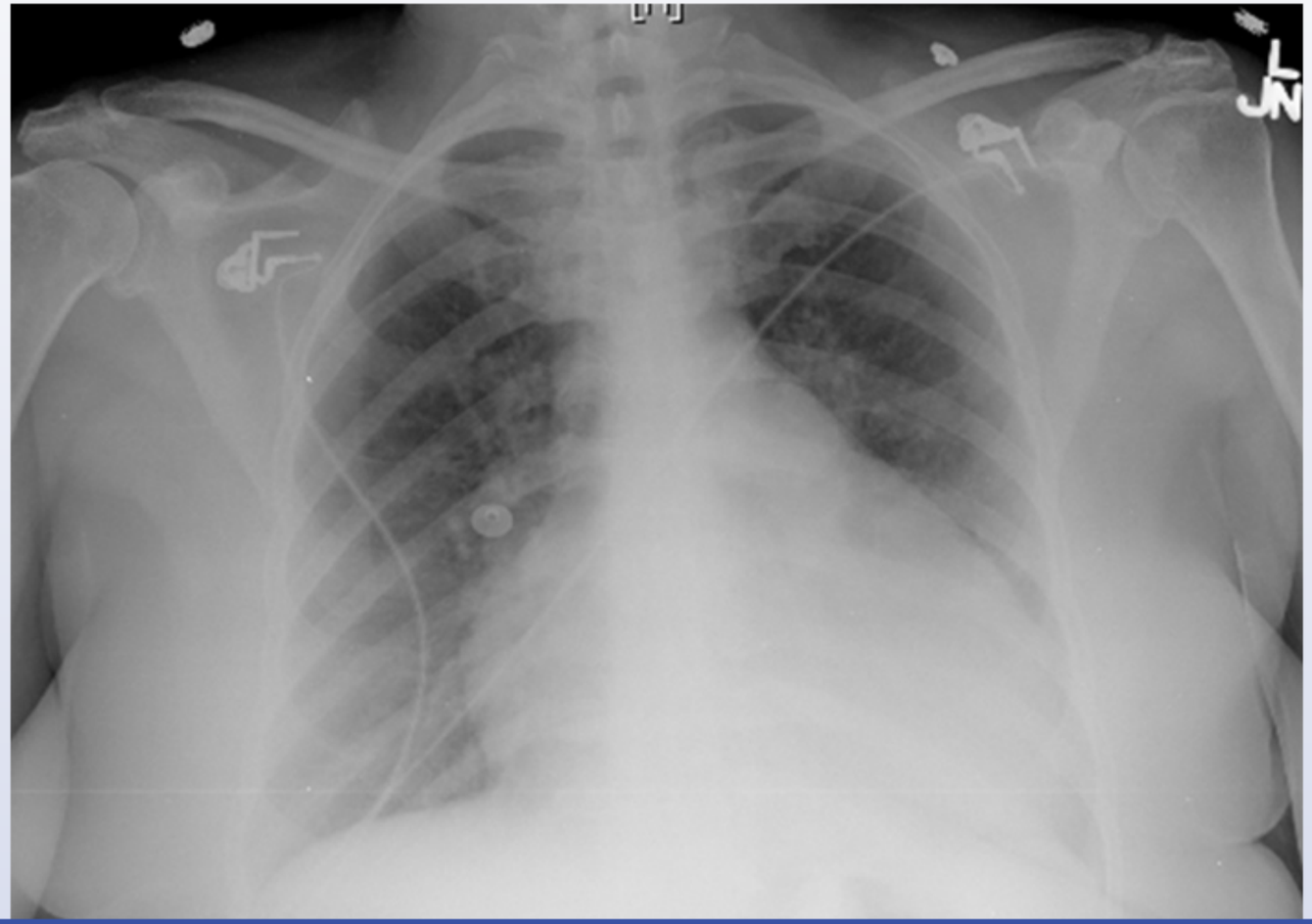
Educational objective:
Normal pressure hydrocephalus (NPH) is characterized by ventriculomegaly with normal opening pressure on lumbar puncture. It classically presents with a triad of incontinence, cognitive impairment, and gait abnormalities; however, all symptoms may not be present in early disease. NPH can be idiopathic or occur secondary to neurologic insults (eg, subarachnoid hemorrhage, trauma, meningitis) that result in scarring of the arachnoid granulations responsible for cerebrospinal fluid resorption.

Surgery	Nervous System	Normal pressure hydrocephalus
Subject	System	Topic

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A 43-year-old woman complains of fatigue and shortness of breath over the last 2 weeks. She has no chest pain, nausea, vomiting, or weight loss. She reports a recent upper respiratory tract infection. The patient does not use tobacco, alcohol, or illicit drugs. Her blood pressure is 98/55 mm Hg and pulse is 105/min. Jugular veins are distended with the patient in the seated position. Lungs are clear to auscultation. Chest x-ray is shown below.

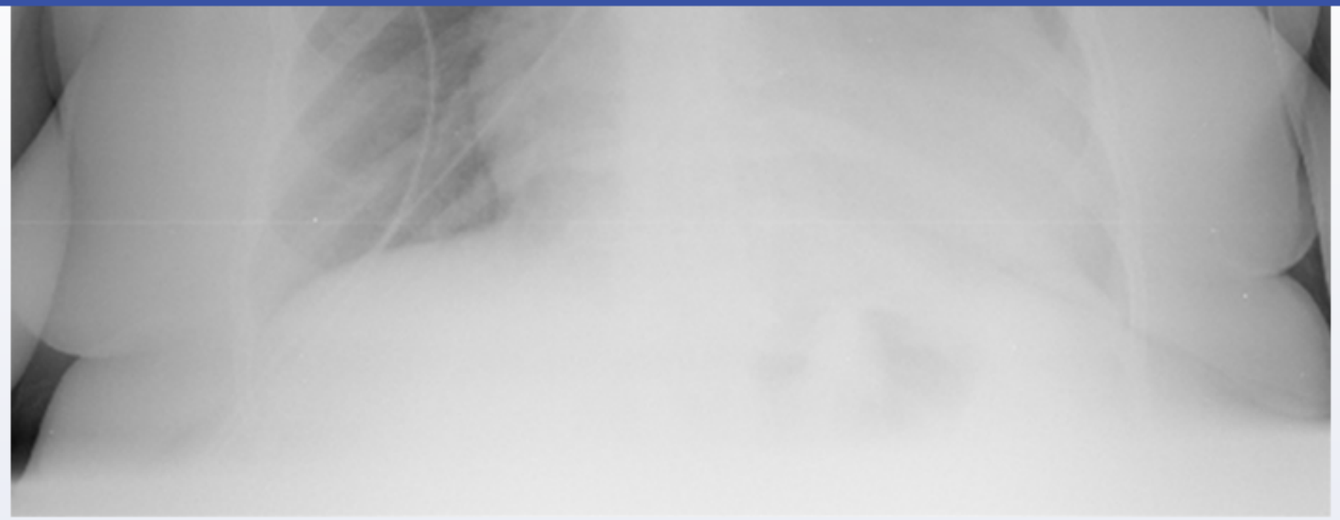


Settings

Item 21 of 40
Question Id: 4445

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Which of the following is the most likely additional finding in this patient?

A. Audible fourth heart sound
B. Fixed splitting of the second heart sound
C. Intermittent ptosis
D. Nonpalpable point of maximal impulse
E. Opening snap
F. Pulsus bisferiens

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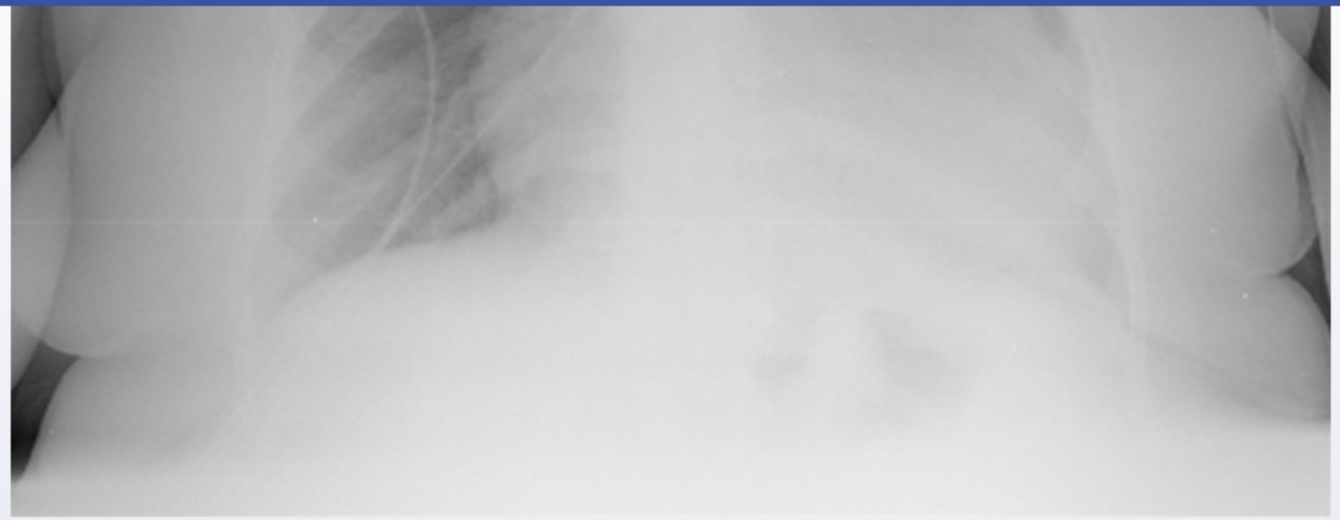
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Item 21 of 40
Question Id: 4445

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Which of the following is the most likely additional finding in this patient?

- A. Audible fourth heart sound (32%)
- B. Fixed splitting of the second heart sound (8%)
- C. Intermittent ptosis (0%)
- ✓ D. Nonpalpable point of maximal impulse (40%)
- E. Opening snap (5%)
- F. Pulsus bisferiens (12%)

Omitted
Correct answer

40%
Answered correctly

20 secs
Time Spent

02/02/2020
Last Updated

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Explanation

This patient's clinical presentation - recent upper respiratory tract infection, dyspnea, elevated jugular venous pressure (JVP), clear lung fields, and increased cardiac silhouette on chest x-ray - is suggestive of **early cardiac tamponade due to a large pericardial effusion**. Pericardial effusion is most commonly idiopathic (thought to be likely from a viral illness) but can also occur due to bacterial or fungal infections, neoplasms (metastatic or primary), post myocardial infarction, trauma, uremia, autoimmune diseases, and hypothyroidism. Large pericardial effusions typically appear on chest x-ray as an **enlarged and globular** cardiac silhouette ("water bottle" heart shape) with **clear lung fields**. Physical examination findings in pericardial effusion are nonspecific and vary depending on size of the effusion. However, the inability to palpate the point of maximal apical impulse is consistent with large pericardial effusion. Patients with cardiac tamponade may also have Beck's triad of hypotension, elevated JVP, and muffled heart sounds.

(Choice A) Patients with viral myocarditis may present similarly with a history of recent upper respiratory infection, fatigue, dyspnea, elevated JVP, and cardiomegaly on imaging. However, patients typically have an **audible S3** and bibasilar rales on physical examination, along with **pulmonary vascular congestion** on imaging studies. An abnormal S4 may be heard in patients with decreased left ventricular compliance, including those with hypertensive heart disease, aortic stenosis, or hypertrophic cardiomyopathy, and during the acute phase of myocardial infarction.

(Choice B) Fixed splitting of the second heart sound is heard in patients with atrial septal defect. Chest x-ray may show an enlarged right atrium and ventricle along with prominent hilar or proximal pulmonary arterial vasculature.

(Choice C) Intermittent ptosis can be seen in patients with myasthenia gravis, which can occur as an autoimmune disorder or as a paraneoplastic disorder in association with thymoma. These tumors present as anterior mediastinal (or retrosternal) masses on lateral chest x-ray projection. Cardiac size and silhouette are typically normal.

(Choice E) An opening snap is heard in patients with mitral stenosis. Significant mitral stenosis leads to left atrial enlargement, which presents on chest x-ray as straightening of the left heart border, elevated left main bronchus, and pulmonary vascular congestion with cephalization of the blood flow to upper lobes. Lateral chest x-ray projection can reveal posterior displacement and impingement of the esophagus.

(Choice F) Pulsus bisferiens (or biphasic pulse) refers to 2 strong systolic peaks of the aortic pulse from left ventricular ejection separated by a midsystolic dip. It can be palpated in patients with significant **aortic regurgitation** (with or without aortic stenosis), hypertrophic obstructive

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Item 21 of 40
Question Id: 4445

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Explanation

Exhibit Display



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midsystolic dip. It can be palpated in patients with significant **aortic regurgitation** (with or without aortic stenosis), hypertrophic obstructive

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(Choice F) Pulsus bisferiens (or biphasic pulse) refers to 2 strong systolic peaks of the aortic pulse from left ventricular ejection separated by a midsystolic dip. It can be palpated in patients with significant **aortic regurgitation** (with or without aortic stenosis), hypertrophic obstructive cardiomyopathy, and, occasionally, large patent ductus arteriosus.

Educational objective:
A pericardial effusion appears as an enlarged, "water bottle"-shaped cardiac silhouette on chest x-ray. Physical examination findings of effusion without cardiac tamponade include diminished heart sounds on auscultation and a maximal apical impulse that is difficult to palpate.

References

- Clinical clues to the causes of large pericardial effusions.
- A systematic approach to evaluation of pericardial effusion and cardiac tamponade.

Surgery	Cardiovascular System	Cardiac tamponade
Subject	System	Topic

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Item 22 of 40
Question Id: 4375

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A 67-year-old man comes to the office due to 2 days of back pain. He was moving boxes in his garage when the pain started. The pain is not relieved by lying down and increases in intensity when straining and coughing. He cannot sleep at night due to pain and has taken acetaminophen several times without relief. He has never had such pain before. Physical examination shows 2+ symmetrical knee and ankle jerk reflexes. Straight leg raising test is negative. There is point tenderness to palpation and percussion along the midline at the fourth lumbar vertebra. Which of the following is the most likely underlying etiology of this patient's current condition?

A. Apophyseal joint arthritis
B. Intervertebral disc degeneration
C. Ligamentous sprain
D. Loss of bone mineral density
E. Nerve root demyelination

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A. Apophyseal joint arthritis (2%)
B. Intervertebral disc degeneration (23%)
C. Ligamentous sprain (28%)
✓ D. Loss of bone mineral density (45%)
E. Nerve root demyelination (0%)

Omitted
Correct answer
D

45%
Answered correctly

02 secs
Time Spent

06/04/2020
Last Updated

Explanation

Clinical features of vertebral compression fracture	
	• Trauma • **Osteoporosis**, osteomalacia

Clinical features of vertebral compression fracture	
Etiologies	• Trauma • **Osteoporosis**, osteomalacia • Bone metastases • Metabolic (eg, hyperparathyroidism) • Paget disease
Clinical presentation	**Acute** • Low back **pain** & **decreased spinal mobility** • Pain increasing with standing, walking, lying on back • Tenderness at affected level **Chronic/gradual** • Painless • Progressive kyphosis • Loss of stature
Complications	• Increased risk for future fractures • Hyperkyphosis, possibly leading to protuberant abdomen, early satiety, weight loss, decreased respiratory capacity

This older patient developed acute back pain associated with vertebral point tenderness after a nontraumatic event, suggesting an acute **vertebral compression fracture** (VCF). VCF is most commonly due to **decreased bone density** from **osteoporosis**. The risk is greatest in postmenopausal women and men age >65 (as in this patient). Uncommon etiologies include osteomalacia, vertebral osteomyelitis, malignancy with bone metastases, metabolic abnormalities (eg, hyperparathyroidism), and trauma.

Osteoporotic VCF can be chronic and painless, or may occur acutely due to twisting, lifting, coughing, or minor trauma (eg, fall from standing height), leading to severe **midline back pain** that is typically **localized**. The pain often worsens with movement, coughing, or straining and may **persist at night**. Examination typically demonstrates **vertebral point tenderness**; however, spinal cord or nerve root compression is rare, and

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This older patient developed acute back pain associated with vertebral point tenderness after a nontraumatic event, suggesting an acute **vertebral compression fracture** (VCF). VCF is most commonly due to **decreased bone density** from **osteoporosis**. The risk is greatest in postmenopausal women and men age >65 (as in this patient). Uncommon etiologies include osteomalacia, vertebral osteomyelitis, malignancy with bone metastases, metabolic abnormalities (eg, hyperparathyroidism), and trauma.

Osteoporotic VCF can be chronic and painless, or may occur acutely due to twisting, lifting, coughing, or minor trauma (eg, fall from standing height), leading to severe **midline back pain** that is typically **localized**. The pain often worsens with movement, coughing, or straining and may **persist at night**. Examination typically demonstrates **vertebral point tenderness**; however, spinal cord or nerve root compression is rare, and patients usually do not have neurologic deficits. Multiple/recurrent VCF is common and can lead to height loss and kyphosis; complications of kyphosis can include decreased respiratory capacity and abdominal compression (eg, early satiety, weight loss). The diagnosis is confirmed with plain radiography.

(Choice A) Apophyseal joint arthritis can occur in spondyloarthropathy (eg, ankylosing spondylitis), which typically presents with chronic, progressive pain that is worse at night and with prolonged rest; symptoms usually begin at age <40.

(Choice B) Degenerative disc disease can cause low back pain, but the pain is usually chronic, worsens with activity, and is relieved with rest. Disc degeneration can also lead to acute disc herniation, but this typically presents with acute lumbosacral radiculopathy (ie, pain radiating in a dermatomal distribution). Vertebral point tenderness is more consistent with spinal fracture.

(Choice C) Ligamentous back sprain can occur following exertion. However, the pain is usually relieved with rest, and tenderness would be seen in the paraspinal tissues rather than at the midline.

(Choice E) Nerve root demyelination (eg, Guillain-Barré syndrome) presents with paresthesia and weakness corresponding to the affected nerve root. It typically is not associated with acute back pain or vertebral tenderness.

Educational objective:
Acute vertebral compression fracture can be caused by twisting, lifting, or trauma and presents with back pain and vertebral point tenderness. It typically occurs in patients with osteoporosis or other conditions associated with decreased bone mineral density.

References

height), leading to severe **midline back pain** that is typically **localized**. The pain often worsens with movement, coughing, or straining and may **persist at night**. Examination typically demonstrates **vertebral point tenderness**; however, spinal cord or nerve root compression is rare, and patients usually do not have neurologic deficits. Multiple/recurrent VCF is common and can lead to height loss and kyphosis; complications of kyphosis can include decreased respiratory capacity and abdominal compression (eg, early satiety, weight loss). The diagnosis is confirmed with plain radiography.

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Educational objective:
Acute vertebral compression fracture can be caused by twisting, lifting, or trauma and presents with back pain and vertebral point tenderness. It typically occurs in patients with osteoporosis or other conditions associated with decreased bone mineral density.

References

- Evaluation and management of vertebral compression fractures.

Surgery	Rheumatology/Orthopedics & Sports	Vertebral compression fracture
Subject	System	Topic

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Item 23 of 40
Question Id: 15889

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A 65-year-old man comes to the emergency department due to sudden-onset chest pain followed by syncope. The pain started an hour ago, during which he had an episode of syncope lasting 1-2 minutes. The patient has had no dyspnea or palpitations. He has never had similar symptoms before. Medical history is significant for hypertension and a 40-pack-year smoking history. Blood pressure is 190/110 mm Hg in both arms; pulse is 100/min and regular; and respirations are 24/min. Pulses are symmetric and equal in all extremities. Jugular venous pressure is normal. Breath sounds are normal on both sides. There is an S4 gallop. ECG shows changes consistent with left ventricular hypertrophy. Serum troponin is normal. D-dimer is elevated. Chest x-ray shows an enlarged cardiac silhouette but is otherwise unremarkable. CT scan of the chest is obtained and is shown below:



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Which of the following is the best next step in management of this patient?

A. Administration of thrombolytic therapy
B. Admission to critical care unit for close blood pressure control
C. Emergent surgical repair
D. Unfractionated heparin infusion with close PTT monitoring
E. Urgent coronary angiogram

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Item 23 of 40
Question Id: 15889

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Which of the following is the best next step in management of this patient?

- A. Administration of thrombolytic therapy (4%)
- B. Admission to critical care unit for close blood pressure control (18%)
- ✓ C. Emergent surgical repair (70%)
- D. Unfractionated heparin infusion with close PTT monitoring (4%)
- E. Urgent coronary angiogram (2%)

Omitted
Correct answer

70%
Answered correctly

05 secs
Time Spent

03/18/2020
Last Updated

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Explanation

Acute aortic dissection	
Clinical presentation	• History of HTN, genetic disorder (eg, Marfan syndrome) • Severe, sharp, tearing chest or back pain • >20 mm Hg difference in SBP between arms
Diagnosis	• ECG: normal or nonspecific ST- & T-wave changes • Chest x-ray: mediastinal widening • CT angiography or TEE for definitive diagnosis
Treatment	• Pain control (eg, morphine) • Intravenous beta blockers (eg, esmolol) • ± Sodium nitroprusside (if SBP >120 mm Hg) • Emergent surgical repair for ascending dissection

HTN = hypertension; **SBP** = systolic blood pressure; **TEE** = transesophageal echocardiogram.

This patient's presentation is consistent with an **acute ascending aortic dissection**, which is a **surgical emergency**. Aortic dissections are commonly classified based on ascending aorta involvement. Those that involve the ascending aorta are known as **type A** dissections, accounting for approximately 60%. Those originating in the descending aorta are known as type B dissections. Dissections can propagate proximally or distally; therefore, a type B dissection may extend to involve the ascending portion, becoming a retrograde type A dissection.

The most common symptom of acute aortic dissection is **sudden-onset chest or back pain** that is typically severe, sharp, and tearing. Complications of type A dissections, including **syncope**, stroke, myocardial infarction, or heart failure, depend on the vessels and structures involved (eg, subclavian or carotid arteries, coronary artery ostia, aortic root). Additional signs may include asymmetry of upper extremity blood pressures, hypotension, and aortic regurgitation. D-dimer elevation (sensitive but not specific) is frequently seen due to the presence of fibrin degradation products. ECG findings depend on underlying comorbidities (eg, hypertension) and on whether the coronary ostia have been compromised. Plain radiographs may demonstrate a widened cardiac silhouette; **CT angiography** confirms the diagnosis, often revealing an

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Type A dissections have a very high mortality rate in the absence of **immediate surgical intervention**. Intraoperative transesophageal echocardiography is frequently performed to identify further abnormalities that may require intervention including aortic root/valve damage or tamponade.

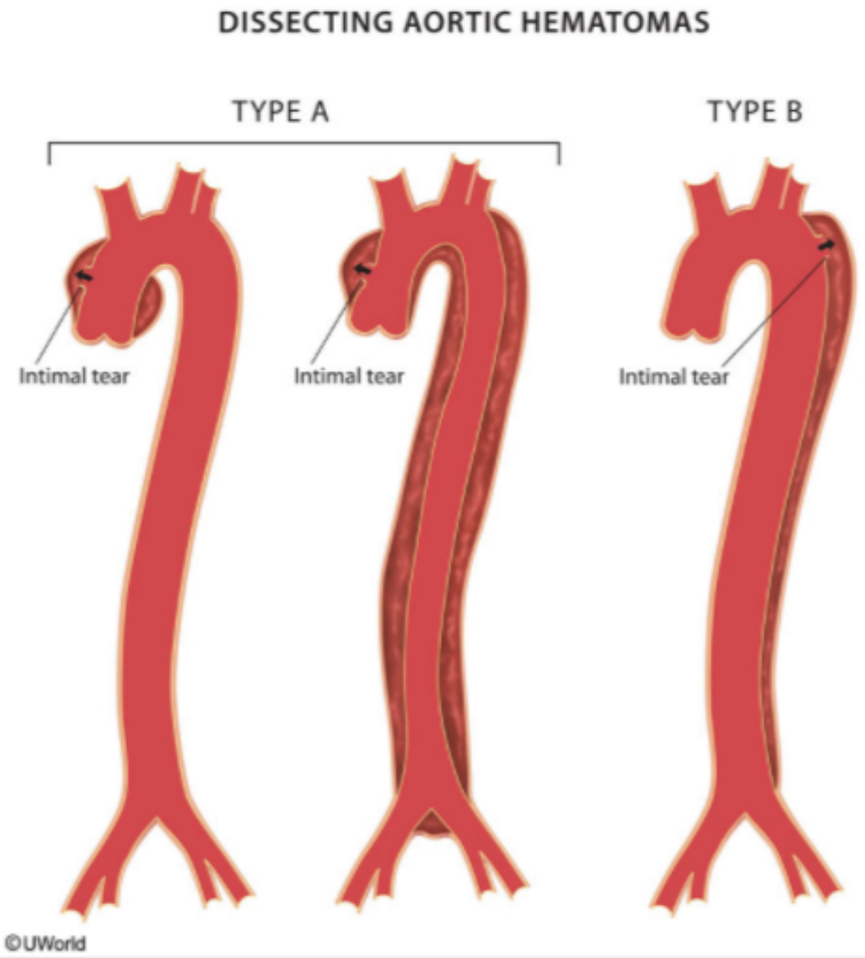
(Choices A and D) Early identification of aortic dissection is essential because therapies for similarly presenting conditions (eg, aspirin and heparin for myocardial infarction; thrombolytics for pulmonary embolism or ischemic stroke) worsen outcomes and are contraindicated. In this patient, the normal troponin, the lack of acute ECG changes, and the presence of imaging findings consistent with dissection make myocardial infarction and pulmonary embolism unlikely.

(Choice B) Type B dissections that do not result in malperfusion to thoracic or abdominal organs (eg, mesenteric ischemia) may be managed medically with pain and blood pressure control. Type B dissections complicated by organ malperfusion benefit from urgent surgical or endovascular repair.

(Choice E) Coronary angiography is a useful diagnostic measure in acute ST-elevation myocardial infarction, which would cause acute ECG changes and a troponin elevation. It does not have a role in type A aortic dissection because it delays definitive surgical management.

HTN = hypertension; SBP = systolic blood pressure; TEE = transesophageal echocardiogram.

Exhibit Display



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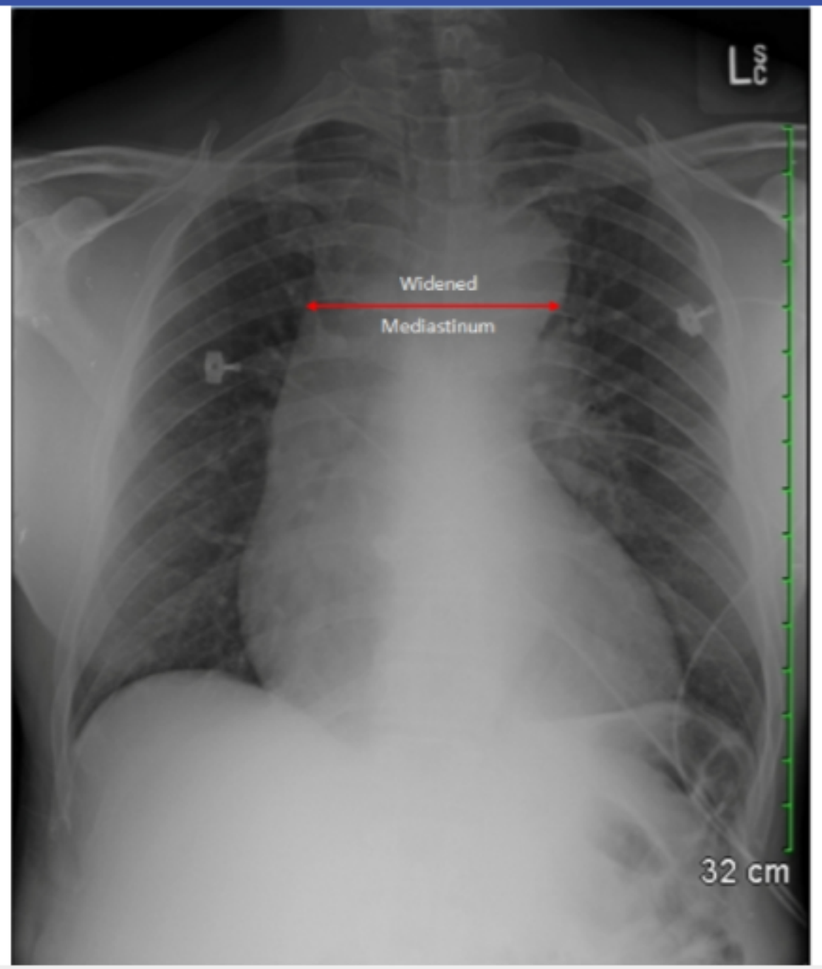
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HTN = hypertension; SBP = systolic blood pressure; TEE = transesophageal echocardiogram.

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intimal flap and double lumen.

Type A dissections have a very high mortality rate in the absence of **immediate surgical intervention**. Intraoperative transesophageal echocardiography is frequently performed to identify further abnormalities that may require intervention including aortic root/valve damage or tamponade.

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(Choice E) Coronary angiography is a useful diagnostic measure in acute ST-elevation myocardial infarction, which would cause acute ECG changes and a troponin elevation. It does not have a role in type A aortic dissection because it delays definitive surgical management.

Educational objective:
Type A dissections involve the ascending aorta and present with sudden-onset chest or back pain that is severe and described as sharp or tearing. They may be complicated by syncope, stroke, myocardial infarction, or heart failure and require immediate surgical intervention.

References

- Acute aortic dissection and intramural hematoma: a systematic review.
- Aneurysms of the ascending aorta.

Surgery	Cardiovascular System	Aortic dissection
Subject	System	Topic

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Item 24 of 40
Question Id: 4540

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A 23-year-old man was extricated from his vehicle following a motor vehicle collision in which he was the unrestrained driver. The patient was found unresponsive at the scene and intubated by paramedics. He received 2.5 L of normal saline over 20 minutes en route to the emergency department. His medical history is not known. At the emergency department, blood pressure is 70/30 mm Hg and pulse is 120/min. The patient responds to strong vocal and tactile stimuli by opening his eyes. Pupils are equal and reactive to light. There are multiple bruises over the anterior chest and upper abdomen. Neck veins are flat, trachea is midline, and extremities are cold. The abdomen is mildly distended. Cardiac monitoring shows sinus tachycardia. Which of the following is most likely to be seen in this patient?

A. Diastolic collapse with elevated right ventricular pressure
B. Dilated left ventricle with apical hypokinesis
C. Inferior vena cava engorgement
D. Right ventricular dilation and hypokinesis
E. Small left ventricular cavity volume with ejection fraction of 75%

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A. Diastolic collapse with elevated right ventricular pressure (17%)
B. Dilated left ventricle with apical hypokinesis (11%)
C. Inferior vena cava engorgement (9%)
D. Right ventricular dilation and hypokinesis (4%)
✓ E. Small left ventricular cavity volume with ejection fraction of 75% (57%)

Omitted
Correct answer
E

57%
Answered correctly

02 secs
Time Spent

01/28/2020
Last Updated

Explanation

Hemodynamic measurements in shock				
Parameter	Hypovolemic	Cardiogenic	Obstructive	Distributive

Hemodynamic measurements in shock				
Parameter	**Hypovolemic shock**	**Cardiogenic shock**	**Obstructive shock**	**Distributive shock**
CVP (right-sided preload)	↓	↑	↑	↓
PCWP (left-sided preload)	↓	↑	↓*	↓
Cardiac index (LV output)	↓	↓	↓	↑**
SVR (afterload)	↑	↑	↑	↓
SvO_2	↓	↓	↓	↑**

*In tamponade, left-sided preload is decreased, but measured PCWP is paradoxically increased due to external compression by pericardial fluid.
**Cardiac index and SvO_2 are usually decreased in neurogenic shock due to impaired sympathetic reflexes.
CVP = central venous pressure; **LV** = left ventricular; **PCWP** = pulmonary capillary wedge pressure; **SvO_2** = mixed venous oxygen saturation; **SVR** = systemic vascular resistance.

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This patient with blunt thoracic and abdominal trauma is most likely in **hypovolemic shock** due to massive internal hemorrhage. Loss of intravascular volume leads to a decrease in venous return to the right atrium (**decreased preload**) and a consequent **decrease in cardiac output** and systemic blood pressure. In an effort to maintain adequate cardiac output and organ perfusion, the sympathetic nervous system is activated, resulting in peripheral vasoconstriction (**increase in systemic vascular resistance**) and an increase in heart rate. The left ventricle, decreased in size due to low filling volume, also compensates by **increasing ejection fraction**.

These responses create the typical clinical presentation of hypovolemic shock, which includes hypotension, tachycardia, **cold extremities**, evidence of poor organ perfusion (eg, somnolence, unresponsiveness), and physical examination evidence of hypovolemia (eg, **flat neck veins**). Despite the compensatory mechanisms in hypovolemic shock, cardiac output cannot be sustained and circulatory collapse (and death) occurs in the absence of aggressive volume resuscitation and control of volume loss.

(Choice A) Diastolic collapse (failure of ventricular filling) due to elevated right ventricular filling pressure is characteristic of cardiac tamponade. This scenario can occur in the setting of blunt thoracic trauma (eg, hemopericardium); however, jugular venous distension and distant heart sounds should be present. Diastolic collapse also occurs in hypovolemic shock, but right ventricular filling pressure is low rather than elevated.

(Choices B and C) A dilated left ventricle with apical hypokinesis and engorgement of the inferior vena cava are characteristics of cardiogenic shock. Blunt thoracic trauma may cause myocardial contusion, leading to this scenario; however, evidence of elevated ventricular filling pressure (eg, jugular venous distension) would be expected. As in hypovolemic shock, hypotension, tachycardia, and cold extremities due to peripheral vasoconstriction are present.

(Choice D) Right ventricular dilation and hypokinesis can occur due to massive pulmonary embolism. Such a scenario is unlikely immediately following major thoracic trauma and, if present, should be accompanied by jugular venous distension.

Educational objective:
Hypovolemic shock involves an initial decrease in preload and cardiac output followed by a compensatory increase in systemic vascular resistance, heart rate, and ejection fraction. Hypotension, tachycardia, cold extremities, and evidence of hypovolemia (eg, decreased jugular venous pressure) should be present.

References

- Massive posttraumatic bleeding: epidemiology, causes, clinical features, and therapeutic management.

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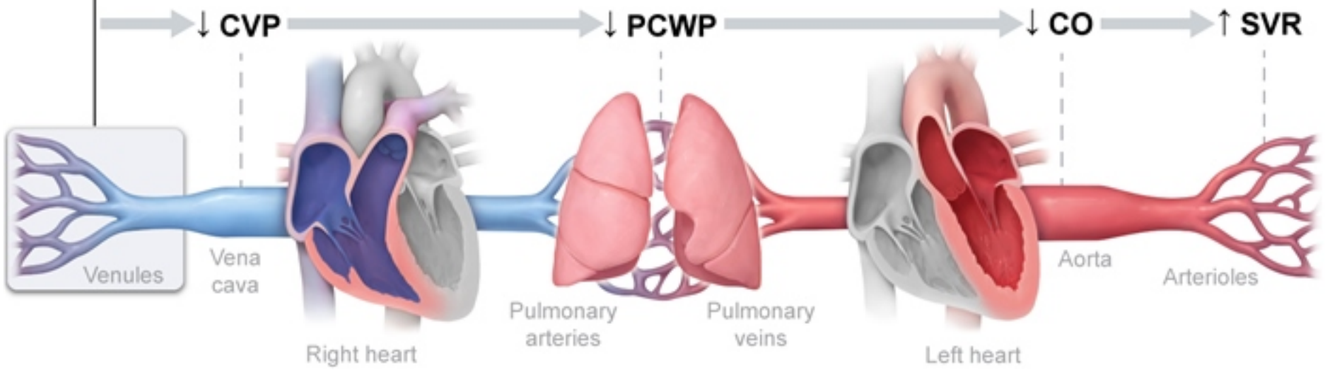
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Exhibit Display

Hypovolemic shock

Primary disturbance
Decreased blood volume



CO = cardiac output; **CVP** = central venous pressure;
PCWP = pulmonary capillary wedge pressure; **SVR** = systemic vascular resistance.

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- Massive posttraumatic bleeding: epidemiology, causes, clinical features, and therapeutic management.

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A 60-year-old man comes to the emergency department due to several hours of right lower quadrant pain and vomiting. His oral intake has been minimal for the last 12 hours. Past medical history is notable for well-controlled hypertension. An abdominal CT scan demonstrates appendicitis, and the patient is taken to the operating room. He vomits during rapid sequence induction for intubation, requiring repeat suctioning from the mouth and trachea. The surgery is otherwise uneventful; the patient receives a total of 2 liters of intravenous crystalloids in the intra- and peri-operative period and maintains normal hemodynamics and urine output. Approximately 4 hours later, he is tachypneic and hypoxemic. Temperature is 37.2 C (99 F), blood pressure is 150/80 mm Hg, and pulse is 95/min and regular. Pulmonary examination reveals bilateral crackles. ECG is unremarkable. Arterial blood gas analysis demonstrates PO_2 of 67 mm Hg on a fraction of inspired oxygen of 90%. Chest x-ray reveals bilateral infiltrates. Which of the following is the most likely mechanism of lung injury?

A. Cardiogenic fluid overload
B. Infection of airways from oropharyngeal contents
C. Inflammatory reaction to aspirated gastric acid
D. Negative pressure pulmonary edema
E. Ventilator-associated bacterial pneumonia

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A. Cardiogenic fluid overload (8%)
B. Infection of airways from oropharyngeal contents (5%)
✓ C. Inflammatory reaction to aspirated gastric acid (77%)
D. Negative pressure pulmonary edema (7%)
E. Ventilator-associated bacterial pneumonia (1%)

Omitted
Correct answer
C

77%
Answered correctly

02 secs
Time Spent

05/27/2020
Last Updated

Explanation

Aspiration syndromes

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Aspiration syndromes

	Pneumonia	Pneumonitis
Pathophysiology	• Lung parenchyma **infection** • Aspiration of upper airway or stomach **microbes** (anaerobes)	• Lung parenchyma **inflammation** • Aspiration of **gastricacid** with direct tissue injury
Clinical features	• Present **days** after aspiration event • **Fever**, cough, ↑ sputum • CXR infiltrate in dependent lung segment (classically **RLL**) • Can progress to **abscess**	• Present **hours** after aspiration event • Range from no symptoms to nonproductive cough, ↓ O_2, respiratory distress • CXR infiltrates (one or both lower lobes) resolve without antibiotics
Management	• **Antibiotics:** clindamycin or beta-lactam & beta-lactamase inhibitor	• Supportive (no antibiotics)

CXR = chest x-ray; RLL = right lower lobe.

This patient had a **witnessed aspiration event** (vomiting during intubation that required suctioning) a few hours ago and now has profound **hypoxemia** with bilateral infiltrates on chest x-ray. He likely has **aspiration pneumonitis**, an acute lung injury due to aspiration of acidic and sterile stomach contents. The **gastric acid** induces a **chemical** burn and consequent inflammatory response, usually within **hours** of the aspiration event. Bilateral infiltrates can sometimes be seen on chest imaging. The symptoms (and infiltrates) usually resolve rapidly (24-48 hours) with supportive management.

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By contrast, **aspiration pneumonia (Choice B)**, which usually occurs in individuals with impaired level of consciousness (eg, following overdose, seizure, or anesthetic use), is caused by inhalation of pathogenic bacteria that colonize **oropharyngeal** secretions. A typical presentation would be that of an institutionalized elderly patient who has dysphagia and develops fever and cough **days** (not hours) following an (often unwitnessed) aspiration event. Treatment requires **antibiotics**.

(Choice A) Cardiogenic pulmonary edema is less likely as this patient has no history of congestive heart failure, only received 2 liters of fluids, has had normal urine output, has a normal ECG, and had a witnessed aspiration episode. Acute respiratory distress syndrome, which can occur following both aspiration pneumonitis or aspiration pneumonia and is characterized by profound hypoxemia and diffuse bilateral pulmonary infiltrates, would cause noncardiogenic rather than cardiogenic edema.

(Choice D) Negative pressure pulmonary edema occurs when a patient has upper airway obstruction (eg, laryngospasm during extubation) that results in large negative intrathoracic pressure (due to inspiration against the obstruction), causing noncardiogenic pulmonary edema. It is more common in young men or after head and neck surgery.

(Choice E) Ventilator-associated pneumonia is a lung infection that typically develops after 2 days of intubation and frequently presents with fever.

Educational objective:
Aspiration pneumonitis is an acute lung injury secondary to a chemical burn from aspirated sterile gastric contents. In contrast, aspiration pneumonia is an infectious disease caused by aspiration of infected oropharyngeal secretions.

References

- Healthcare-associated Pneumonia and Aspiration Pneumonia.

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Educational objective:
Aspiration pneumonitis is an acute lung injury secondary to a chemical burn from aspirated sterile gastric contents. In contrast, aspiration pneumonia is an infectious disease caused by aspiration of infected oropharyngeal secretions.

References

- Healthcare-associated Pneumonia and Aspiration Pneumonia.
- Aspiration-induced lung injury.

Surgery	Pulmonary & Critical Care	Aspiration pneumonia
Subject	System	Topic

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A 62-year-old woman comes to the physician complaining of 6-8 weeks of fatigue and yellowish skin discoloration. She feels tired, has lost 4.5 kg (10 lb), and has occasional mild nausea. She has no change in bowel habits or abdominal pain. The patient had a colposcopy for an abnormal Pap smear 15 years ago. Her last mammogram 6 months ago was normal. She is a nonsmoker and drinks 2 or 3 beers each night. The patient's father has hypertension and hyperlipidemia and had a stroke. Her temperature is 36.7 C (98 F), blood pressure is 110/70 mm Hg, pulse is 88/min, and respirations are 14/min. There is marked scleral icterus. Abdominal examination shows normal bowel sounds and no organomegaly. No occult blood is detected in her stool. Laboratory results are as follows:

Total protein	6.1 g/dL
Albumin	3.9 g/dL
Aspartate aminotransferase	67 U/L
Alanine aminotransferase	52 U/L
Alkaline phosphatase	890 U/L
Total bilirubin	14.6 mg/dL
Direct bilirubin	10.9 mg/dL
Serum lipase	46 U/L (normal <95 U/L)
Anti-mitochondrial antibodies	Negative

Which of the following is the most likely cause of this patient's condition?

A. Acute choledocholithiasis
B. Chronic autoimmune hepatitis
C. Chronic pancreatitis

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Which of the following is the most likely cause of this patient's condition?

A. Acute choledocholithiasis
B. Chronic autoimmune hepatitis
C. Chronic pancreatitis
D. Hemochromatosis
E. Malignant biliary obstruction
F. Primary biliary cholangitis

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Anti-mitochondrial antibodies	Negative

Which of the following is the most likely cause of this patient's condition?

A. Acute choledocholithiasis (5%)
B. Chronic autoimmune hepatitis (2%)
C. Chronic pancreatitis (2%)
D. Hemochromatosis (0%)
✓ E. Malignant biliary obstruction (78%)
F. Primary biliary cholangitis (9%)

Omitted
Correct answer

78%
Answered correctly

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This patient has predominantly **conjugated (direct) hyperbilirubinemia**. Predominantly unconjugated hyperbilirubinemia is due to increased bilirubin production (eg, hemolysis), decreased bilirubin uptake by the liver (eg, portosystemic shunt), or abnormal bilirubin conjugation (eg, Gilbert's syndrome). Predominant conjugated hyperbilirubinemia is due to hepatocellular injury, decreased bilirubin excretion in bile canaliculi (eg, Dubin-Johnson syndrome), intrahepatic cholestasis (eg, primary biliary cirrhosis), or extrahepatic cholestasis from biliary obstruction (eg, malignancy).

The liver enzyme pattern can help differentiate the etiology of conjugated hyperbilirubinemia. Normal transaminases (aspartate aminotransferase, alanine aminotransferase) and alkaline phosphatase suggest inherited bilirubin metabolism disorders (eg, Dubin-Johnson syndrome). Predominantly elevated transaminases with normal alkaline phosphatase favor intrinsic liver disease (eg, viral hepatitis, hemochromatosis). Elevated alkaline phosphatase out of proportion to the transaminases suggests intrahepatic **cholestasis** or biliary obstruction.

Malignant biliary obstruction	
Etiologies	• Cholangiocarcinoma • Pancreatic/hepatocellular carcinoma • Metastasis (eg, colon, gastric)
Manifestations	• Jaundice, pruritus, acholic stools, dark urine • Weight loss • RUQ pain • RUQ mass or hepatomegaly • ↑ Direct bilirubin, ALP, GGT
Diagnosis	• Serum tumor markers (CEA, CA-19, AFP) • Abdominal imaging (ultrasound, CT scan) • EUS or ERCP for tissue diagnosis if unclear

AFP = alpha-fetoprotein; **ALP** = alkaline phosphatase; **CEA** = carcinoembryonic antigen; **EUS** = endoscopic ultrasound; **ERCP** = endoscopic retrograde cholangiopancreatography; **GGT** = gamma-glutamyl transferase; **RUQ** = right upper quadrant.

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cholangiopancreatography; GGT = gamma-glutamyl transferase; RUQ = right upper quadrant.

This patient's conjugated hyperbilirubinemia, elevated alkaline phosphatase, **painless jaundice**, and systemic symptoms (fatigue, weight loss) suggest **malignant obstruction** of the biliary system. Likely etiologies include pancreatic adenocarcinoma or cholangiocarcinoma. The next step in this patient's evaluation should be abdominal imaging (ultrasound or computed tomography), with consideration for endoscopic retrograde cholangiopancreatography if initial imaging is nondiagnostic.

(Choice A) Acute choledocholithiasis can present similarly, with conjugated hyperbilirubinemia and markedly elevated alkaline phosphatase. However, patients typically have acute-onset right upper quadrant or epigastric pain rather than the painless jaundice seen in this patient. Pancreatic cancer causes epigastric pain in the majority of patients, but compared to acute choledocholithiasis, the pain is more chronic and typically worsens in the supine position and at night.

(Choice B) Chronic autoimmune hepatitis usually causes elevated aminotransferases and conjugated hyperbilirubinemia. However, it is usually not associated with significantly elevated alkaline phosphatase.

(Choice C) Chronic pancreatitis typically presents with recurrent bouts of abdominal pain and/or symptoms of fat malabsorption with steatorrhea. Liver function tests are usually normal in chronic pancreatitis. Recurrent episodes of pancreatitis can lead to fibrosis, stricture of the intrapancreatic portion of the bile duct, and elevated bilirubin and alkaline phosphatase. However, this usually develops later in patients with known chronic pancreatitis.

(Choice D) Intrinsic liver disorders (eg, sarcoidosis, hemochromatosis, hepatic malignancy) usually cause hepatocellular injury with predominantly elevated transaminases. Hemochromatosis is also associated with diabetes mellitus, erectile dysfunction, skin pigmentation, arthropathy, and increased risk of cirrhosis and hepatocellular carcinoma. However, bilirubin and alkaline phosphatase levels are usually normal or mildly elevated without clinically obvious jaundice.

(Choice F) Primary biliary cholangitis may present with fatigue, itching, jaundice, weight loss, and elevated alkaline phosphatase levels. However, antimitochondrial antibodies would be positive.

Educational objective:
Painless jaundice in a patient with conjugated hyperbilirubinemia and markedly elevated alkaline phosphatase should raise concern for biliary obstruction due to pancreatic or biliary cancer. Other common causes of biliary obstruction include choledocholithiasis and benign biliary

typically worsens in the supine position and at night.

(Choice B) Chronic autoimmune hepatitis usually causes elevated aminotransferases and conjugated hyperbilirubinemia. However, it is usually not associated with significantly elevated alkaline phosphatase.

(Choice C) Chronic pancreatitis typically presents with recurrent bouts of abdominal pain and/or symptoms of fat malabsorption with steatorrhea. Liver function tests are usually normal in chronic pancreatitis. Recurrent episodes of pancreatitis can lead to fibrosis, stricture of the intrapancreatic portion of the bile duct, and elevated bilirubin and alkaline phosphatase. However, this usually develops later in patients with known chronic pancreatitis.

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(Choice F) Primary biliary cholangitis may present with fatigue, itching, jaundice, weight loss, and elevated alkaline phosphatase levels. However, antimitochondrial antibodies would be positive.

Educational objective:

Painless jaundice in a patient with conjugated hyperbilirubinemia and markedly elevated alkaline phosphatase should raise concern for biliary obstruction due to pancreatic or biliary cancer. Other common causes of biliary obstruction include choledocholithiasis and benign biliary strictures.

References

- Malignant biliary tract obstruction: evaluation and therapy.

Surgery	Gastrointestinal & Nutrition	Pancreatic cancer
Subject	System	Topic

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A 54-year-old woman is admitted to the hospital with a day of right-sided weakness. The stroke team was activated, but no intervention was performed due to long length of time since symptom onset. The patient also notes 6 weeks of headaches and generalized weakness. She has not had recent fever, shortness of breath, cough, chest pain, palpitations, or syncope. She has no chronic medical conditions and does not take medications. The patient smoked a pack of cigarettes daily for 20 years but quit 15 years ago. She does not use alcohol or illicit drugs. Temperature is 37.1 C (98.8 F), blood pressure is 160/96 mm Hg, and pulse is 80/min and regular. Oxygen saturation is 99% on room air. BMI is 25 kg/m^2. Cardiopulmonary examination shows no abnormalities. Abdomen is soft and tender; there is no hepatosplenomegaly. Extremities have no cyanosis, clubbing, or edema. A right facial droop is present. Motor strength is 2/5 in right upper extremity, 3/5 in right lower extremity, and 5/5 in left upper and left lower extremities. Sensation is intact diffusely. Laboratory results are as follows:

Hemoglobin	20.2 g/dL
Hematocrit	61%
Leukocytes	7,200/mm^3
Platelets	180,000/mm^3
Creatinine	1.2 mg/dL
LDL cholesterol	120 mg/dL
Erythropoietin level	22.9 mU/mL (normal: 4.1-19.5)

MRI of the brain reveals an acute infarction involving the left internal capsule. Chest x-ray is normal. ECG shows normal sinus rhythm. Echocardiogram shows no abnormalities. Which of the following is most likely to establish a diagnosis in this patient?

A. Bone marrow aspiration
B. CT scan of the abdomen
C. Factor V Leiden mutation testing

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A. Bone marrow aspiration
B. CT scan of the abdomen
C. Factor V Leiden mutation testing
D. Lupus anticoagulant
E. Serologic test for syphilis

Submit

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Hematocrit	61%
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Platelets	180,000/mm^3
Creatinine	1.2 mg/dL
LDL cholesterol	120 mg/dL
Erythropoietin level	22.9 mU/mL (normal: 4.1-19.5)

MRI of the brain reveals an acute infarction involving the left internal capsule. Chest x-ray is normal. ECG shows normal sinus rhythm. Echocardiogram shows no abnormalities. Which of the following is most likely to establish a diagnosis in this patient?

- A. Bone marrow aspiration (31%)
- ✓ B. CT scan of the abdomen (58%)
- C. Factor V Leiden mutation testing (5%)
- D. Lupus anticoagulant (4%)
- E. Serologic test for syphilis (0%)

Omitted
Correct answer

58%
Answered correctly

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Time Spent

02/15/2020
Last Updated

Differential diagnosis of polycythemia	
Primary (↓ EPO)	**Secondary** (normal/↑ EPO)
• Polycythemia vera (*JAK2* mutation) • EPO receptor mutations	• Hypoxemia ◦ Cardiopulmonary disease ◦ Obstructive sleep apnea ◦ High altitude • EPO-producing tumors (renal, hepatic) • Congenital (high-affinity hemoglobin) • Following renal transplantation • Androgen supplementation

EPO = erythropoietin.

This patient with an acute ischemic stroke has **polycythemia**, defined as a hematocrit level >49% in men or >48% in women. Hematocrit is the main determinant of blood viscosity; therefore, significant elevations in hematocrit can result in cerebral microcirculation sludging and potentially life-threatening ischemic events.

Polycythemia is generally classified as follows:

- Primary polycythemia is largely caused by malignant transformation of erythrocyte progenitor cells, which results in unregulated erythrocyte production (eg, polycythemia vera). Erythropoietin (EPO), the hormone that stimulates red blood cell production, will be low or absent because elevated red blood cell mass exerts a negative feedback effect on EPO-producing cells in the renal cortex.
- **Secondary polycythemia** is typically due to **elevated circulating EPO levels**. Most cases are caused by conditions associated with chronic hypoxia (eg, cardiopulmonary disease, obstructive sleep apnea), which stimulates EPO secretion, or by **EPO-producing tumors** (eg, renal cell carcinoma).

This patient's elevated EPO level indicates secondary polycythemia. Given the patient's normal BMI, pulse oximetry, and chest x-ray, chronic hypoxia is unlikely. Therefore, exploration for an EPO-secreting tumor should be undertaken. Because the kidney is the primary site of EPO

EPO = erythropoietin.

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Polycythemia is generally classified as follows:

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- **Secondary polycythemia** is typically due to **elevated circulating EPO levels**. Most cases are caused by conditions associated with chronic hypoxia (eg, cardiopulmonary disease, obstructive sleep apnea), which stimulates EPO secretion, or by **EPO-producing tumors** (eg, renal cell carcinoma).

This patient's elevated EPO level indicates secondary polycythemia. Given the patient's normal BMI, pulse oximetry, and chest x-ray, chronic hypoxia is unlikely. Therefore, exploration for an EPO-secreting tumor should be undertaken. Because the kidney is the primary site of EPO production, **renal cell carcinoma**, a primary malignant neoplasm of the kidney, is most likely (and may explain her several weeks of generalized weakness); **abdominal CT scan** is the first test of choice for diagnosis. CT would also evaluate for hepatocellular carcinoma, which sometimes causes EPO production (although it does not always lead to polycythemia, possibly due to inhibited erythropoiesis).

(Choice A) Primary polycythemia, which is associated with low (not high) EPO levels, requires bone marrow aspiration/biopsy with *JAK2* mutation testing (to evaluate for polycythemia vera). Secondary polycythemia does not usually require bone marrow evaluation.

(Choices C and D) Factor V Leiden is an autosomal dominant disease associated with venous thromboembolism (VTE), myocardial infarction, and stroke; it is generally suspected when a patient has a family history of VTE or develops VTE at a young age (<50). Lupus anticoagulant is an antiphospholipid antibody associated with autoimmune diseases and certain drugs/infections; it can cause VTE, thrombocytopenia, stroke, and fetal loss. Neither factor V Leiden nor lupus anticoagulant is associated with polycythemia.

(Choice E) Syphilis can cause infectious arteritis, leading to thrombosis and stroke. Syphilis is not usually associated with significant

chronic hypoxia (eg, cardiopulmonary disease, obstructive sleep apnea), which stimulates EPO secretion, or by **EPO-producing tumors** (eg, renal cell carcinoma).

This patient's elevated EPO level indicates secondary polycythemia. Given the patient's normal BMI, pulse oximetry, and chest x-ray, chronic hypoxia is unlikely. Therefore, exploration for an EPO-secreting tumor should be undertaken. Because the kidney is the primary site of EPO production, **renal cell carcinoma**, a primary malignant neoplasm of the kidney, is most likely (and may explain her several weeks of generalized weakness); **abdominal CT scan** is the first test of choice for diagnosis. CT would also evaluate for hepatocellular carcinoma, which sometimes causes EPO production (although it does not always lead to polycythemia, possibly due to inhibited erythropoiesis).

(Choice A) Primary polycythemia, which is associated with low (not high) EPO levels, requires bone marrow aspiration/biopsy with *JAK2* mutation testing (to evaluate for polycythemia vera). Secondary polycythemia does not usually require bone marrow evaluation.

(Choices C and D) Factor V Leiden is an autosomal dominant disease associated with venous thromboembolism (VTE), myocardial infarction, and stroke; it is generally suspected when a patient has a family history of VTE or develops VTE at a young age (<50). Lupus anticoagulant is an antiphospholipid antibody associated with autoimmune diseases and certain drugs/infections; it can cause VTE, thrombocytopenia, stroke, and fetal loss. Neither factor V Leiden nor lupus anticoagulant is associated with polycythemia.

(Choice E) Syphilis can cause infectious arteritis, leading to thrombosis and stroke. Syphilis is not usually associated with significant polycythemia.

Educational objective:
Polycythemia with high circulating erythropoietin (EPO) levels (secondary polycythemia) is usually due to tumors that produce EPO (eg, renal cell carcinoma) or chronic hypoxia (eg, cardiopulmonary disease, obstructive sleep apnea). Individuals with secondary polycythemia and no evidence of hypoxia should undergo abdominal CT scan to evaluate for renal cell carcinoma.

Surgery	Renal, Urinary Systems & Electrolytes	Renal cell carcinoma
Subject	System	Topic

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A 52-year-old woman comes to the emergency department for rectal pain that started 2 hours ago. The pain is described as severe, burning, and exacerbated while sitting. Medical history is significant for chronic idiopathic constipation, for which she takes a fiber supplement. The patient has 4 children, all of whom were vaginally delivered. Family history is unremarkable. She does not use tobacco, alcohol, or illicit drugs. Temperature is 37.2 (99 F), blood pressure is 138/84 mm Hg, and pulse is 90/min. On physical examination, the patient appears in moderate distress due to pain. The abdomen is soft, nondistended, and nontender. Bowel sounds are normoactive. Anal examination reveals a small, exquisitely tender, bluish lesion at the anal verge. Which of the following is the most likely diagnosis?

A. Condyloma acuminata
B. Crohn disease
C. Perianal abscess
D. Prolapsed internal hemorrhoid
E. Rectal prolapse
F. Thrombosed external hemorrhoid

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Settings

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Question Id: 16094

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- A. Condyloma acuminata (0%)
- B. Crohn disease (0%)
- C. Perianal abscess (1%)
- D. Prolapsed internal hemorrhoid (6%)
- E. Rectal prolapse (1%)
- ✓ F. Thrombosed external hemorrhoid (90%)

Omitted
Correct answer
F

90%
Answered correctly

02 secs
Time Spent

05/24/2020
Last Updated

Explanation

Anal & perianal masses

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Anal & perianal masses	
Rectal prolapse	• Erythematous mass with concentric rings that occurs with Valsalva • Mucus discharge, mild abdominal pain, mass sensation
External hemorrhoid	• Dusky/purple lump or polyp • Associated itching, bleeding • Thrombosis: acute enlargement with pain
Internal hemorrhoid	• Intermittent itching, painless bleeding, leakage of stool • Detected with digital rectal exam or anoscopy (unless prolapsed)
Perianal abscess	• Fluctuant mass/swelling with erythema • Fever • Gradual onset
Anogenital wart	• Pink or flesh-colored papules, plaques, or cauliflower-shaped masses • Chronic onset • Mild itching, bleeding
Anorectal cancer	• Squamous cell carcinoma most common • Bleeding, pain • Ulcerating, enlarging mass
Skin tags	• Small, flesh-colored papules • May represent external terminus of anal fissure (sentinel tag)

This patient's acute rectal pain and bluish-appearing anorectal lesion are consistent with a **thrombosed external hemorrhoid**. Hemorrhoids represent abnormal dilation of the hemorrhoidal venous plexus and are categorized by their position in relation to the dentate line as either internal (proximal) or external (distal). Risk factors include **constipation**, abnormal defecation (eg, straining, prolonged sitting on the toilet), increasing

This patient's acute rectal pain and bluish-appearing anorectal lesion are consistent with a **thrombosed external hemorrhoid**. Hemorrhoids represent abnormal dilation of the hemorrhoidal venous plexus and are categorized by their position in relation to the dentate line as either internal (proximal) or external (distal). Risk factors include **constipation**, abnormal defecation (eg, straining, prolonged sitting on the toilet), increasing age, and pregnancy.

Thrombosis typically occurs with external hemorrhoids and manifests as **excruciating anorectal pain** exacerbated by sitting. Direct visualization of a **bluish** (or purplish) **bulge at the anal verge** confirms the diagnosis. Anoscopy can make visualization easier and is useful if the diagnosis is in doubt. Initial management of thrombosed hemorrhoids includes sitz baths, stool softeners, and topical anesthetics (eg, lidocaine). External hemorrhoidectomy is needed for severe cases that fail to respond to conservative measures.

(Choice A) Condyloma acuminata (anogenital warts) present as fleshy, cauliflower-shaped masses. They are more common in individuals who engage in anal intercourse. Symptoms include itching, scant bleeding, and impaired anal hygiene.

(Choices B and C) Perianal abscesses, which can occur with Crohn disease, present as tenderness and swelling with erythema and induration of the overlying skin. The onset is more subacute than a thrombosed hemorrhoid, and fever is common. Other perianal manifestations of Crohn disease include fistulae, which present with malodorous, purulent fecal drainage as well as pain and itchiness. The external opening of a fistula should be apparent on examination.

(Choice D) Although internal hemorrhoids can thrombose, associated pain is typically mild or absent because they are less innervated than external hemorrhoids. Prolapsed internal hemorrhoids appear as pink or purple masses protruding through the anal verge; they may or may not be reducible.

(Choice E) Rectal prolapse is common in older women with multiple vaginal deliveries. Examination demonstrates an erythematous mass with concentric rings that prolapses through the anus with Valsalva. Patients typically experience incomplete bowel evacuation and anorectal mass sensation; severe pain is unexpected.

Educational objective:
Thrombosis of an external hemorrhoid manifests as excruciating anorectal pain exacerbated by sitting. Examination demonstrates a bluish (or purplish) bulge at the anal verge. Initial management includes sitz baths, stool softeners, and topical anesthetics.

References

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References

- Hemorrhoids.

Surgery	Gastrointestinal & Nutrition	Hemorrhoids
Subject	System	Topic

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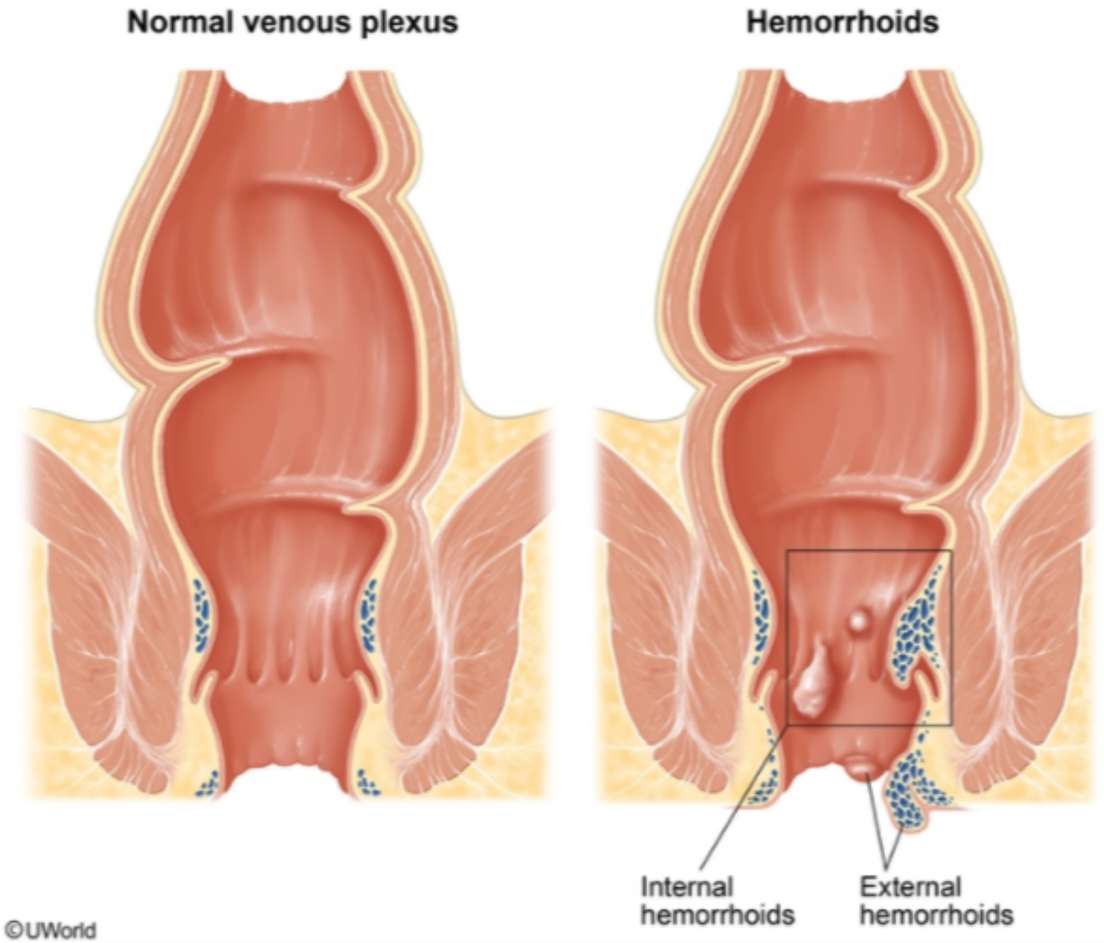
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disease include fistulae, which present with malodorous, purulent fecal drainage as well as pain and itchiness. The external opening of a fistula

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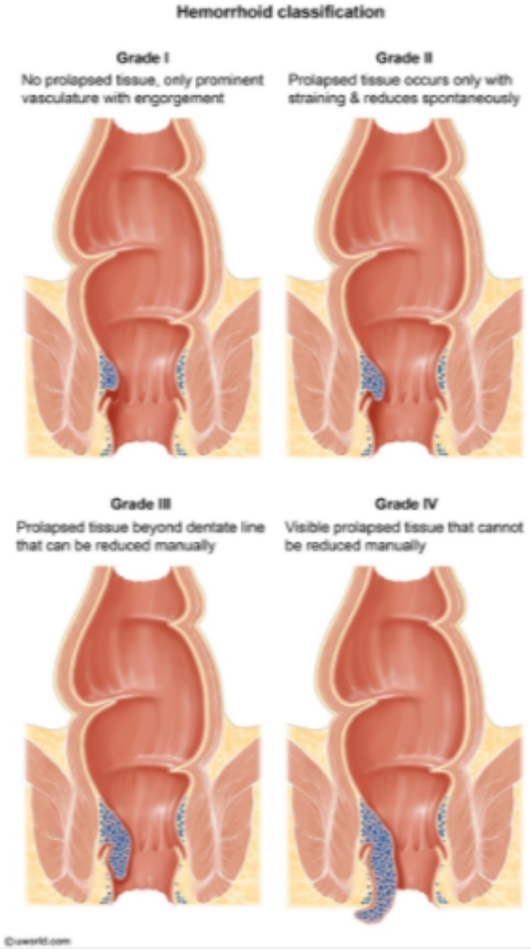
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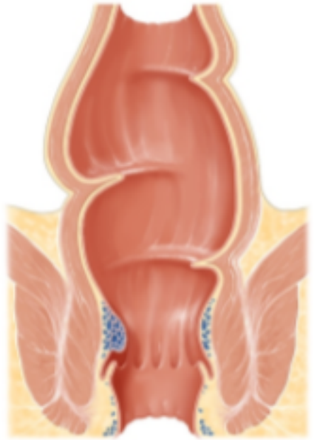
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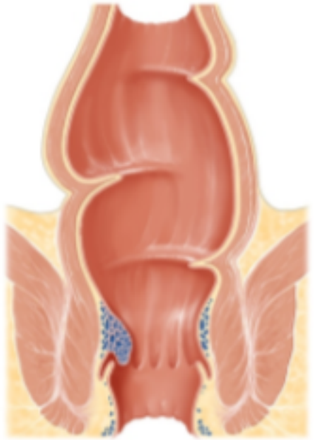
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Hemorrhoid classification

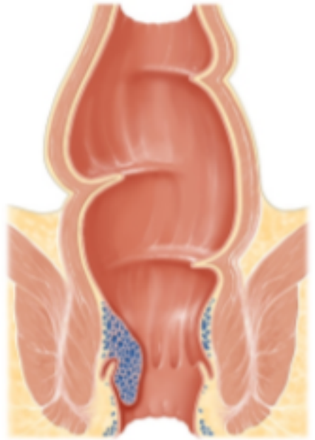
Grade I
No prolapsed tissue, only prominent vasculature with engorgement



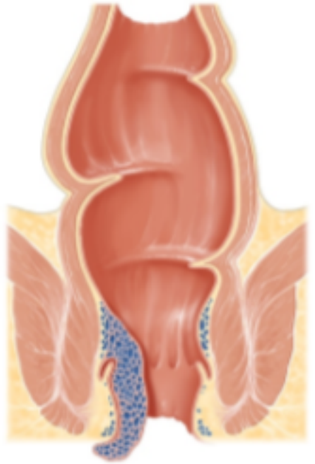
Grade II
Prolapsed tissue occurs only with straining & reduces spontaneously



Grade III
Prolapsed tissue beyond dentate line that can be reduced manually



Grade IV
Visible prolapsed tissue that cannot be reduced manually



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Item 29 of 40
Question Id: 3170

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A 65-year-old man comes to the office due to right upper extremity pain after falling on his right outstretched hand 2 days ago. The patient has mild abrasions over his wrist and elbow with full range of motion and no tenderness over these joints. He has severe pain when he tries to lift his arm above shoulder level or when he pulls or pushes with his right arm. He has been unable to sleep the last 2 nights due to pain and is unable to lie on the affected side. The patient has a 40-pack-year smoking history. His father died of multiple myeloma. Vital signs are normal. Examination shows limited active abduction and external rotation of the humerus; however, passive motion is comparable to the contralateral side. Palpation of the right shoulder, collarbone, and neck reveal no step-off deformities or point tenderness. Radial pulse, extremity sensation, muscle tone, and bulk are normal. Which of the following would most likely confirm the diagnosis in this patient?

A. Bone scan
B. Chest x-ray
C. CT scan of the shoulder
D. MRI of the cervical spine
E. MRI of the shoulder
F. Shoulder x-ray

Submit

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Item 29 of 40
Question Id: 3170

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- A. Bone scan (1%)
- B. Chest x-ray (1%)
- C. CT scan of the shoulder (3%)
- D. MRI of the cervical spine (1%)
- ✓ E. MRI of the shoulder (75%)
- F. Shoulder x-ray (16%)

Omitted
Correct answer
E

75%
Answered correctly

02 secs
Time Spent

03/23/2020
Last Updated

Explanation

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Rotator cuff tendinopathy & tear	
Rotator cuff impingement or tendinopathy	• Pain with **abduction, external rotation** • Subacromial tenderness • Normal range of motion with positive **impingement tests** (eg, Neer, Hawkins)
Rotator cuff tear	• Similar to rotator cuff tendinopathy • **Weakness** with abduction & external rotation • Age >40

This patient has post-traumatic shoulder pain with **limited active abduction**, most likely due to a **rotator cuff tear**. Rotator cuff tears are most common in patients age >40, often after a **fall** on an outstretched arm. Patients typically have pain at the lateral shoulder that is worsened with raising the arm overhead or with external rotation and abduction. Examination shows the drop arm sign (inability to smoothly control shoulder adduction) and **weakness** with external rotation (passive range of motion is normal). Rotator cuff tendinopathy (tendinitis) may also present with pain on abduction, but tendinopathy without tear does not cause weakness.

X-ray of the shoulder in a rotator cuff tear is often performed as an initial study to rule out fracture; in large, chronic tears it may demonstrate migration of the humeral head, but it has low sensitivity for confirming the diagnosis of an acute tear **(Choice F)**. **MRI** can visualize the soft tissues around the humeral head and can accurately diagnose a rotator cuff tear. Treatment of an acute tear usually involves **surgery**, with best results if performed within 6 weeks of the injury.

(Choice A) Bone scans are most often used to diagnose infectious (eg, osteomyelitis) or metastatic disease. However, these conditions would not usually present with acute post-traumatic pain and decreased range of motion.

(Choice B) With this patient's extensive smoking history, lung cancer involving the brachial plexus (Pancoast syndrome) could cause shoulder pain. However, this would typically present with radicular pain radiating to the wrist, atrophy of the muscles, and additional compressive symptoms (eg, edema).

(Choice C) CT of the shoulder is effective in diagnosing fractures and other disorders involving cortical bone but is less sensitive than MRI for visualization of tendons and other soft tissue structures.

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(Choice C) CT of the shoulder is effective in diagnosing fractures and other disorders involving cortical bone but is less sensitive than MRI for visualization of tendons and other soft tissue structures.

(Choice D) MRI of the spine would identify the cause of cervical radiculopathy. This condition usually results from disc herniation (or osteophytes) and presents with arm weakness, paresthesias, and neck pain.

Educational objective:
Rotator cuff tears occur most commonly in patients age >40, often after a fall on an outstretched arm. These injuries are characterized by pain and weakness with abduction and external rotation of the humerus. MRI can confirm the diagnosis.

References

- The diagnostic accuracy of MRI for the detection of partial- and full-thickness rotator cuff tears in adults.

Surgery	Rheumatology/Orthopedics & Sports	Rotator cuff
Subject	System	Topic

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Item 29 of 40
Question Id: 3170

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visualization of tendons and other soft tissue structures.

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Item 30 of 40
Question Id: 3557

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A 16-year-old boy is brought to the emergency department due to left shoulder and hand pain after he fell on his outstretched hand while playing soccer. He immediately heard a crunching sound and had intense pain in the left shoulder following the injury. Blood pressure is 105/72 mm Hg and pulse is 85/min. On examination, he is holding his left arm with his right hand. There is bruising around the left shoulder and a small hematoma is noted at the base of the neck. Neurologic examination reveals intact sensation in the left upper extremity. The right radial pulse is easily palpable, and the left radial pulse is slightly decreased. X-ray of the left shoulder and chest reveals a displaced fracture of the clavicle with a normal cardiac silhouette. Which of the following is the best next step in management of this patient?

A. Closed reduction with figure of eight brace
B. CT angiogram
C. Nerve conduction studies
D. Open reduction of the clavicle
E. Upper extremity venous duplex scan

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A. Closed reduction with figure of eight brace (25%)
✓ B. CT angiogram (37%)
C. Nerve conduction studies (1%)
D. Open reduction of the clavicle (26%)
E. Upper extremity venous duplex scan (8%)

Omitted
Correct answer
B

37%
Answered correctly

02 secs
Time Spent

02/03/2020
Last Updated

Explanation

Signs of traumatic arterial injury	
	• Distal limb ischemia (eg, paralysis, pain, pallor, poikilothermy)

Signs of traumatic arterial injury	
Hard signs (require immediate surgery)	• Distal limb ischemia (eg, paralysis, pain, pallor, poikilothermy) • Absent distal pulse • Active hemorrhage or rapidly expanding hematoma • Bruit or thrill at site of injury
Soft signs (require further imaging)	• Diminished distal pulses • Unexplained hypotension • Stable hematoma • Documented hemorrhage at time of injury • Associated neurologic deficit

Clavicle fracture is a common sports-related injury and can occur following a blow or fall on the shoulder or outstretched arm. The vast majority are uncomplicated and carry a favorable prognosis. However, the middle third of the clavicle overlies the brachial plexus and the **subclavian artery and vein** in the thoracic outlet. Therefore, clavicular fractures require a careful neurovascular assessment.

The presence of **"hard signs"** (eg, absent distal pulses, bruit at injury site) following a fracture indicate definite arterial injury and require **immediate surgical intervention**. However, the presence of a **stable hematoma** (as in this patient), **reduced pulse**, documented hemorrhage at the time of injury, unexplained hypotension, or an associated neurologic deficit also suggest an arterial injury may have occurred. These **"soft signs"** require vascular imaging to confirm and localize the site of injury. **CT angiography** is the diagnostic modality of choice due to its high sensitivity and specificity and rapid procedure time.

(Choices A and D) Uncomplicated fractures of the middle third of the clavicle, which account for most clavicular fractures, are treated nonoperatively with rest, ice, and either a sling or figure of eight bandage. Fractures of the distal third of the clavicle may require open reduction and internal fixation to prevent nonunion. However, this patient has signs of vascular injury, and additional assessment must be performed first.

(Choice C) A clavicle fracture may rarely injure the brachial plexus. Features suggesting neurologic injury include numbness, paresthesia, and

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(Choice C) A clavicle fracture may rarely injure the brachial plexus. Features suggesting neurologic injury include numbness, paresthesia, and upper extremity weakness. Clinical examination is usually adequate to rule out significant brachial plexus injury in the acute phase. If a chronic thoracic outlet syndrome develops, nerve conduction studies could be considered later.

(Choice E) Upper extremity venous duplex imaging is indicated for venous thrombosis or obstruction; signs of venous obstruction include upper extremity edema or cyanosis. This patient's acute hematoma is more consistent with an arterial injury. Although arterial duplex doppler can be used to evaluate arterial injury, it is time consuming and less sensitive than CT angiography.

Educational objective:
Clavicle fracture can injure the underlying brachial plexus and subclavian artery. Hard signs of arterial injury (eg, absent pulses, distal ischemia) require immediate surgical intervention. Soft signs of vascular injury (eg, unexplained hypotension, stable hematoma, reduced pulse) warrant CT angiography for further evaluation.

References

- For the patient-evolution in the management of vascular trauma.

immediate surgical intervention. However, the presence of a **stable hematoma** (as in this patient), **reduced pulse**, documented hemorrhage at the time of injury, unexplained hypotension, or an associated neurologic deficit also suggest an arterial injury may have occurred. These **"soft signs"** require vascular imaging to confirm and localize the site of injury. **CT angiography** is the diagnostic modality of choice due to its high sensitivity and specificity and rapid procedure time.

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Educational objective:

Clavicle fracture can injure the underlying brachial plexus and subclavian artery. Hard signs of arterial injury (eg, absent pulses, distal ischemia) require immediate surgical intervention. Soft signs of vascular injury (eg, unexplained hypotension, stable hematoma, reduced pulse) warrant CT angiography for further evaluation.

References

- For the patient-evolution in the management of vascular trauma.

Surgery	Rheumatology/Orthopedics & Sports	Clavicle fracture
Subject	System	Topic

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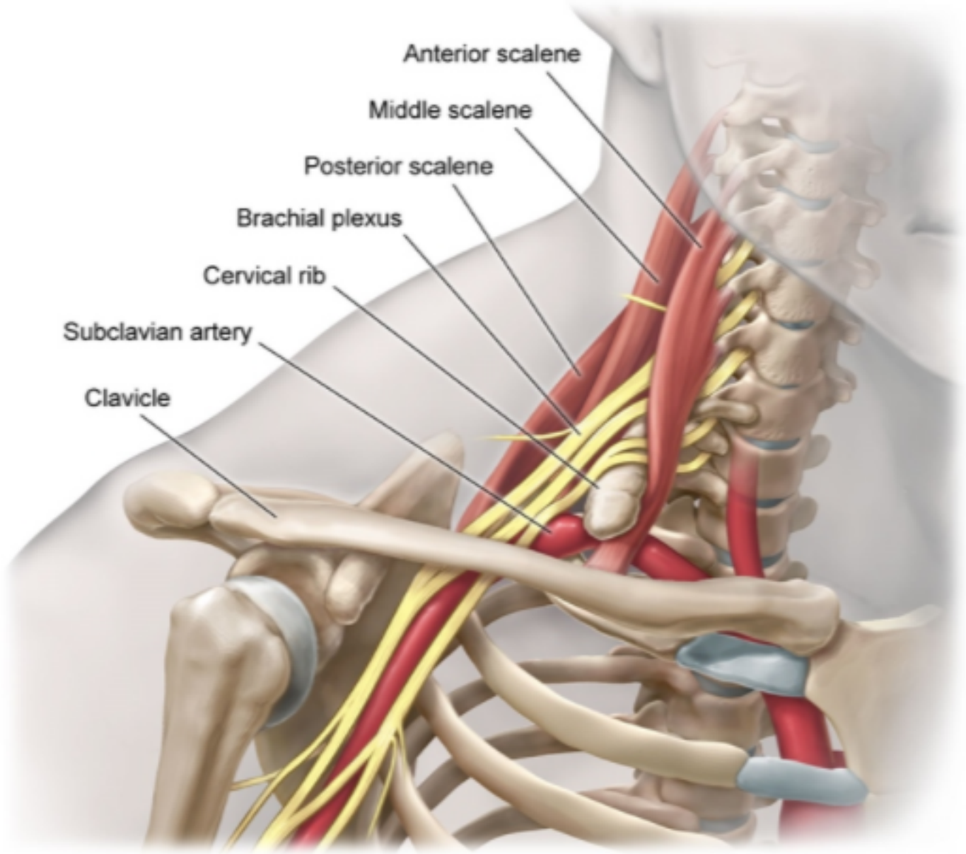
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Signs of traumatic arterial injury

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Thoracic outlet syndrome



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thoracic outlet syndrome develops, nerve conduction studies could be considered later.

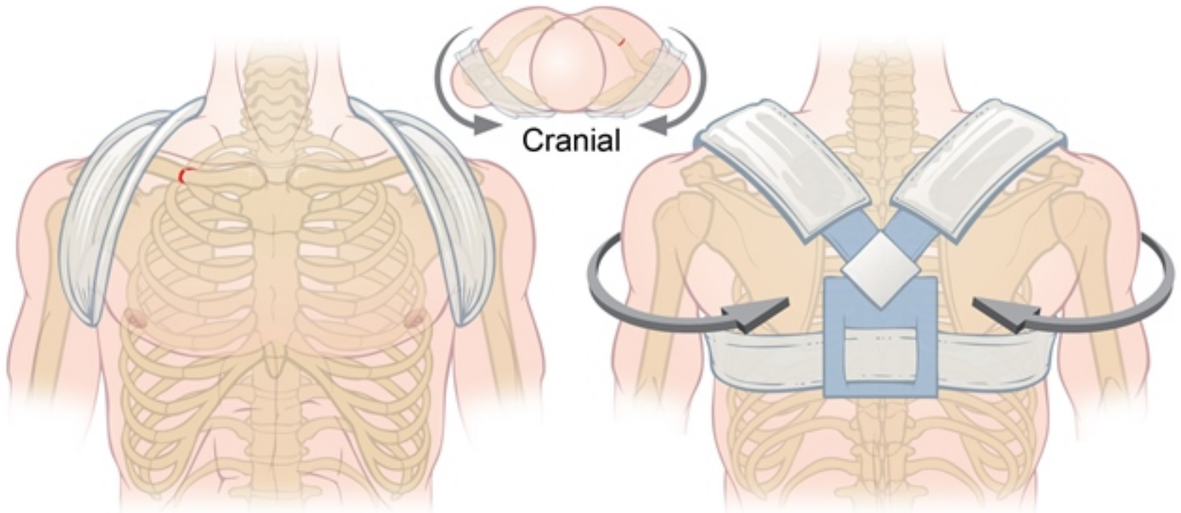
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Signs of traumatic arterial injury

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Figure 8 bandage



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thoracic outlet syndrome develops, nerve conduction studies could be considered later.

A 65-year-old woman comes to the hospital due to vague right flank pain, fatigue, and sweats for 12 days. For the past 2 days she has also had fever and nausea. The patient was treated with oral antibiotics for a urinary tract infection 4 weeks ago and has had no dysuria since, but she has lost 2.3 kg (5 lb) in the interim. Other medical conditions include type 2 diabetes mellitus and hypertension. The patient smokes a pack of cigarettes daily and uses alcohol occasionally. Temperature is 38.7 C (101.7 F), blood pressure is 130/80 mm Hg, pulse is 94/min, and respirations are 16/min. Cardiopulmonary examination is normal. Marked right flank tenderness is present. Laboratory results are as follows:

Complete blood count	
Hemoglobin	10.8 g/dL
Leukocytes	14,000/mm^3
Platelets	340,000/mm^3
Serum chemistry	
Blood urea nitrogen	32 mg/dL
Creatinine	1.6 mg/dL
Glucose	355 mg/dL
Urinalysis	
White blood cells	2-5/hpf
Red blood cells	1-2/hpf
Bacteria	none

Which of the following is the most likely diagnosis?

Platelets	340,000/mm³

Serum chemistry

Blood urea nitrogen	32 mg/dL
Creatinine	1.6 mg/dL
Glucose	355 mg/dL

Urinalysis

White blood cells	2-5/hpf
Red blood cells	1-2/hpf
Bacteria	none

Which of the following is the most likely diagnosis?

A. Acute interstitial nephritis
B. Papillary necrosis
C. Renal abscess
D. Renal cell carcinoma
E. Renal tuberculosis

Submit

Platelets	340,000/mm³

Serum chemistry

Blood urea nitrogen	32 mg/dL
Creatinine	1.6 mg/dL
Glucose	355 mg/dL

Urinalysis

White blood cells	2-5/hpf
Red blood cells	1-2/hpf
Bacteria	none

Which of the following is the most likely diagnosis?

- A. Acute interstitial nephritis (13%)
- B. Papillary necrosis (7%)
- ✓ C. Renal abscess (61%)
- D. Renal cell carcinoma (13%)
- E. Renal tuberculosis (4%)

Omitted
Correct answer

61%
Answered correctly

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Time Spent

01/05/2020
Last Updated

This patient who recently had a urinary tract infection (UTI) now has several days of unilateral flank pain, weight loss, fever, and leukocytosis, with no UTI symptoms or bacteriuria. This presentation is concerning for a **renal abscess**. Renal and perinephric abscesses can form in the setting of urologic infection (eg, pyelonephritis, **UTI**) or through hematogenous spread (eg, bacteremia, endocarditis). Necrosis of infected tissue progresses over time to cavity formation; therefore, manifestations typically develop **insidiously** (average ~12 days of symptoms) in patients with a history of a predisposing infection in the **prior 1-2 months**. Risk factors include anatomic abnormalities (eg, vesicoureteral reflux, neurogenic bladder), nephrolithiasis, **uncontrolled diabetes mellitus**, or tobacco use.

Systemic symptoms (eg, fever, fatigue, diaphoresis, weight loss) are common. Because of the localized nature of the process, unilateral **flank pain**/tenderness and a palpable mass may be present, but **UTI symptoms** (eg, dysuria, urinary urgency) are **often absent**. Although urinalysis results often include pyuria, bacteriuria, and proteinuria, findings may be normal if the abscess is not in contact with the collecting ducts. Other laboratory abnormalities include leukocytosis and elevated inflammatory markers (eg, erythrocyte sedimentation rate, C-reactive protein); acute kidney injury may occur. The diagnosis is confirmed with CT scan or ultrasound. Management includes antibiotic therapy and percutaneous drainage.

(Choice A) Acute interstitial nephritis can cause AKI and fever but is typically associated with rash, pyuria, and urine eosinophilia with white blood cell casts. Weight loss and flank pain would be unexpected.

(Choice B) Acute papillary necrosis can cause AKI, fever, and flank pain; however, it typically causes hematuria and is most common in patients with analgesic overuse or sickle cell anemia. It does not usually cause weight loss.

(Choice D) Renal cell carcinoma can cause weight loss, fever, and anemia, but marked flank tenderness is unexpected. Hematuria is also common.

(Choice E) Renal tuberculosis (due to hematogenous spread of miliary tuberculosis) can result in abscess formation or glomerulonephritis; pyuria, hematuria, urinary casts, and lower urinary tract symptoms are common. In addition, tuberculosis typically occurs in patients with risk factors (eg, incarceration, employment in high-risk health care).

Educational objective:
Renal and perinephric abscesses manifest with insidious onset of flank pain and systemic symptoms (eg, fever, weight loss), typically in patients with a history of urinary tract infection or extrarenal infection (eg, bacteremia) in the prior 1-2 months. In most cases, the urinalysis demonstrates

Systemic symptoms (eg, fever, fatigue, diaphoresis, weight loss) are common. Because of the localized nature of the process, unilateral **flank pain**/tenderness and a palpable mass may be present, but **UTI symptoms** (eg, dysuria, urinary urgency) are **often absent**. Although urinalysis results often include pyuria, bacteriuria, and proteinuria, findings may be normal if the abscess is not in contact with the collecting ducts. Other laboratory abnormalities include leukocytosis and elevated inflammatory markers (eg, erythrocyte sedimentation rate, C-reactive protein); acute kidney injury may occur. The diagnosis is confirmed with CT scan or ultrasound. Management includes antibiotic therapy and percutaneous drainage.

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Renal and perinephric abscesses manifest with insidious onset of flank pain and systemic symptoms (eg, fever, weight loss), typically in patients with a history of urinary tract infection or extrarenal infection (eg, bacteremia) in the prior 1-2 months. In most cases, the urinalysis demonstrates pyuria, bacteriuria, and proteinuria, but it may remain normal if the abscess is not in contact with the collecting ducts.

Surgery	Renal, Urinary Systems & Electrolytes	Urinary tract infection
Subject	System	Topic

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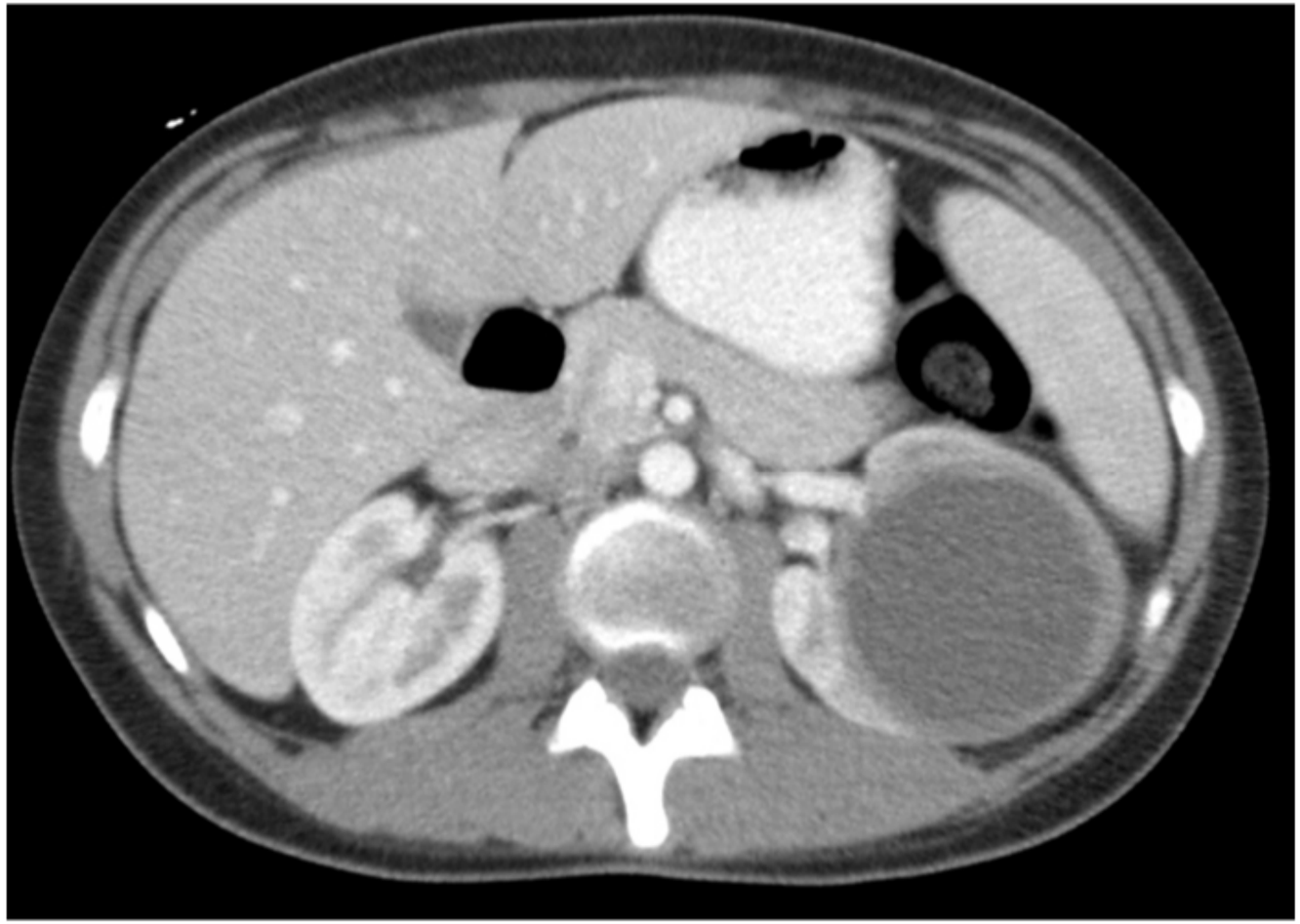
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Question Id: 16340

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Systemic symptoms (eg, fever, fatigue, diaphoresis, weight loss) are common. Because of the localized nature of the process, unilateral **flank**

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Item 32 of 40
Question Id: 16315

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A 25-year-old man is brought to the emergency department due to a stab wound to the chest. The patient was returning to his parked car when he was mugged. He tried to resist, but the assailant stabbed him once in the left chest with a switchblade. During transport, the patient became unresponsive and required intubation. He also received 2 L of normal saline. Upon arrival, blood pressure is 80/42 mm Hg and pulse is 132/min. Pulse oximetry is 98% on 60% oxygen. Weight is 80 kg (176.4 lb) and height is 177.5 cm (5 ft 9 in). On physical examination, there is a fist-sized blood stain on the patient's shirt and a 3-cm linear wound in the left fifth intercostal space at the midaxillary line, with dried blood and no active external hemorrhage. Breath sounds are diminished in the left lung and normal in the right lung. Heart sounds are normal. The jugular veins are flat. The abdomen is nondistended and soft to palpation. Focused assessment with sonography for trauma (FAST) reveals left-sided intrathoracic free fluid. A left-sided chest tube is placed with immediate output of 2,000 mL of blood. Which of the following is the best next step in management of this patient?

A. Clamping the chest tube
B. Contrast-enhanced CT scan
C. Emergent thoracotomy
D. Pericardiocentesis
E. Transthoracic echocardiography
F. Vasopressor initiation

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Item 32 of 40
Question Id: 16315

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- A. Clamping the chest tube (6%)
- B. Contrast-enhanced CT scan (3%)
- ✓ C. Emergent thoracotomy (72%)
- D. Pericardiocentesis (0%)
- E. Transthoracic echocardiography (5%)
- F. Vasopressor initiation (11%)

Omitted
Correct answer
C

72%
Answered correctly

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Time Spent

05/07/2020
Last Updated

Explanation

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Explanation

Hypovolemic shock (ie, severe hypotension, tachycardia, flat neck veins) in the setting of **penetrating chest trauma** (ie, stab to chest) is attributed to **hemorrhage** until proven otherwise; trauma primary survey should seek to identify sources of bleeding. In this patient, diminished breath sounds on the side of the stab wound led to tube thoracostomy with significant bloody output, thereby identifying the hemorrhage source as intrathoracic.

A small external wound can conceal extensive internal injury. Central penetrating wounds inside "the box"—delineated superiorly by the clavicles, inferiorly by the costal margins, and laterally by the nipples—are particularly dangerous because of the underlying heart and mediastinal structures. However, even lateral wounds (eg, this patient's 3-cm lateral wound) can cause significant injury, including **massive hemothorax** (>1,500 mL) from laceration of underlying lung parenchyma or intercostal vessels.

Although **tube thoracostomy** is often sufficient to manage hemothorax, some patients (up to 15%) require **emergent thoracotomy** for extreme bleeding, including those with:

- **Initial bloody output >1,500 mL** (as in this patient)
- Persistent hemorrhage: >200 mL/hr for >2 hours, or continuous need for blood transfusion to maintain hemodynamic stability

(Choice A) Clamping the chest tube is not recommended; blocking the outflow of blood does not staunch the bleeding (the capacity of the hemithorax is too great), and accumulated intrathoracic blood negatively impacts respiratory mechanics (eg, restricted lung expansion).

(Choice B) A contrast-enhanced CT scan can assist in identifying a bleeding source (via visualization of contrast extravasation); however, it is only appropriate for hemodynamically stable patients. This patient is unstable (ie, hypotensive despite fluids), and his massive chest tube output warrants emergent surgical intervention.

(Choices D and E) Cardiac tamponade (ie, hemopericardium) is a life-threatening possibility in penetrating thoracic trauma; it can be visualized on transthoracic echocardiography and treated with pericardiocentesis. Although acute tamponade can cause severe hypotension and tachycardia, it classically causes elevated jugular venous pressure with distended (rather than flat) neck veins.

(Choice F) Vasopressors are appropriate for patients with severe peripheral vasodilatation due to distributive (eg, septic, neurogenic) shock. Patients (such as this one) with shock due to blood loss (ie, hemorrhagic shock) should receive volume resuscitation with blood transfusion while

intrathoracic.

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(Choice F) Vasopressors are appropriate for patients with severe peripheral vasodilatation due to distributive (eg, septic, neurogenic) shock. Patients (such as this one) with shock due to blood loss (ie, hemorrhagic shock) should receive volume resuscitation with blood transfusion while awaiting definitive management of the hemorrhage (eg, surgical intervention). Vasopressor administration without appropriate resuscitation can worsen tissue perfusion.

Educational objective:
Penetrating trauma accompanied by shock (eg, severe hypotension) is attributed to hemorrhage until proven otherwise. Intrathoracic hemorrhage can cause massive hemothorax (>1,500 mL), which requires emergent thoracotomy to prevent exsanguination.

(Choice A) Clamping the chest tube is not recommended; blocking the outflow of blood does not staunch the bleeding (the capacity of the hemithorax is too great), and accumulated intrathoracic blood negatively impacts respiratory mechanics (eg, restricted lung expansion).

(Choice B) A contrast-enhanced CT scan can assist in identifying a bleeding source (via visualization of contrast extravasation); however, it is only appropriate for hemodynamically stable patients. This patient is unstable (ie, hypotensive despite fluids), and his massive chest tube output warrants emergent surgical intervention.

(Choices D and E) Cardiac tamponade (ie, hemopericardium) is a life-threatening possibility in penetrating thoracic trauma; it can be visualized on transthoracic echocardiography and treated with pericardiocentesis. Although acute tamponade can cause severe hypotension and tachycardia, it classically causes elevated jugular venous pressure with distended (rather than flat) neck veins.

(Choice F) Vasopressors are appropriate for patients with severe peripheral vasodilatation due to distributive (eg, septic, neurogenic) shock. Patients (such as this one) with shock due to blood loss (ie, hemorrhagic shock) should receive volume resuscitation with blood transfusion while awaiting definitive management of the hemorrhage (eg, surgical intervention). Vasopressor administration without appropriate resuscitation can worsen tissue perfusion.

Educational objective:
Penetrating trauma accompanied by shock (eg, severe hypotension) is attributed to hemorrhage until proven otherwise. Intrathoracic hemorrhage can cause massive hemothorax (>1,500 mL), which requires emergent thoracotomy to prevent exsanguination.

References

- Practice management guidelines for management of hemothorax and occult pneumothorax.
- Hemothorax: etiology, diagnosis, and management.

Surgery	Pulmonary & Critical Care	Penetrating thoracic trauma
Subject	System	Topic

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A 70-year-old man comes to the hospital due to worsening right upper quadrant pain, fever, and anorexia for the past 2 days. Today, he also developed chills. The patient was treated for acute diverticulitis 4 weeks ago. Medical conditions also include type 2 diabetes mellitus and hypertension. He does not use tobacco, alcohol, or illicit drugs. The patient has not traveled recently. Temperature is 39.3 C (102.7 F), blood pressure is 130/80 mm Hg, pulse is 98/min, and respirations are 18/min. Examination shows no jaundice. The right upper quadrant is markedly tender with some guarding on palpation. Bowel sounds are normal, and there is no ascites. Laboratory results are as follows:

Hemoglobin	11.2 g/dL
Leukocytes	19,000/mm^3
Total bilirubin	1.7 mg/dL
Aspartate aminotransferase (SGOT)	90 U/L
Alanine aminotransferase (SGPT)	80 U/L
Alkaline phosphatase	190 U/L

CT scan of the abdomen is shown in the exhibit:

Blood cultures are obtained. Which of the following is the best next step in diagnosis?

A. Percutaneous aspiration
B. Peripheral smears for *Plasmodium* species
C. Serology for *Echinococcus granulosus*
D. Serology for *Entamoeba histolytica*
E. Stool test for *Clostridioides* (formerly *Clostridium*) *difficile* toxin
F. Stool test for ova and parasites

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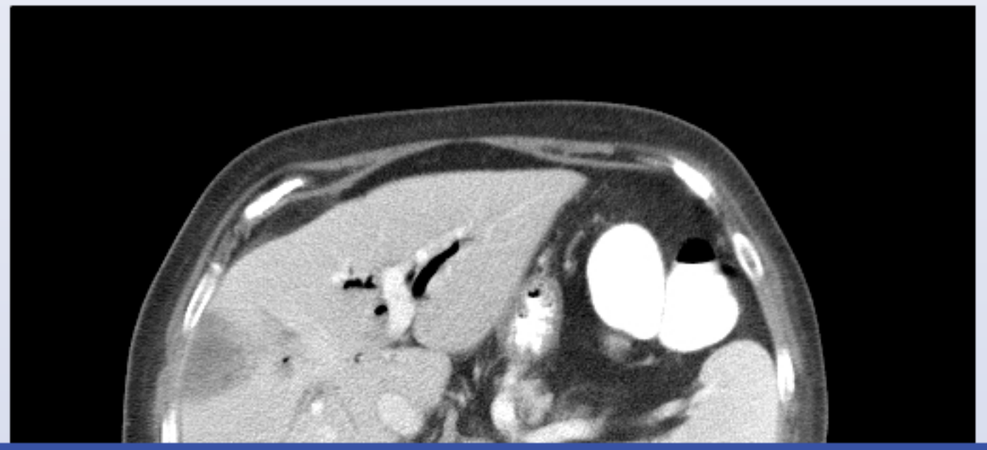
Item 33 of 40
Question Id: 15723

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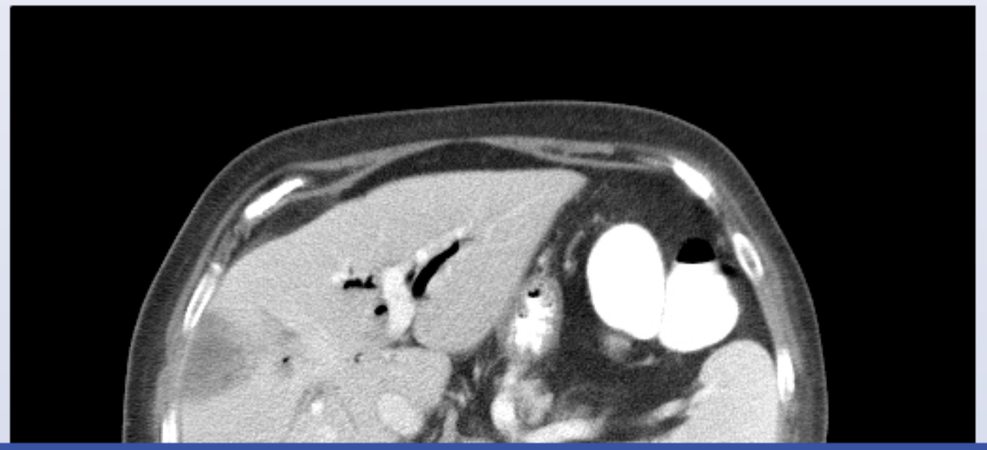
Item 33 of 40
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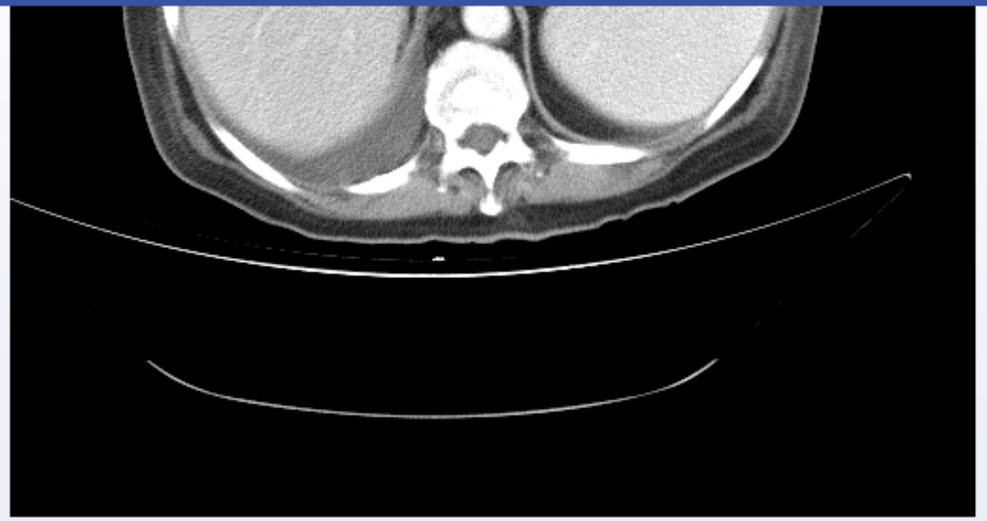
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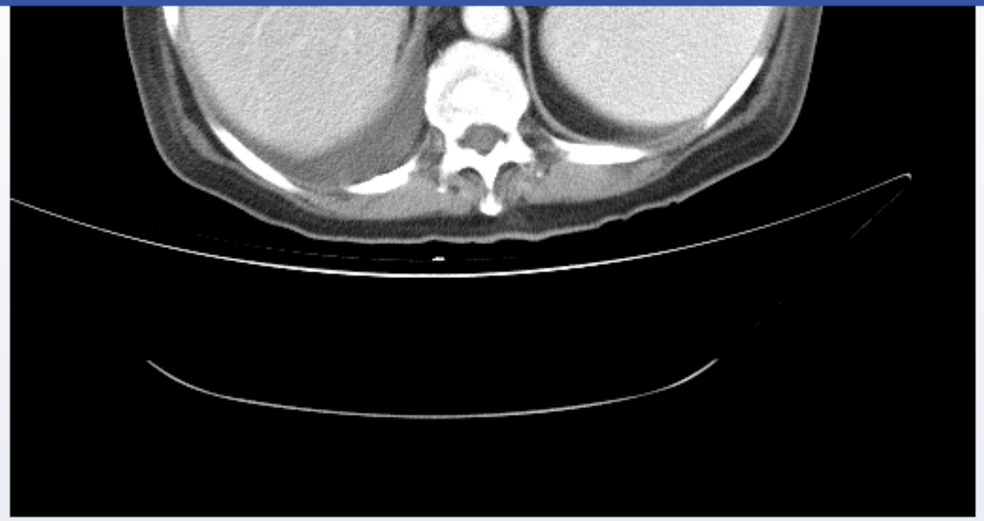
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F. Stool test for ova and parasites

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Blood cultures are obtained. Which of the following is the best next step in diagnosis?

- ✓ A. Percutaneous aspiration (60%)
- B. Peripheral smears for *Plasmodium* species (0%)
- C. Serology for *Echinococcus granulosus* (10%)
- D. Serology for *Entamoeba histolytica* (17%)
- E. Stool test for *Clostridioides* (formerly *Clostridium*) *difficile* toxin (4%)
- F. Stool test for ova and parasites (6%)

Omitted
Correct answer

60%
Answered correctly

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03/17/2020
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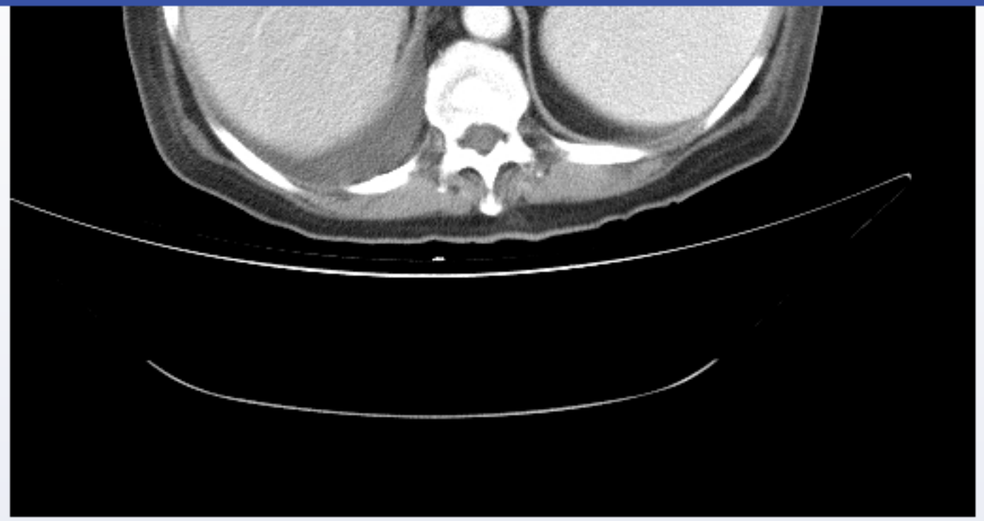
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Omitted
Correct answer

60%
Answered correctly

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Time Spent

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Explanation



This patient with fever, right upper quadrant pain, leukocytosis, and elevated liver enzymes has a rounded, hypoattenuating lesion in the liver, which is concerning for **pyogenic liver abscess**. Pyogenic liver abscess can occur due to direct extension from biliary tract infections,

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This patient with fever, right upper quadrant pain, leukocytosis, and elevated liver enzymes has a rounded, hypoattenuating lesion in the liver, which is concerning for **pyogenic liver abscess**. Pyogenic liver abscess can occur due to direct extension from biliary tract infections, penetrating trauma, or hematogenous spread from the systemic (eg, infectious endocarditis) or portal circulation (eg, intraabdominal infection). This patient likely developed the abscess as a result of his recent **diverticulitis**, which allowed for the spread of bacteria from the inflamed intestines through the portal circulation.

Manifestations typically include **fever**, **right upper quadrant pain** (which may be severe), **leukocytosis**, and **elevated liver function studies**. The diagnosis is confirmed with abdominal imaging; CT scan classically demonstrates a **well-defined, hypoattenuating, rounded lesion**, often surrounded by a peripherally enhancing abscess membrane.

Management includes blood cultures, antibiotics, and **percutaneous aspiration** and **drainage**, which is both diagnostic (eg, culture, Gram stain) and therapeutic; catheter placement is often required to drain large lesions. Surgical drainage can be considered for abscesses not amenable to percutaneous intervention.

(Choice B) Malaria can present with fevers, anemia, and hyperbilirubinemia; however, it would not be expected to cause right upper quadrant pain or a hypoattenuating liver lesion on CT scan. It would also be unexpected in a patient who has not traveled recently.

(Choice C) *Echinococcus granulosus* causes cystic liver lesions in individuals exposed to infected sheep or canines; patients are typically asymptomatic unless the cysts are large or rupture. Cysts are typically visible on a CT scan as thin-walled, septated lesions, occasionally with calcification.

(Choices D and F) *Entamoeba histolytica* is a major cause of hepatic abscess; however, most patients with amebic liver abscess have a history of exposure in endemic areas (eg, India, Mexico). This diagnosis should be considered in patients without other, more common causes of abscess (unlike this patient with recent diverticulitis). Testing options include serology or stool analysis (eg, ova and parasite).

(Choice E) This patient is at increased risk for *Clostridioides* (formerly *Clostridium*) *difficile* infection due to his recent hospitalization and antibiotic treatment for diverticulitis. However, *C difficile* infection is characterized by persistent, watery diarrhea and would not be expected to cause abscess formation.

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Educational objective:

Pyogenic liver abscess typically presents with fevers, right upper quadrant pain, leukocytosis, and altered liver function tests. It can result from direct spread from the biliary tract or from hematogenous seeding of distal infection, particularly those involving the portal system (eg, diverticulitis). Diagnosis requires abdominal imaging, and management includes blood cultures, antibiotics, aspiration, and drainage.

References

- Increased risk of pyogenic liver abscess among patients with colonic diverticular diseases: a nationwide cohort study.

Surgery	Gastrointestinal & Nutrition	Liver abscess
Subject	System	Topic

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Item 34 of 40
Question Id: 4537

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A 43-year-old woman on the surgical floor is being evaluated for increasing shortness of breath. She was brought to the emergency department 8 hours ago following a high-speed motor vehicle collision. The patient had been drinking alcohol prior to driving. She was restrained and air bags were deployed, but her right knee smashed against the front console. Trauma workup revealed a right femur fracture as well as bruising of the face and chest without underlying fractures. The patient received 3 L of isotonic fluids and was admitted for observation and pain management prior to anticipated fracture fixation. She now has increased work of breathing. Blood pressure is 138/82 mm Hg, pulse is 102/min, and respirations are 24/min. Pulse oximetry shows an oxygen saturation of 90% on 4 L of oxygen. The patient is alert with no focal neurological deficits. Diffuse rales are heard in the anterior lung fields bilaterally. Heart sounds are normal. There are no other changes to the clinical examination. CT scan of the chest reveals peripheral, anterior ground-glass opacities in both lungs. Which of the following is the most likely diagnosis in this patient?

A. Aspiration pneumonia
B. Bronchial rupture
C. Fat embolism
D. Hemothorax
E. Myocardial contusion
F. Pulmonary contusion

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Item 34 of 40
Question Id: 4537

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- A. Aspiration pneumonia (1%)
- B. Bronchial rupture (1%)
- C. Fat embolism (33%)
- D. Hemothorax (1%)
- E. Myocardial contusion (1%)
- ✓ F. Pulmonary contusion (61%)

Omitted
Correct answer
F

61%
Answered correctly

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Time Spent

06/20/2020
Last Updated

Explanation

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Pulmonary contusion	
Clinical features	• Present **<24 hours** after blunt thoracic trauma • Tachypnea, tachycardia, **hypoxia**
Diagnosis	• Rales or decreased breath sounds • CT scan (most sensitive) or CXR with patchy, alveolar infiltrate **not restricted by anatomical borders**
Management	• Pain control • Pulmonary hygiene (eg, incentive spirometry, chest PT) • Supplemental oxygen & ventilatory support

CXR = chest x-ray; **PT** = physiotherapy.

Despite being restrained during the high-speed motor vehicle collision, this patient sustained **blunt thoracic trauma** with chest wall (and facial) bruising, likely from airbag impact. Blunt force to the chest wall can injure the underlying lung, resulting in **alveolar hemorrhage** and **edema**. Subsequent resuscitative fluid administration can exacerbate the alveolar edema, leading to progressive **dyspnea**, **tachypnea**, and **hypoxemia**. On CT scan, the alveolar edema can appear as ground-glass opacities in the lung adjacent to the affected chest wall (eg, anterior, peripheral lung in this patient); this pattern and distribution is classic for **pulmonary contusion**.

Pulmonary contusion is common (25%-35% of cases) following blunt thoracic trauma. Because clinically significant alveolar edema may take up to 24 hours to accumulate, pulmonary contusion may not be apparent immediately following an injury, and initial chest x-ray is often negative. CT scan of the chest is more sensitive and can identify the classic **irregular**, **nonlobular** (ie, not restricted by anatomic landmarks) **infiltrates**. Management involves pain control, pulmonary hygiene, and respiratory support.

(Choice A) The patient's alcohol use prior to driving increases her risk of aspiration. Although aspiration pneumonia can cause tachypnea and hypoxemia with pulmonary infiltrates, it typically has accompanying fever, cough, and purulent sputum production. The infiltrate distribution depends on the patient's position during the aspiration event; however, peripheral, nonlobular infiltrates are unlikely.

(Choice B) Although bronchial rupture can cause progressive shortness of breath and hypoxemia, evidence of air leakage from the

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(Choice B) Although bronchial rupture can cause progressive shortness of breath and hypoxemia, evidence of air leakage from the tracheobronchial tree (eg, pneumothorax, pneumomediastinum) is typically present on CT scan.

(Choice C) Tachypnea and hypoxemia in the setting of femur fracture are concerning for fat embolism. However, patients with fat embolism classically have accompanying neurological abnormalities and petechial rash, as well as a latency period of 12-72 hours after the initial injury.

(Choice D) Hemothorax (eg, from injured lung parenchymal vessels) can cause tachypnea and hypoxemia but typically appears as a pleural effusion on CT scan.

(Choice E) Myocardial contusion can cause contractile dysfunction (eg, left ventricle) and cardiogenic shock with tachycardia and hypoxemia. However, these symptoms would be accompanied by hypotension. In addition, associated pulmonary edema would be diffuse, rather than anterior and peripheral.

Educational objective:
Blunt thoracic trauma can injure the underlying lung. The resulting alveolar hemorrhage and edema—often worsened by fluid resuscitation—can cause dyspnea, tachypnea, and hypoxemia. Irregular, nonlobular infiltrates on chest x-ray or CT scan are classic for pulmonary contusion.

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References

- Pulmonary contusion.
- Lung contusion: a clinico-pathological entity with unpredictable clinical course.

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Educational objective:
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Surgery	Pulmonary & Critical Care	Pulmonary contusion
Subject	System	Topic

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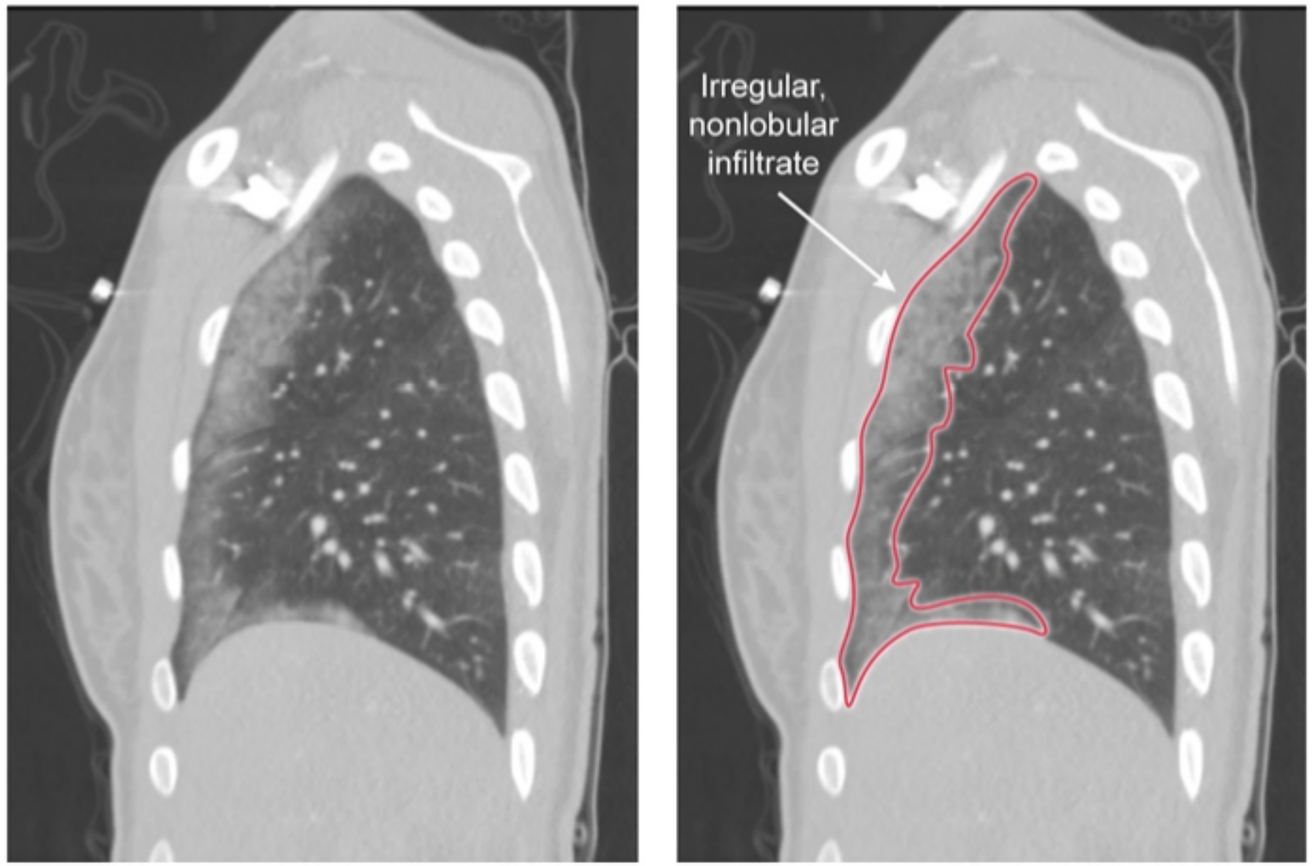
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Clinical features

- Present **<24 hours** after blunt thoracic trauma

Exhibit Display

Pulmonary contusion



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Question Id: 4106

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A 45-year-old man comes to the office with a 6-month history of recurrent, burning epigastric pain and diarrhea. His stools are frothy and unusually foul smelling and they float. The patient's clothes fit loosely, and he believes that he may have lost some weight. He has tried several over-the-counter medications, including antacids, H-2 blockers, and proton pump inhibitors, with moderate success. Vital signs are normal. Examination shows no abnormalities except for midepigastric tenderness to deep palpation. Test of the stool for occult blood is positive, and stool fat is also positive. Gastrointestinal endoscopy reveals two duodenal ulcers and a jejunal ulcer. Which of the following is the best explanation for this patient's impaired fat absorption?

A. Autoimmune mucosal injury
B. Bacterial overgrowth
C. Pancreatic enzyme deficiency
D. Pancreatic enzyme inactivation
E. Reduced bile acid absorption

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Question Id: 4106

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- A. Autoimmune mucosal injury (7%)
- B. Bacterial overgrowth (5%)
- C. Pancreatic enzyme deficiency (22%)
- ✓ D. Pancreatic enzyme inactivation (57%)
- E. Reduced bile acid absorption (7%)

Omitted
Correct answer
D

57%
Answered correctly

02 secs
Time Spent

03/03/2020
Last Updated

Explanation

Zollinger-Ellison syndrome	

TUTOR

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Zollinger-Ellison syndrome	
Epidemiology	• Age 20-50 • 80% Sporadic/20% MEN1
Clinical features	• Multiple & refractory peptic ulcers • Ulcers distal to duodenum • Chronic diarrhea
Diagnosis	• Markedly elevated serum gastrin (>1000 pg/mL) in the presence of normal gastric acid (pH <4)
Workup	• Endoscopy • CT/MRI & somatostatin receptor scintigraphy for tumor localization

MEN1 = multiple endocrine neoplasia type 1.

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This patient with multiple peptic ulcers and diarrhea has clinical features of **Zollinger-Ellison syndrome** (ZES). ZES is due to a **gastrin-producing tumor**, which usually occurs in the pancreas or duodenum. Most cases are sporadic, but ZES also occurs frequently in the context of multiple endocrine neoplasia type 1 (MEN1). Uncontrolled gastrin secretion leads to parietal cell hyperplasia, with excessive production of gastric acid. **Multiple** duodenal (and sometimes jejunal) **ulcers** are typical, and the ulcers can be refractory to standard acid-reducing medications. The excess gastric acid in the small intestine can cause diarrhea and steatorrhea due to **inactivation of pancreatic enzymes** and injury to the mucosal brush border.

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The diagnosis of ZES is suggested by a markedly elevated serum gastrin level (>1000 pg/mL) in the presence of acidic gastric pH (<4). Endoscopy usually reveals ulcers (>90% of patients with ZES) and occasionally will identify a primary duodenal gastrinoma. CT, MRI, and somatostatin receptor scintigraphy can be used to identify pancreatic tumors and metastatic disease. If gastrinoma is confirmed, patients should be screened for MEN1 with assays for parathyroid hormone, ionized calcium, and prolactin.

(Choices A, B, and C) Celiac disease is an autoimmune disorder characterized by malabsorption due to mucosal villous atrophy triggered by exposure to gluten-containing wheat products. Small intestinal bacterial overgrowth can also cause mucosal injury, possibly due to bacterial toxins. Pancreatic exocrine deficiency can be seen in chronic (eg, alcoholic) pancreatitis, cystic fibrosis, and pancreatic resection. However, duodenal and jejunal ulcerations are not typical in these conditions.

(Choice E) Bile acids are primarily reabsorbed in the ileum; impaired absorption can cause malabsorption of fats. This is typically seen following extensive ileal resection in Crohn disease (CD), which presents with chronic or recurrent abdominal pain, fever, diarrhea, and weight loss. It would be unusual for CD to present with multiple duodenal ulcers.

Educational objective:
Zollinger-Ellison syndrome should be suspected in patients with multiple duodenal ulcers refractory to treatment or ulcers distal to the duodenum or associated with chronic diarrhea. In these patients, inactivation of pancreatic enzymes by increased production of stomach acid may lead to malabsorption.

Surgery	Gastrointestinal & Nutrition	Zollinger ellison syndrome
Subject	System	Topic

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producing tumor, which usually occurs in the pancreas or duodenum. Most cases are sporadic, but ZES also occurs frequently in the context of multiple endocrine neoplasia type 1 (MEN1). Uncontrolled gastrin secretion leads to parietal cell hyperplasia, with excessive production of gastric acid. **Multiple** duodenal (and sometimes jejunal) **ulcers** are typical, and the ulcers can be refractory to standard acid-reducing medications. The excess gastric acid in the small intestine can cause diarrhea and steatorrhea due to **inactivation of pancreatic enzymes** and injury to the mucosal brush border.

The diagnosis of ZES is suggested by a markedly elevated serum gastrin level (>1000 pg/mL) in the presence of acidic gastric pH (<4). Endoscopy usually reveals ulcers (>90% of patients with ZES) and occasionally will identify a primary duodenal gastrinoma. CT, MRI, and somatostatin receptor scintigraphy can be used to identify pancreatic tumors and metastatic disease. If gastrinoma is confirmed, patients should be screened for MEN1 with assays for parathyroid hormone, ionized calcium, and prolactin.

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Educational objective:
Zollinger-Ellison syndrome should be suspected in patients with multiple duodenal ulcers refractory to treatment or ulcers distal to the duodenum or associated with chronic diarrhea. In these patients, inactivation of pancreatic enzymes by increased production of stomach acid may lead to malabsorption.

Surgery	Gastrointestinal & Nutrition	Zollinger ellison syndrome
Subject	System	Topic

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A 46-year-old man comes to the emergency department due to several episodes of vomiting. The last episode of emesis contained blood. Five hours ago, he had a fatty meal and several alcoholic drinks. The patient's medical history is notable for alcohol abuse. He also has chronic dyspepsia, for which he was evaluated 3 days ago with upper gastrointestinal endoscopy and abdominal ultrasound. The ultrasound revealed an enlarged, hyperechoic liver and gallstones in the gallbladder, and the endoscopy found mild esophagitis and gastritis. His temperature is 36.6 C (97.9 F), blood pressure is 120/70 mm Hg, pulse is 95/min, and respirations are 15/min. The abdomen is soft and nontender. The rectal examination shows no melena. Laboratory results are as follows:

Hemoglobin	12.8 g/dL
Leukocytes	5,400/mm^3
Blood urea nitrogen	26 mg/dL
Creatinine	1.1 mg/dL
Aspartate aminotransferase (SGOT)	100 U/L
Alanine aminotransferase (SGPT)	45 U/L
Bilirubin	0.7 mg/dL

Nasogastric suction returns normal stomach contents mixed with bright red blood. Which of the following is the most likely explanation for this patient's bloody vomiting?

A. Effort rupture of the esophagus
B. Endoscopy-related esophageal perforation
C. Hemobilia
D. Mucosal tear at the gastroesophageal junction

Hemoglobin	12.8 g/dL
Leukocytes	5,400/mm^3
Blood urea nitrogen	26 mg/dL
Creatinine	1.1 mg/dL
Aspartate aminotransferase (SGOT)	100 U/L
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A. Effort rupture of the esophagus
B. Endoscopy-related esophageal perforation
C. Hemobilia
D. Mucosal tear at the gastroesophageal junction
E. Rupture of esophageal varices
F. Stress gastritis

Submit

Hemoglobin	12.8 g/dL
Leukocytes	5,400/mm^3
Blood urea nitrogen	26 mg/dL
Creatinine	1.1 mg/dL
Aspartate aminotransferase (SGOT)	100 U/L
Alanine aminotransferase (SGPT)	45 U/L
Bilirubin	0.7 mg/dL

Nasogastric suction returns normal stomach contents mixed with bright red blood. Which of the following is the most likely explanation for this patient's bloody vomiting?

- A. Effort rupture of the esophagus (9%)
- B. Endoscopy-related esophageal perforation (3%)
- C. Hemobilia (0%)
- ✓ D. Mucosal tear at the gastroesophageal junction (73%)
- E. Rupture of esophageal varices (9%)
- F. Stress gastritis (2%)

Omitted
Correct answer

73%
Answered correctly

03 secs
Time Spent

04/09/2020
Last Updated

Mallory-Weiss tear	
Etiology	• Sudden increase in abdominal pressure (eg, forceful retching) • **Mucosal tear** in esophagus or stomach (submucosal arterial or venous plexus bleeding) • Risk factors: Hiatal hernia, alcoholism
Clinical presentation	• Vomiting, retching • Hematemesis • Epigastric pain
Diagnosis	• Longitudinal laceration on endoscopy
Treatment	• Most heal spontaneously • Endoscopic therapy for persistent bleeding

This patient with alcohol abuse, alcoholic hepatitis (2:1 ratio of aspartate aminotransferase to alanine aminotransferase), esophagitis, and gastritis now has acute, bright red **hematemesis** following multiple episodes of vomiting. This presentation is highly suggestive of a **Mallory-Weiss tear** (MWT). MWT is characterized by **longitudinal tears in the mucosa** near the gastroesophageal junction, with bleeding due to injury to the submucosal arteries or veins. It typically occurs due to a sudden increase in intraabdominal pressure (eg, **retching**, blunt abdominal trauma).

MWT is a common cause of upper gastrointestinal (GI) hemorrhage and is often seen in association with **alcohol abuse** and **hiatal hernia**. The diagnosis can be confirmed on endoscopy. Bleeding stops **spontaneously** in 90% of patients. Those with ongoing bleeding can be treated endoscopically with electrocoagulation or local injection of epinephrine.

(Choices A and B) Esophageal rupture can be caused by severe retching (Boerhaave syndrome), penetrating trauma, or as a complication of endoscopy. It is characterized by acute chest pain, subcutaneous emphysema, and often a left-sided pleural effusion. When esophageal rupture occurs due to endoscopy, it is usually apparent shortly after the procedure.

- Endoscopic therapy for persistent bleeding

This patient with alcohol abuse, alcoholic hepatitis (2:1 ratio of aspartate aminotransferase to alanine aminotransferase), esophagitis, and gastritis now has acute, bright red **hematemesis** following multiple episodes of vomiting. This presentation is highly suggestive of a **Mallory-Weiss tear** (MWT). MWT is characterized by **longitudinal tears in the mucosa** near the gastroesophageal junction, with bleeding due to injury to the submucosal arteries or veins. It typically occurs due to a sudden increase in intraabdominal pressure (eg, **retching**, blunt abdominal trauma).

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(Choice C) Hemobilia (bleeding in the biliary tree) is an uncommon cause of upper GI hemorrhage. It is typically seen following abdominal trauma or surgery. Endoscopy without manipulation of the biliary system would not cause hemobilia.

(Choice E) Esophageal varices are submucosal veins that have dilated due to portal hypertension. Eventual rupture causes upper GI bleeding. However, varices would likely have been visible on this patient's endoscopy 3 days earlier.

(Choice F) Stress ulcers develop in the setting of severe and prolonged physiological stress. GI bleeding from stress ulcers is usually seen in patients in an intensive care or burn unit setting.

Educational objective:
Mallory-Weiss tear occurs due to a sudden increase in intraabdominal pressure (eg, retching), leading to a mucosal tear and hematemesis. The diagnosis can be confirmed on endoscopy. Bleeding stops spontaneously in most patients, but those with ongoing bleeding can be treated endoscopically.

References

- Endoscopic management of Mallory-Weiss tearing.

submucosal arteries or veins. It typically occurs due to a sudden increase in intraabdominal pressure (eg, **retching**, blunt abdominal trauma).

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Educational objective:
Mallory-Weiss tear occurs due to a sudden increase in intraabdominal pressure (eg, retching), leading to a mucosal tear and hematemesis. The diagnosis can be confirmed on endoscopy. Bleeding stops spontaneously in most patients, but those with ongoing bleeding can be treated endoscopically.

References

- Endoscopic management of Mallory-Weiss tearing.

Surgery	Gastrointestinal & Nutrition	Mallory-weiss syndrome
Subject	System	Topic

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Item 37 of 40
Question Id: 15918

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A 16-year-old boy comes to the office due to occasional discomfort and heaviness of his scrotum over the past several months. He has had no trauma, dysuria, or urethral discharge. The patient is not sexually active. He is afebrile, and vital signs are within normal limits. On physical examination, an irregular, ropy mass is noted on both sides of the upper scrotum. The mass increases in size with Valsalva and reduces on supine positioning. There is no erythema, ulcers, or tenderness of the scrotal skin and no inguinal lymphadenopathy. The remainder of the examination is normal. Surgical correction is discussed with the patient and his parents. The primary reason to perform surgery is to prevent which of the following complications in this patient?

A. Chronic epididymitis
B. Infertility
C. Intestinal strangulation
D. Scrotal skin ulceration
E. Testicular cancer
F. Torsion of the testis

Submit

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Item 37 of 40
Question Id: 15918

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- A. Chronic epididymitis (1%)
- ✓ B. Infertility (60%)
- C. Intestinal strangulation (22%)
- D. Scrotal skin ulceration (1%)
- E. Testicular cancer (4%)
- F. Torsion of the testis (10%)

Omitted
Correct answer
B

60%
Answered correctly

02 secs
Time Spent

01/29/2020
Last Updated

Explanation

Varicocele

TUTOR

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Varicocele	
Clinical presentation	• Soft scrotal mass ("bag of worms") ◦ ↓ In supine position ◦ ↑ With standing/Valsalva maneuvers • Subfertility • Testicular atrophy
Ultrasound findings	• Retrograde venous flow • Tortuous, anechoic tubules adjacent to testis • Dilation of pampiniform plexus veins
Treatment	• Gonadal vein ligation (boys & young men with testicular atrophy) • Scrotal support & NSAIDs (older men who do not desire additional children)

NSAIDs = nonsteroidal anti-inflammatory drugs.

A **varicocele** is a tortuous dilation of the pampiniform plexus of veins surrounding the spermatic cord and testis. It occurs in nearly 20% of men (usually between age 15-25) and presents as a soft, irregular mass **("bag of worms")** that **increases in size with standing** and Valsalva. Reduction on supine positioning (due to decompression of the plexus) can also be seen. Varicoceles are more common on the left side because the left spermatic vein drains to the left renal vein, which is vulnerable to compression where it passes between the superior mesenteric artery and the aorta. Bilateral varicoceles are also common; however, unilateral right varicoceles are relatively rare and should raise suspicion for thrombosis or malignant compression.

The diagnosis of varicocele can be confirmed on **ultrasound**, which shows dilation of the pampiniform plexus and retrograde venous flow. Initial interventions for scrotal discomfort due to a varicocele include scrotal support and simple analgesics (eg, nonsteroidal anti-inflammatory drugs).

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Varicoceles are associated with increased risk for **infertility and testicular atrophy**, which may be due to slightly **increased scrotal temperature**. For older men who do not have concerns about fertility, no intervention may be needed. However, younger men should be followed for signs of testicular atrophy or changes in semen analysis; abnormal findings generally warrant surgical intervention. When intervention is indicated, surgical venous ligation can improve fertility.

(Choice A) Chronic epididymitis is usually a noninfectious inflammatory process, and is believed in most cases to be related to retrograde flow of urine into the epididymis. It carries an independent risk of infertility, but it is not a complication of varicocele.

(Choice C) Intestinal strangulation is a potential complication of inguinal hernia, which can cause a bulge in the groin and extend into the scrotum but would not have a "bag of worms" (ropy) texture and is less likely to reduce in supine position.

(Choices D and F) A hydrocele is a fluid collection within the tunica vaginalis; it typically presents in newborns as a painless scrotal swelling, although it is occasionally seen in adult men. On rare occasions, large hydroceles can cause irritation and ulceration in the overlying skin. In addition, congenital hydroceles are associated with an increased risk for testicular torsion due to inadequate fixation of the lower pole of the testis to the tunica vaginalis. This patient's irregular scrotal mass that changes in size with position is more consistent with varicocele.

(Choice E) The risk of testicular cancer is increased in patients with cryptorchidism (ie, undescended testis), but cancer is not a notable complication of varicocele.

Educational objective:

The diagnosis of varicocele can be confirmed on **ultrasound**, which shows dilation of the pampiniform plexus and retrograde venous flow. Initial interventions for scrotal discomfort due to a varicocele include scrotal support and simple analgesics (eg, nonsteroidal anti-inflammatory drugs).

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(Choice E) The risk of testicular cancer is increased in patients with cryptorchidism (ie, undescended testis), but cancer is not a notable complication of varicocele.

Educational objective:
A varicocele is a tortuous dilation of the pampiniform plexus surrounding the spermatic cord and testis. It presents as a soft, irregular mass that increases in size with standing and Valsalva. The diagnosis is confirmed with ultrasound. Initial interventions include scrotal support and simple analgesics. Varicoceles are associated with increased risk for infertility; for patients with testicular atrophy or changes in semen analysis, surgical venous ligation can improve fertility.

References

- Varicocele-induced infertility: newer insights into its pathophysiology.

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Educational objective:
A varicocele is a tortuous dilation of the pampiniform plexus surrounding the spermatic cord and testis. It presents as a soft, irregular mass that increases in size with standing and Valsalva. The diagnosis is confirmed with ultrasound. Initial interventions include scrotal support and simple analgesics. Varicoceles are associated with increased risk for infertility; for patients with testicular atrophy or changes in semen analysis, surgical venous ligation can improve fertility.

References

- Varicocele-induced infertility: newer insights into its pathophysiology.

Surgery	Male Reproductive System	Varicocele
Subject	System	Topic

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A 35-year-old man comes to the emergency department due to right knee pain. The patient was participating in a recreational football game when he jumped to catch a ball and landed with his foot planted and knee partially bent. He heard a loud popping sound, felt immediate pain, and has been unable to walk since. The patient smokes half a pack of cigarettes a day and drinks a few beers on the weekend. BMI is 35 kg/m^2. There is a large effusion over the right knee. The patient can bend the right knee but is unable to straighten his leg due to weakness. He is unable to bear weight on the knee but has no instability. X-ray of the right knee shows a large effusion and a low-lying patella with no fractures noted. Which of the following is the most likely diagnosis in this patient?

A. Anterior cruciate ligament tear
B. Meniscus tear
C. Patellar ligament rupture
D. Popliteal cyst rupture
E. Quadriceps tendon rupture

Submit

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Question Id: 15657
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A. Anterior cruciate ligament tear (7%)
B. Meniscus tear (3%)
C. Patellar ligament rupture (16%)
D. Popliteal cyst rupture (0%)
✓ E. Quadriceps tendon rupture (71%)

Omitted
Correct answer
E

71%
Answered correctly

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Time Spent

04/12/2020
Last Updated

Explanation

Anterior thigh anatomy

Iliacus Psoas major

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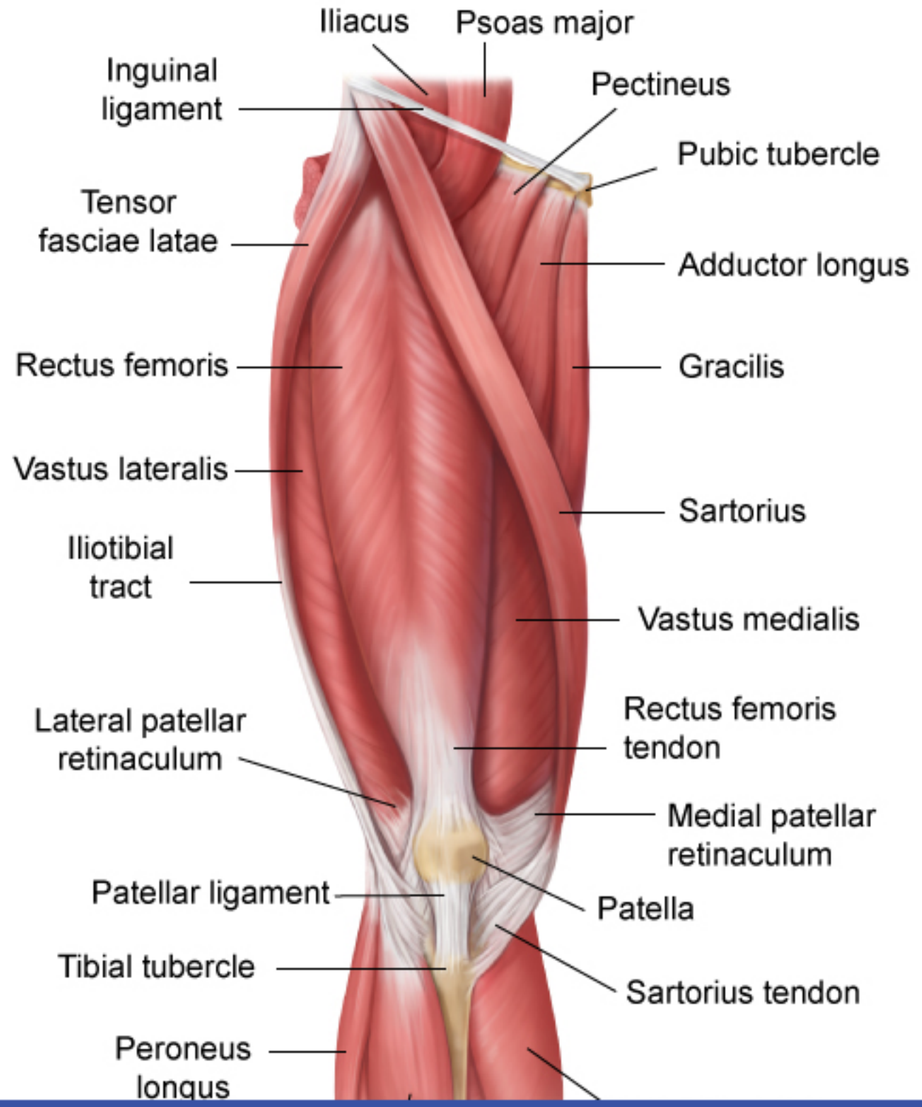
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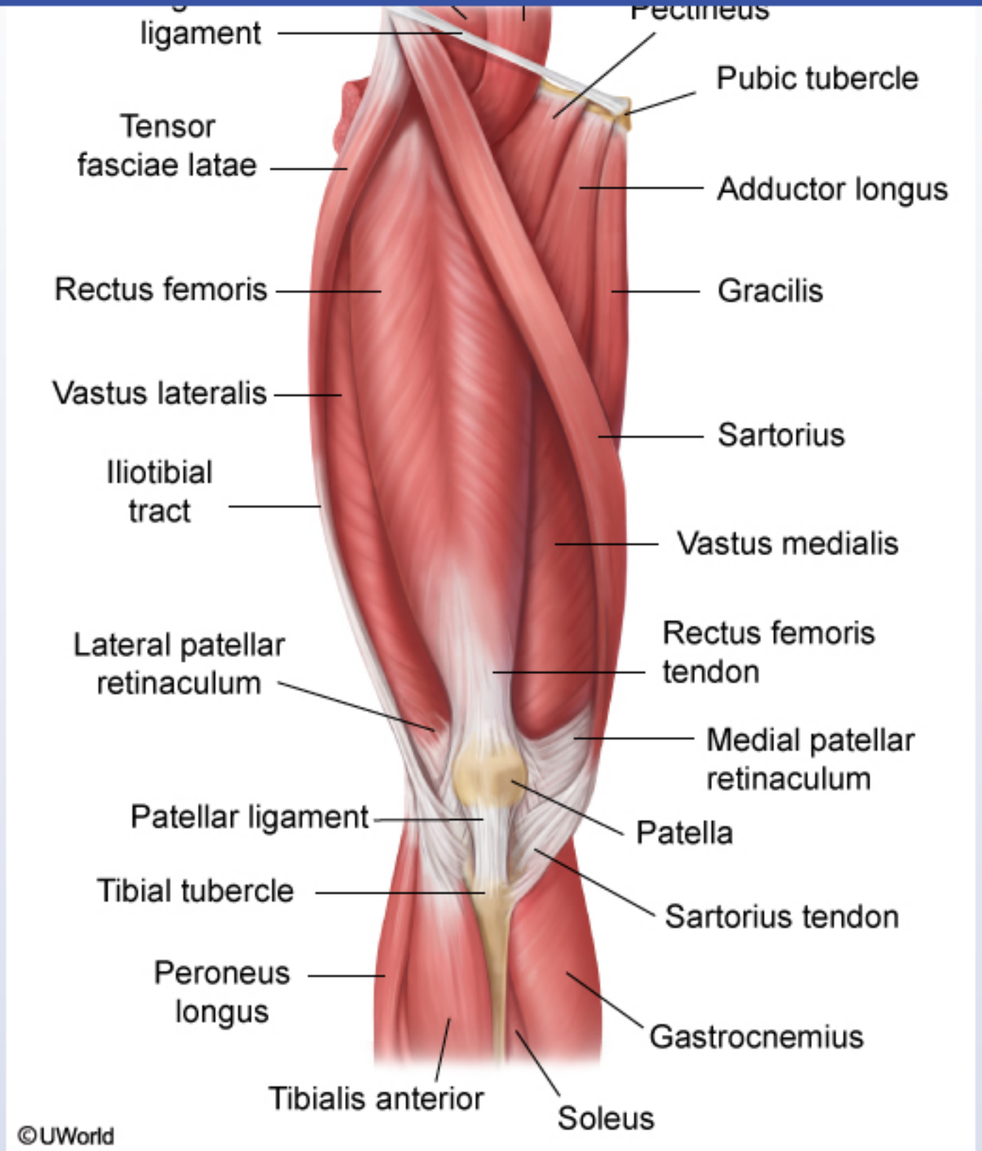
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Anterior thigh anatomy



TUTOR
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ligament
Pectineus
Pubic tubercle
Tensor fasciae latae
Adductor longus
Rectus femoris
Gracilis
Vastus lateralis
Sartorius
Iliotibial tract
Vastus medialis
Lateral patellar retinaculum
Rectus femoris tendon
Medial patellar retinaculum
Patellar ligament
Patella
Tibial tubercle
Sartorius tendon
Peroneus longus
Gastrocnemius
Tibialis anterior
Soleus
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At full activation, the quadriceps muscle—comprised of the rectus femoris, vastus lateralis, vastus medialis, and vastus intermedius—generates extreme force across the knee joint. **Sudden**, **forceful contraction**, as can occur in deceleration from a fall or in certain athletic activities, can cause rupture of the quadriceps–patellar tendon complex. Tendon injuries can be categorized in relation to the patella:

- **Quadriceps tendon tears** (proximal to the patella in the rectus femoris tendon): the **patella rides low** (as seen in this patient), indicating an intact connection to the tibia, with a palpable **defect above the patella**
- Patellar tendon tears (distal to the patella): the patella rides high, often with a palpable defect below the patella (the nomenclature can be confusing as the patellar tendon is actually a ligament) **(Choice C)**

This patient, who is unable to bear weight after landing on flexed knee, has a large knee effusion and a low-lying patella; this presentation suggests quadriceps tendon rupture (proximal to the patella). Typical symptoms include an audible pop, rapid swelling, and inability to actively extend the knee against gravity. Risk factors include chronic kidney disease, hyperparathyroidism, and anabolic steroid abuse. Exposure to fluoroquinolone antibiotics may also increase the risk. The diagnosis and extent of the injury can be assessed on MRI. Management of complete tears of the quadriceps tendon requires surgical intervention.

(Choice A) Tears involving the anterior cruciate ligament are common in middle-aged athletes and can cause rapid-onset hemarthrosis. Extensive swelling may mask ligamentous instability in the acute phase, but knee extension against gravity is intact.

(Choice B) Meniscal injuries typically present with slow-onset swelling, with locking or catching during range-of- motion testing. Weight bearing and knee extension are intact.

(Choice D) Popliteal cyst rupture typically presents with acute pain, ecchymosis, and swelling in the posterior knee and calf. Although this injury occurs most commonly in patients with underlying knee pathology (eg, osteoarthritis), weight bearing and joint stability are unaffected.

Educational objective:
Sudden, forceful contraction of the quadriceps muscle can cause rupture of the quadriceps–patellar tendon complex. Symptoms include an audible pop, rapid swelling, and inability to actively extend the knee against gravity. In tears of the quadriceps tendon (proximal to the patella) the patella rides low, with a palpable defect above the patella.

References

- Patellar tendon tears (distal to the patella): the patella rides high, often with a palpable defect below the patella (the nomenclature can be confusing as the patellar tendon is actually a ligament) **(Choice C)**

This patient, who is unable to bear weight after landing on flexed knee, has a large knee effusion and a low-lying patella; this presentation suggests quadriceps tendon rupture (proximal to the patella). Typical symptoms include an audible pop, rapid swelling, and inability to actively extend the knee against gravity. Risk factors include chronic kidney disease, hyperparathyroidism, and anabolic steroid abuse. Exposure to fluoroquinolone antibiotics may also increase the risk. The diagnosis and extent of the injury can be assessed on MRI. Management of complete tears of the quadriceps tendon requires surgical intervention.

(Choice A) Tears involving the anterior cruciate ligament are common in middle-aged athletes and can cause rapid-onset hemarthrosis. Extensive swelling may mask ligamentous instability in the acute phase, but knee extension against gravity is intact.

(Choice B) Meniscal injuries typically present with slow-onset swelling, with locking or catching during range-of- motion testing. Weight bearing and knee extension are intact.

(Choice D) Popliteal cyst rupture typically presents with acute pain, ecchymosis, and swelling in the posterior knee and calf. Although this injury occurs most commonly in patients with underlying knee pathology (eg, osteoarthritis), weight bearing and joint stability are unaffected.

Educational objective:
Sudden, forceful contraction of the quadriceps muscle can cause rupture of the quadriceps–patellar tendon complex. Symptoms include an audible pop, rapid swelling, and inability to actively extend the knee against gravity. In tears of the quadriceps tendon (proximal to the patella) the patella rides low, with a palpable defect above the patella.

References

- Quadriceps tendon rupture.

Surgery	Rheumatology/Orthopedics & Sports	Quadriceps muscle and tendon injuries
Subject	System	Topic

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Question Id: 15657

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- Patellar tendon tears (distal to the patella): the patella rides high, often with a palpable defect below the patella (the nomenclature can be

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Question Id: 16127

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A 59-year-old man comes to the office with a 3-month history of persistent right ear pain. He has tried to control the pain with acetaminophen and ibuprofen but with no improvement. He has no other medical issues. He works as a welder and has smoked a pack of cigarettes daily for 40 years and drinks a case of beer each weekend. Vital signs are within normal limits. Right ear examination shows a normal external ear, normal external auditory canal, and a clear tympanic membrane with no middle ear fluid. Palpation of the temporomandibular joint elicits no tenderness or crepitus. His left ear examination shows no abnormalities. Oral cavity examination shows poor dentition, but there are no ulcers. The tonsils are not enlarged, and posterior pharyngeal wall is nonerythematous. There is a nontender 2-cm lymph node on the right side of his neck. Which of the following is the best next step in management of this patient?

A. Audiogram
B. Flexible laryngopharyngoscopy
C. MR imaging of the brain
D. Reassurance and symptomatic care
E. Tympanometry
F. Tympanostomy tube placement

Submit

TUTOR

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A 59-year-old man comes to the office with a 3-month history of persistent right ear pain. He has tried to control the pain with acetaminophen and ibuprofen but with no improvement. He has no other medical issues. He works as a welder and has smoked a pack of cigarettes daily for 40 years and drinks a case of beer each weekend. Vital signs are within normal limits. Right ear examination shows a normal external ear, normal external auditory canal, and a clear tympanic membrane with no middle ear fluid. Palpation of the temporomandibular joint elicits no tenderness or crepitus. His left ear examination shows no abnormalities. Oral cavity examination shows poor dentition, but there are no ulcers. The tonsils are not enlarged, and posterior pharyngeal wall is nonerythematous. There is a nontender 2-cm lymph node on the right side of his neck. Which of the following is the best next step in management of this patient?

- A. Audiogram (6%)
- ✓ B. Flexible laryngopharyngoscopy (51%)
- C. MR imaging of the brain (30%)
- D. Reassurance and symptomatic care (6%)
- E. Tympanometry (5%)
- F. Tympanostomy tube placement (0%)

Omitted
Correct answer
B

51%
Answered correctly

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Time Spent

03/29/2020
Last Updated

Explanation

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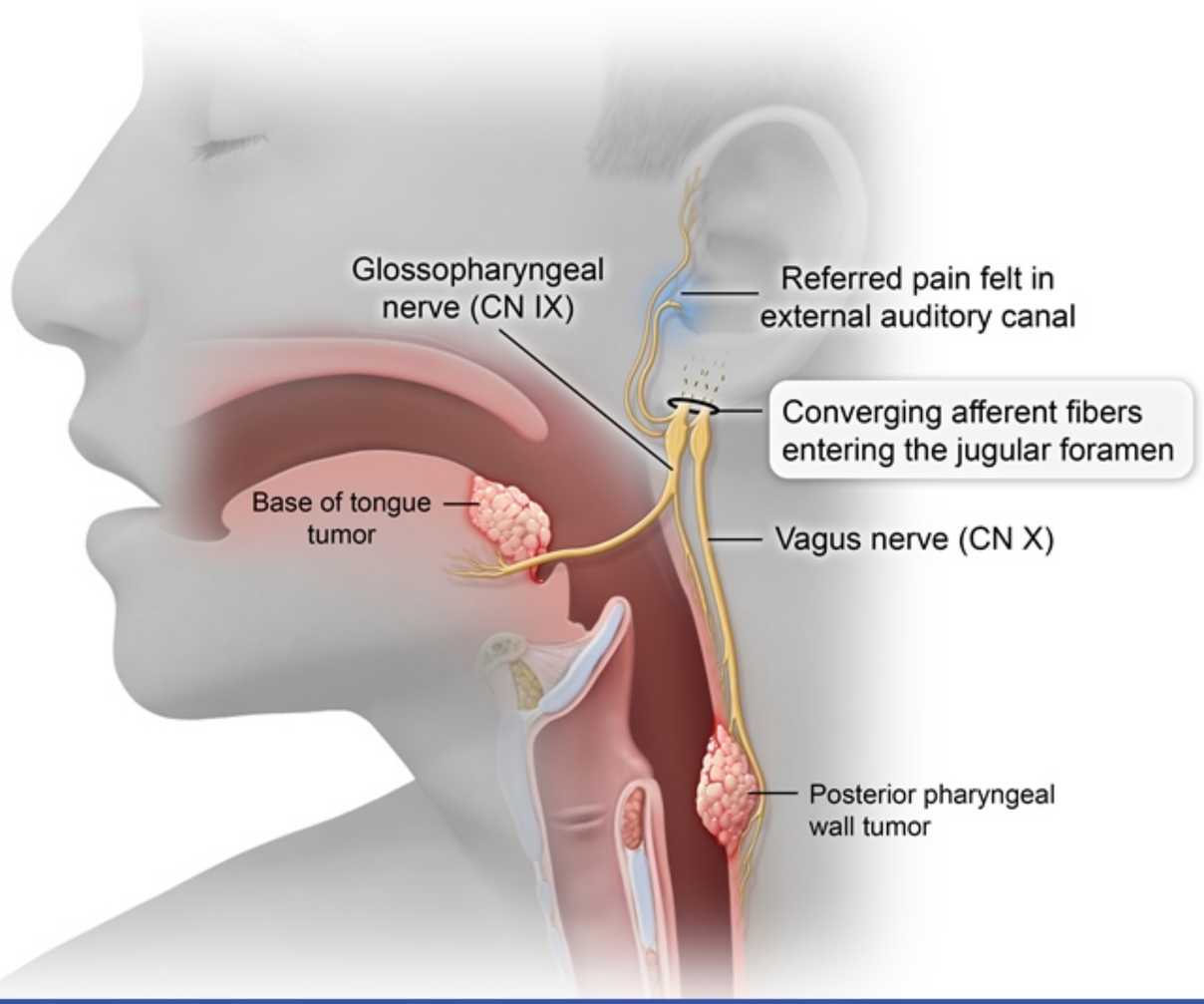
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Explanation

Referred otalgia

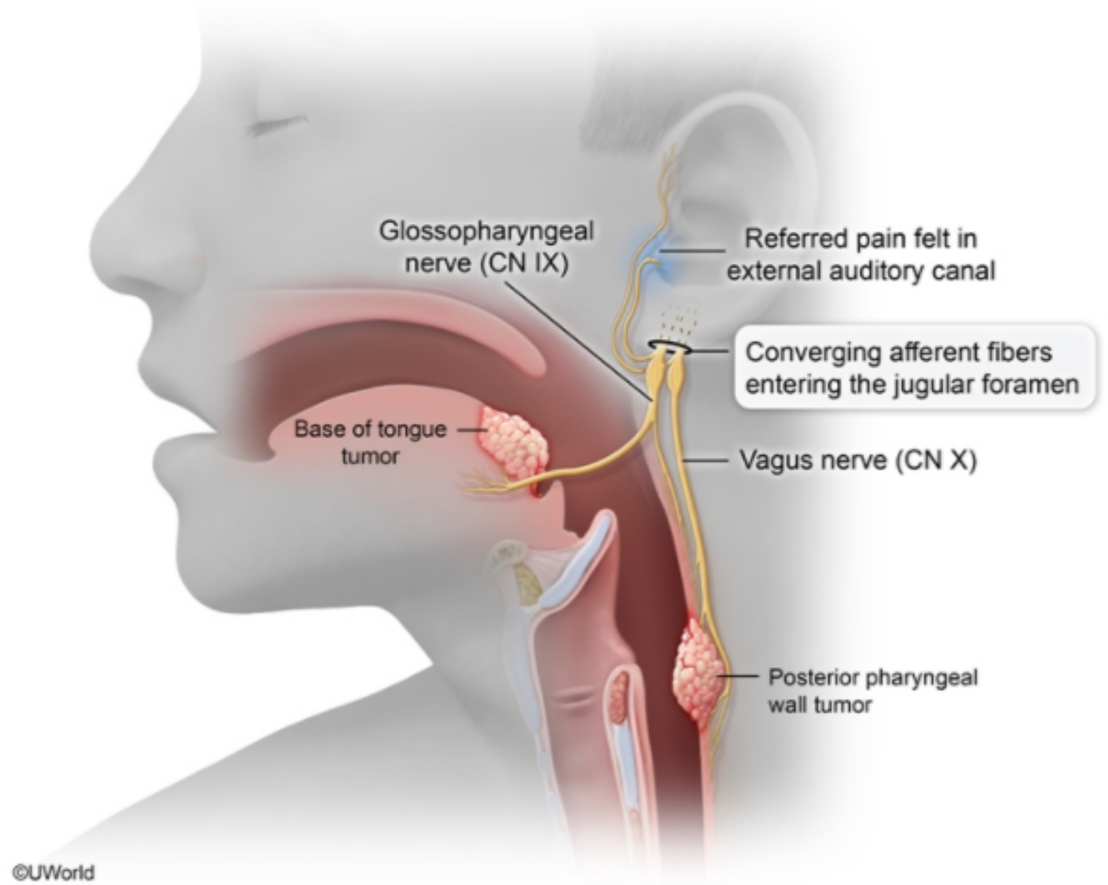


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Referred otalgia



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causes of **referred otalgia** are dental disease and temporomandibular joint disorders. However, referred otalgia is commonly a presenting

Otalgia in the setting of a normal ear examination is likely referred pain (pain perceived at a different site than its true origin). The most common causes of **referred otalgia** are dental disease and temporomandibular joint disorders. However, referred otalgia is commonly a presenting symptom of **mucosal head and neck squamous cell carcinoma (HNSCC)**, especially in an older patient with a history of **smoking**, alcohol use, occupational exposure to welding fumes, and **cervical lymphadenopathy**.

Referred pain frequently occurs when nerves travel in close proximity, especially if their cell bodies are located in the same ganglia or they synapse in the same location. In this case, the **glossopharyngeal nerve** (CN IX), which has afferent fibers innervating the base of the tongue, also has a branch that provides afferent sensory input from the external auditory canal; all of these afferent fibers converge in a ganglion just prior to entering the jugular foramen. Similarly, the **vagus nerve** (CN X), which innervates parts of the larynx and hypopharynx, also provides sensory innervation to the external auditory canal.

Therefore, referred otalgia can be due to a tumor at the base of the tongue or from the larynx/hypopharynx. Flexible laryngopharyngoscopy would likely identify the primary tumor site.

(Choice A) An audiogram is used to evaluate hearing loss. Although many etiologies of hearing loss present with a normal ear examination, ear pain, especially in a patient with HNSCC risk factors, is concerning for malignancy.

(Choice C) MRI scan of the brain can assess for vestibular schwannoma (acoustic neuroma), which can cause hearing loss, dizziness, and tinnitus but would not cause referred otalgia. Referred otalgia is almost never due to central causes.

(Choice D) Although a normal ear examination is reassuring that there is no primary etiology of otalgia (eg, otitis externa, otitis media), referred otalgia can be the presenting symptom of many diverse, insidious pathologies and therefore must be further evaluated.

(Choices E and F) Tympanometry can assess for eustachian tube dysfunction, which can cause ear pain but would also cause hearing loss, feeling of fullness, and tympanic membrane retraction or middle ear effusion; tympanostomy tube placement can be considered in patients who do not respond to medical management (eg, decongestants). Tube placement is also indicated in some children with recurrent otitis media.

Educational objective:
In a patient with risk factors for malignancy, ear pain with a normal ear examination may be referred from the base of the tongue or hypopharynx/larynx. Associated cervical adenopathy makes head and neck squamous cell carcinoma the most likely diagnosis.

innervation to the external auditory canal.

Therefore, referred otalgia can be due to a tumor at the base of the tongue or from the larynx/hypopharynx. Flexible laryngopharyngoscopy would likely identify the primary tumor site.

(Choice A) An audiogram is used to evaluate hearing loss. Although many etiologies of hearing loss present with a normal ear examination, ear pain, especially in a patient with HNSCC risk factors, is concerning for malignancy.

(Choice C) MRI scan of the brain can assess for vestibular schwannoma (acoustic neuroma), which can cause hearing loss, dizziness, and tinnitus but would not cause referred otalgia. Referred otalgia is almost never due to central causes.

(Choice D) Although a normal ear examination is reassuring that there is no primary etiology of otalgia (eg, otitis externa, otitis media), referred otalgia can be the presenting symptom of many diverse, insidious pathologies and therefore must be further evaluated.

(Choices E and F) Tympanometry can assess for eustachian tube dysfunction, which can cause ear pain but would also cause hearing loss, feeling of fullness, and tympanic membrane retraction or middle ear effusion; tympanostomy tube placement can be considered in patients who do not respond to medical management (eg, decongestants). Tube placement is also indicated in some children with recurrent otitis media.

Educational objective:
In a patient with risk factors for malignancy, ear pain with a normal ear examination may be referred from the base of the tongue or hypopharynx/larynx. Associated cervical adenopathy makes head and neck squamous cell carcinoma the most likely diagnosis.

References

- Clinical differences in types of otalgia.
- Survival trends in hypopharyngeal cancer: a population-based review.
- Diagnosis of ear pain.

Surgery	Ear, Nose & Throat (ENT)	Head and neck cancers
Subject	System	Topic

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A 65-year-old man comes to the office due to a nonhealing ulcer on the left upper extremity. For the last 2 months, he has had an enlarging ulcerated lesion, with intermittent bleeding and itching. In the last 3 weeks, the patient has also noted local numbness, paresthesias, and burning pain. He does not recall any injury prior to the onset of symptoms. He has good appetite and reports no weight loss. There is no fever, dyspnea, or cough. The patient has a history of renal transplantation and takes an appropriate immunosuppressive regimen. He does not use tobacco, alcohol, or illicit drugs. Vital signs are normal. Physical examination of the lesion is shown in the image below. The remainder of the examination is unremarkable.



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Which of the following is the most likely diagnosis?

A. Basal cell carcinoma
B. Disseminated cryptococcosis
C. Kaposi sarcoma
D. Malignant melanoma
E. Squamous cell carcinoma

Submit

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Which of the following is the most likely diagnosis?

- A. Basal cell carcinoma (37%)
- B. Disseminated cryptococcosis (2%)
- C. Kaposi sarcoma (3%)
- D. Malignant melanoma (1%)
- ✓ E. Squamous cell carcinoma (56%)

Omitted
Correct answer

56%
Answered correctly

06 secs
Time Spent

04/28/2020
Last Updated

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Explanation

This patient has a cutaneous **squamous cell carcinoma** (SCC). SCC typically forms an enlarging nodule in sun-exposed areas. The lesions often become **keratinized** (with a thickened, rough surface) or ulcerate with crusting and bleeding. In addition, SCC can display early perineural invasion, causing regional **neurologic symptoms** (eg, numbness, paresthesias).

Risk factors for SCC include sunlight exposure, fair skin, chronic inflammation or scar formation, and ionizing radiation exposure. SCC is especially common in patients who have a history of organ transplant and are on chronic **immunosuppressive therapy**. SCC in immunosuppressed patients is typically more aggressive, with an increased risk of local recurrence and regional metastasis.

(Choice A) Basal cell carcinoma (BCC) characteristically presents as a pearly, flesh- or pink-colored nodule with telangiectatic vessels and is usually found on the head or neck. BCC is the most common skin malignancy in the general population; however, SCC occurs more commonly among immunosuppressed patients and more commonly on the extremities, and it is more likely to cause neural invasion.

(Choice B) Disseminated cryptococcosis is usually seen in immunosuppressed patients. The skin is the most common site. It presents as multiple, discrete, flesh- to red-colored papules of varying size with slight central umbilication.

(Choice C) Kaposi sarcoma is most commonly seen in the setting of coinfection with HIV and human herpes virus 8. The lesions typically begin as papules and later develop into plaques or nodules. The color can change from light brown to violet, and patients often have multiple lesions.

(Choice D) Melanomas are also seen with increased frequency in transplant patients. They are most often pigmented and are characterized by asymmetry, irregular border, variegated color, diameter >6 mm, and evolution in size and appearance over time.

Educational objective:
Squamous cell carcinoma (SCC) is the most common skin malignancy in patients on chronic immunosuppressive therapy for a history of organ transplant. SCC in immunosuppressed patients is more aggressive, with an increased risk of local recurrence and regional metastasis.

References

- Factors predictive of recurrence and death from cutaneous squamous cell carcinoma: a 10-year, single-institution cohort study.

Surgery Dermatology Nonmelanoma skin cancer

Settings

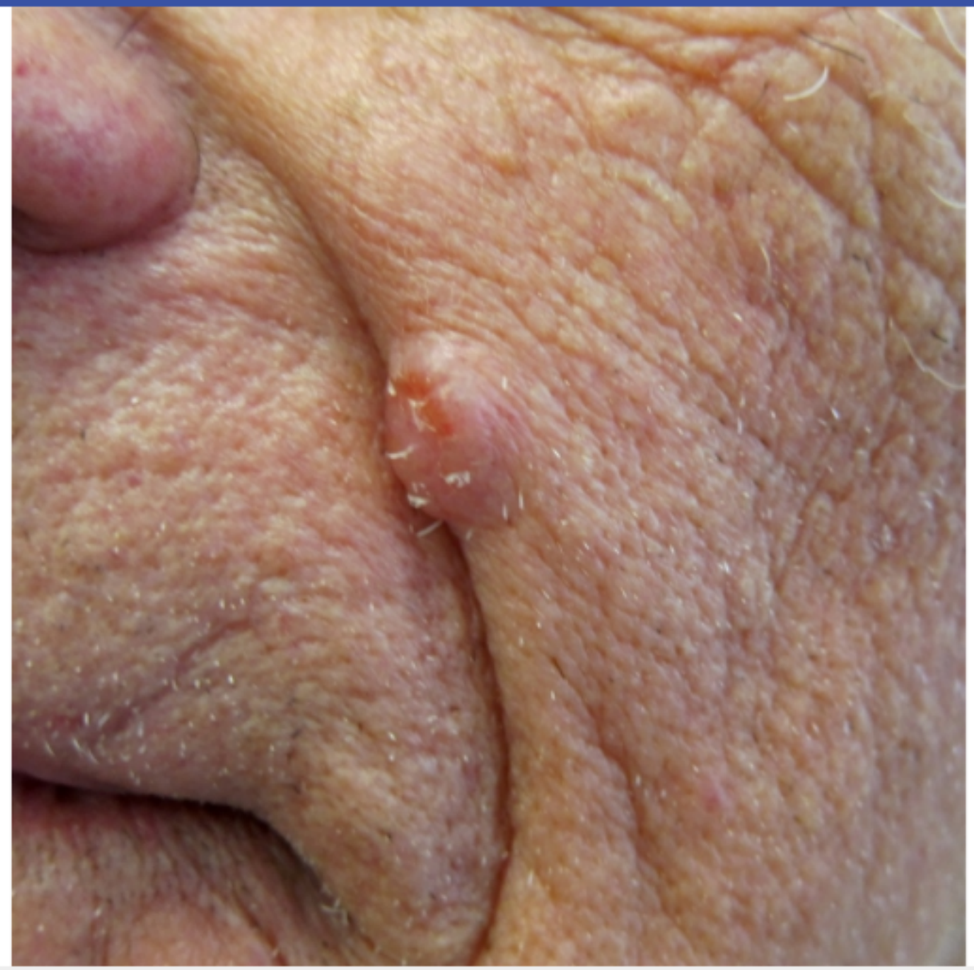
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Explanation

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Surgery Dermatology Nonmelanoma skin cancer

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Surgery Dermatology Nonmelanoma skin cancer

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