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Item 1 of 40

Question Id: 12079



A 28-year-old woman comes to the office due to a right breast mass. The patient first noticed the mass several weeks ago and it has slowly increased in size. She had an uncomplicated vaginal delivery 7 months ago and exclusively breastfed her baby for 6 months. The patient has not had a breast mass before. She uses a progestin-releasing subcutaneous implant for contraception. Temperature is 36.7 C (98.1 F) and blood pressure is 110/60 mm Hg. Examination of the right breast shows a soft, mobile, nontender 4-cm subareolar mass. No skin changes, nipple discharge or retraction, or axillary or supraclavicular lymphadenopathy is present. The left breast has no abnormalities. Which of the following is the most likely diagnosis in this patient?

- A. Abscess (0%)
- B. Fat necrosis (0%)
- C. Fibroadenoma (31%)
- D. Fibrocystic changes (2%)
- E. Galactocele (64%)
- F. Intraductal papilloma (0%)

Incorrect

Correct answer
E

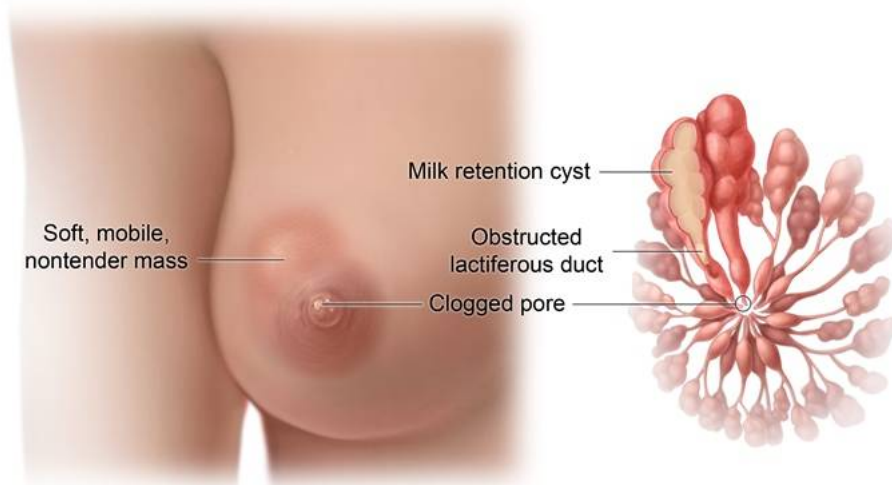
64%
Answered correctly

06 mins, 03 secs
Time Spent

03/19/2021
Last Updated

Explanation

Galactocele



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A **galactocele** is a benign **milk retention cyst** that typically occurs a few weeks to months **after cessation of breastfeeding**, when milk stagnates. Galactoceles may occur less commonly during lactation or, rarely, late in the third trimester. Dried, deposited proteins in the lactiferous duct cause blockage; milk accumulation behind the obstruction results in a **soft, mobile, nontender subareolar mass** as large as 5 cm.

No intervention is required for an asymptomatic galactocele; symptomatic galactoceles may be needle aspirated. Ultrasound is the first-line imaging modality for diagnosis; aspiration confirms the diagnosis and is curative. Ice packs and a supportive, well-fitting bra provide symptomatic relief.

(Choice A) Patients with a breast abscess typically have fever and a tender, fluctuant breast mass with surrounding erythema.

(Choice B) Fat necrosis can present as a nontender breast mass; however, it is typically the result of trauma and is associated with ecchymosis, which is not seen in this patient.

(Choice C) Fibroadenomas are a common benign (eg, mobile, nontender) breast mass in adolescents and young women. Fibroadenomas increase in size in response to estrogen, which is why they present during adolescence and involute in postmenopausal women; therefore, they are less likely to develop as new masses in recently breastfeeding (ie, estrogen-deficient) patients.

(Choice D) Fibrocystic breast disease typically presents as diffuse, bilateral changes rather than a unilateral breast mass.

(Choice F) An intraductal papilloma can present as a singular, nontender mass near the nipple; however, it is usually small (≤ 1 cm), solid, and irregularly shaped, with bloody nipple discharge.

Educational objective:

A galactocele may occur weeks to months after cessation of breastfeeding and is due to ductal blockage with resulting milk accumulation. Examination shows a soft, mobile, nontender mass in the subareolar region. Diagnosis is made with ultrasound and needle aspiration.

References

- Radiologic evaluation of breast disorders related to pregnancy and lactation.
(<http://www.ncbi.nlm.nih.gov/pubmed/18180221>)
- Breast lumps in pregnant women.
(<http://www.ncbi.nlm.nih.gov/pubmed/26341843>)
- Galactocele in the axillary accessory breast mimicking suspicious solid mass on ultrasound.
(<http://www.ncbi.nlm.nih.gov/pubmed/28487794>)

Obstetrics & Gynecology
Subject

Female Reproductive System & Breast
System

Breast mass
Topic



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UWORLD

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SKETCHY

BNB

MTB

AMBOSS

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PIXORIZE

GET THEM NOW

REVIEW

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Item 2 of 40

Question Id: 12138





A 62-year-old man comes to the emergency department due to painful swelling in the right groin. He also has had nausea and 2 episodes of bilious vomiting since the onset of pain several hours ago. Medical history is notable for hypertension and a myocardial infarction treated with a coronary stent a year ago. The patient is a former smoker and drinks alcohol occasionally. Temperature is 38.2 C (100.8 F), blood pressure is 140/80 mm Hg, and pulse is 110/min. On examination, the abdomen is soft and mildly distended with hyperactive bowel sounds. There is a 4-cm tender mass in the right inguinal region with erythema of the overlying skin. The patient subsequently undergoes urgent exploratory surgery of the right groin. Which of the following is most likely to be found during surgery?


- ✗ A. Arteriovenous fistula (1%)
- B. Cyst containing keratinous material (0%)
- C. Dilated, tortuous blood vessels (2%)
- D. Infarcted testes (3%)
- ✓ E. Ischemic bowel segment (84%)
- F. Localized pus collection (7%)
- G. Malignant deposits in lymph nodes (0%)

Incorrect

Correct answer
E

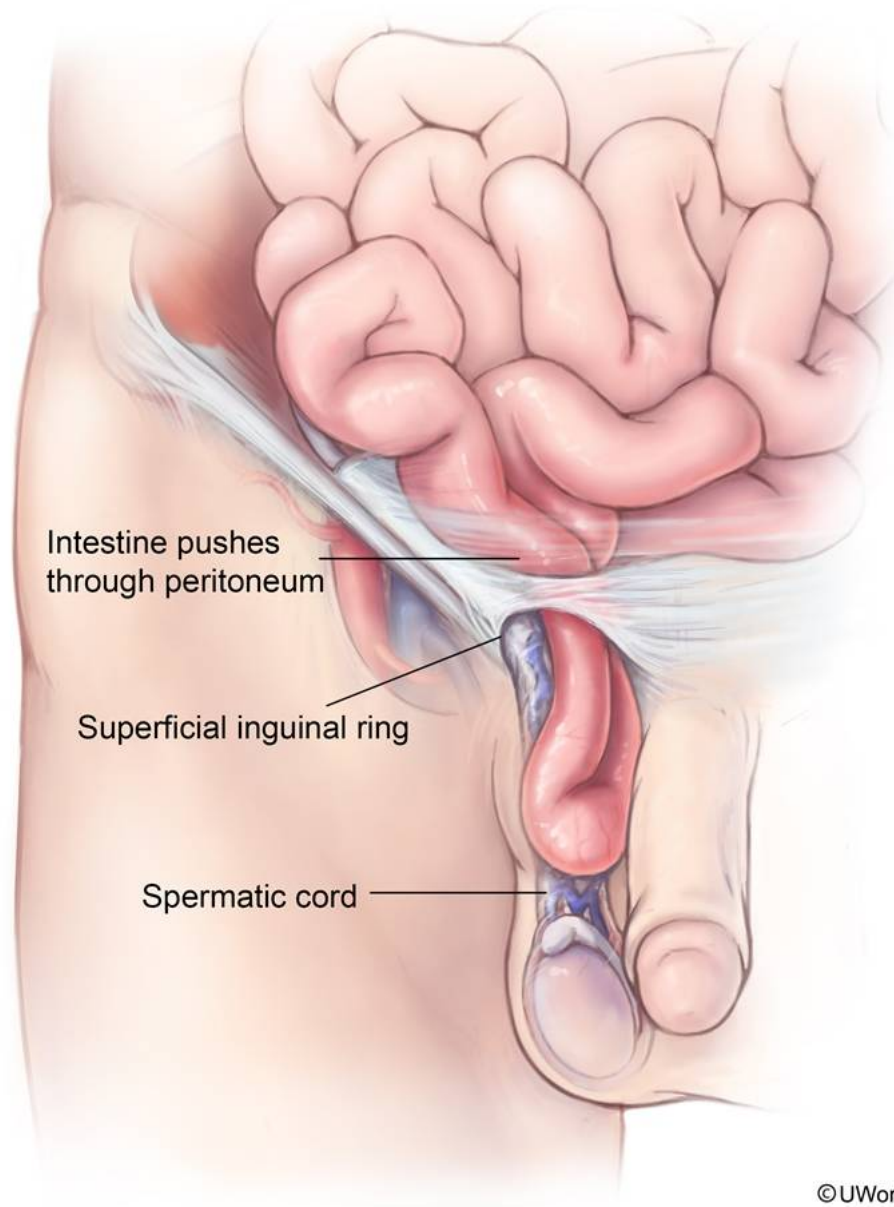
 84%
Answered correctly

 03 mins, 22 secs
Time Spent

 04/18/2021
Last Updated

Explanation

Direct inguinal hernia



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This patient, an older man who has an acutely painful groin bulge and features of bowel obstruction (ie, vomiting, abdominal distension, hyperactive bowel sounds), most likely has a strangulated **inguinal hernia**. Direct inguinal hernias are common in older men and usually present with a chronic or slowly progressive bulge and dull discomfort that is worse with Valsalva. However, trapping of a loop of bowel within the hernia (**incarceration**) can disrupt blood flow to the involved bowel segment, leading to ischemic necrosis (**strangulation**).

Strangulated hernias can be exquisitely tender on palpation, with associated fever and erythema of the overlying skin. Ultrasound or CT imaging can rapidly confirm the diagnosis but is not always necessary. Management of a strangulated hernia requires expedited **surgical intervention**.

(Choice A) Arteriovenous fistula involving the femoral vessels is a potential complication of percutaneous coronary interventions. Early signs include a palpable thrill and distal ischemia. Late manifestations can include high-output heart failure. Delayed inflammatory complications are uncommon.

(Choice B) An epidermoid cyst is a discrete nodule in the skin and is a result of epidermal keratin becoming lodged in the dermis. It may occasionally become inflamed or infected but would not cause bowel obstruction.

(Choices C and D) A varicocele, a chronic disorder characterized by distension of the pampiniform plexus within the spermatic cord, can present with dull discomfort and a palpable bulge in the groin. Testicular torsion is most common in children and adolescents and is characterized by acute pain with a high-riding, horizontally oriented testis. These conditions would not cause bowel obstruction.

(Choice F) Inguinal abscesses are uncommon but can occur due to complicated skin and soft tissue infections or an extension of an intra-abdominal abscess. Bowel sounds would be normal or hypoactive rather than hyperactive.

(Choice G) Malignant inguinal adenopathy can be seen in melanoma and other skin neoplasms, lymphoma, and squamous cell carcinoma of the anus or genitalia. However, symptoms would be subacute to chronic rather than acute.

Educational objective:

Strangulated hernias are characterized by disruption of blood flow to the involved bowel segment, leading to ischemic necrosis. Clinical features include severe local pain and tenderness, fever, and signs of bowel obstruction. The diagnosis can be confirmed by imaging, and urgent surgical

REVIEW

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Item 3 of 40

Question Id: 12289



A 68-year-old man with a history of chronic obstructive pulmonary disease requiring home oxygen therapy came to the hospital 3 days ago due to worsening pedal edema, abdominal distension, and fatigue of several weeks duration. At the time of admission, his physical examination was notable for distended neck veins, loud second heart sound, bilateral lower extremity edema, and moderate ascites. The patient's clinical condition has gradually improved with intravenous furosemide, but he is found to have worsening renal function and decreasing urine output. His other medical problems include hypertension and hyperlipidemia. The patient has a 40-pack-year smoking history but quit 5 years ago. He takes atorvastatin, lisinopril, inhaled glucocorticoids, and bronchodilators at home, which have been continued in the hospital. Today, temperature is 37.1 C (98.8 F), blood pressure is 110/70 mm Hg, and pulse is 96/min. Physical examination shows flat neck veins, 1+ bilateral lower extremity edema, and mild ascites. Breath sounds are diminished with no added sounds. Pulmonic component of the second heart sound is loud with no murmur. Rectal examination shows a slightly enlarged, smooth prostate. Urine output and renal function since admission are shown below.

| | At admission | Day 1 | Day 2 | Day 3 |
|------------------------------------|--------------|-------|-------|-------|
| Urine output (L/24 hr) | - | 4.2 | 3.1 | 1.5 |
| Blood urea nitrogen (mg/dL) | 24 | 28 | 36 | 52 |
| Serum creatinine (mg/dL) | 1.0 | 1.2 | 1.5 | 2.1 |

Urinalysis shows no cells, casts, or protein. Which of the following is the most likely cause of this patient's current renal dysfunction?

- ✗ A. Bilateral renal artery stenosis (1%)
- B. Bladder outlet obstruction (3%)
- C. Decreased afferent arteriolar dilation (4%)
- ✓ D. Decreased intravascular volume (73%)
- E. Impaired cardiac contractility (5%)
- F. Renal parenchymal inflammation (1%)
- G. Splanchnic arterial dilation (9%)

Incorrect
Correct answer
D

73%
Answered correctly

06 mins, 30 secs
Time Spent

04/29/2021
Last Updated

Explanation

Prerenal acute kidney injury

| | |
|--------------------------|--|
| Etiology | <ul style="list-style-type: none"> • Decreased renal perfusion <ul style="list-style-type: none"> ◦ True volume depletion ◦ Decreased EABV (eg, heart failure, cirrhosis) ◦ Displacement of intravascular fluid (eg, sepsis, pancreatitis) ◦ Renal artery stenosis ◦ Afferent arteriole vasoconstriction (eg, NSAIDs) |
| Clinical features | <ul style="list-style-type: none"> • Increase in serum creatinine (eg, 50% from baseline) • Decreased urine output • Blood urea nitrogen/creatinine ratio >20:1 • Fractional excretion of sodium <1% • Unremarkable ("bland") urine sediment |
| Treatment | <ul style="list-style-type: none"> • Restoration of renal perfusion |

EABV = effective arterial blood volume; **NSAIDs** = nonsteroidal anti-inflammatory drugs.

This patient with chronic obstructive pulmonary disease (COPD) and evidence of pulmonary hypertension (eg, loud pulmonary component of the second heart sound) came to the hospital in decompensated **right-sided heart failure**. His initial response to furosemide (eg, high urine output on day 1) improved his cardiac function by decreasing right ventricular end-diastolic volume (preload); however, patients with right ventricular dysfunction are preload-dependent and therefore sensitive to excessive volume loss. Although this patient still has edema, he has likely developed **acute kidney injury (AKI)** due to **intravascular volume depletion** (eg, flat neck veins on repeat examination).

Prerenal AKI occurs due to **decreased renal perfusion**. The kidneys increase tubular sodium and water reabsorption, leading to an increase in passive urea reabsorption and an elevated **blood urea nitrogen/creatinine ratio >20:1**. Urine output is typically decreased. There is no intrinsic kidney damage in prerenal AKI and urine studies are typically free of casts, protein, and cells. Restoration of renal perfusion corrects the AKI and prevents the development of acute tubular necrosis (which can occur from a prolonged prerenal state).

(Choice A) In bilateral renal artery stenosis (RAS), glomerular filtration rate is often maintained by angiotensin II-induced constriction of the efferent arterioles. Severe AKI can occur if angiotensin II activity is removed by initiation of an ACE inhibitor (eg, lisinopril). This patient had normal renal function while taking lisinopril, making bilateral RAS unlikely.

(Choice B) Bladder outlet obstruction due to benign prostatic hyperplasia is a common cause of postrenal AKI in elderly men; however, ongoing urine output rules out significant urinary obstruction.

(Choice C) Nonsteroidal anti-inflammatory drugs (NSAIDs) can cause prerenal AKI by blocking prostaglandin-induced dilation of the glomerular afferent arterioles. This patient has not been taking NSAIDs.

(Choice E) Impaired cardiac contractility can lead to prerenal AKI due to decreased cardiac output. It is unlikely to be responsible for this patient's AKI as the initial response to diuresis indicates improved right ventricular contractility.

(Choice F) Renal parenchymal inflammation occurs in intrinsic AKI due to interstitial nephritis (eg, medication-induced). Absence of leukocyte casts or protein in the urine makes interstitial nephritis unlikely.

(Choice G) Splanchnic arterial dilation is the mechanism of hepatorenal syndrome in patients with cirrhosis. Ascites and lower extremity edema are typically present; however, this patient's history of COPD and a loud second heart sound on examination makes right-sided heart failure due to pulmonary hypertension more likely.

Educational objective:

Patients with right-sided heart failure are preload dependent and require careful diuresis. Prerenal acute kidney injury results from decreased renal perfusion and is typically characterized by an elevated blood urea nitrogen/creatinine ratio >20:1 and unremarkable urine sediment.

References

- Clinical scenarios in acute kidney injury: pre-renal acute kidney injury.

(<http://www.ncbi.nlm.nih.gov/pubmed/27169621>)

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|----------|---------------------------------------|-------------------|
| Medicine | Renal, Urinary Systems & Electrolytes | Prerenal azotemia |
| Subject | System | Topic |

REVIEW

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Item 4 of 40
Question Id: 12075



A 30-year-old man comes to the office for follow-up of primary adrenal insufficiency. He was initially diagnosed 3 months ago after presenting with fatigue, weight loss, lethargy, decreased appetite, and abdominal pain. The patient was started on treatment with hydrocortisone, resulting in significant improvement in his initial symptoms and slight weight gain. However, he continues to have mild residual fatigue and frequent episodes of dizziness. Medical history is notable for celiac disease, for which he is following a gluten-free diet. Family history is notable for thyroid disease, with hypothyroidism in his mother and Graves disease in his sister. The patient consumes alcohol only on social occasions and does not smoke or use illicit drugs. Seated blood pressure is 100/80 mm Hg and pulse is 95/min; standing blood pressure is 75/50 mm Hg and pulse is 102/min. Examination shows excessive pigmentation of mucous membranes and skin creases. The remainder of the examination is normal. Which of the following laboratory findings would most likely be found in this patient?

- A. High plasma dehydroepiandrosterone sulfate level (4%)
- ✓ B. High plasma renin activity (72%)
- C. Hyponatremia (2%)
- D. Hypokalemia (7%)
- ✗ E. Low circulating norepinephrine level (12%)

Incorrect
Correct answer
B

72%
Answered correctly

02 mins, 11 secs
Time Spent

09/05/2021
Last Updated

Explanation

| Primary versus secondary adrenal insufficiency | | |
|--|--|--|
| | Primary | Secondary |
| Mechanism | • Destruction of bilateral adrenal cortex | • Disruption of hypothalamic-pituitary axis |
| Possible etiologies | • Autoimmune adrenalitis • Infection, malignancy | • Chronic glucocorticoid therapy • Infiltrative disease |
| Cortisol | ↓ | ↓ |
| Aldosterone | ↓ | Normal |
| ACTH | ↑ | ↓ |
| Clinical features | • More severe symptoms • Hypovolemia • Hyperkalemia, hyponatremia • Hyperpigmentation | • Less severe symptoms • Euvolemia • Minimal electrolyte disturbance • No hyperpigmentation |

Primary adrenal insufficiency (PAI) is characterized by injury to all 3 layers of the adrenal cortex (ie, zona glomerulosa, fasciculata, reticularis). Patients with PAI can therefore have features of **glucocorticoid** (eg, fatigue, loss of appetite, weight loss) and **mineralocorticoid deficiencies** (eg, orthostatic hypotension). Women can also have symptoms of androgen deficiency (eg, low libido) as the adrenals are a major source of androgens in women. In contrast, patients with central adrenal insufficiency will have only glucocorticoid deficiency as aldosterone production is regulated by the renin-angiotensin system and is not affected.

Patients with PAI require replacement of both glucocorticoid and mineralocorticoid. Hydrocortisone has partial mineralocorticoid activity, but physiologic doses do not provide adequate mineralocorticoid activity for most patients. Signs of relative mineralocorticoid deficiency include hypotension, hyperkalemia, hyponatremia (**Choices C and D**), and elevated **plasma renin activity**. Addition of fludrocortisone is advised to correct this deficiency.

(Choice A) Adrenal androgens (eg, androstenedione, dehydroepiandrosterone, dehydroepiandrosterone sulfate) are secreted from the zona reticularis of the adrenal cortex and will be diminished in PAI.

(Choice E) The adrenal medulla is not directly affected in PAI, and total catecholamine production is normal. Epinephrine levels may be low as the conversion of norepinephrine to epinephrine is catalyzed by phenylethanolamine N-methyltransferase, which is normally upregulated by cortisol from the adrenal cortex; however, norepinephrine levels will be normal.

Educational objective:

Primary adrenal insufficiency is characterized by features of glucocorticoid and mineralocorticoid deficiency. Hydrocortisone has partial mineralocorticoid activity, but most patients will require additional mineralocorticoid supplementation. In central adrenal insufficiency, mineralocorticoid production is normal.

References

- Diagnosis and treatment of primary adrenal insufficiency: an Endocrine Society clinical practice guideline.

(<http://www.ncbi.nlm.nih.gov/pubmed/26760044>)

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| Medicine | Endocrine, Diabetes & Metabolism | Adrenal insufficiency |
| Subject | System | Topic |

REVIEW

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Item 5 of 40

Question Id: 12443





A 24-year-old woman, gravida 1 para 1, comes to the office for evaluation of amenorrhea. The patient had an uncomplicated vaginal delivery 2 years ago. She breastfed her child for the first year and had irregular menses during that time. The patient had a copper intrauterine device (IUD) placed after cessation of breastfeeding and has not had a menstrual period since. She has had a 20-kg (44.1-lb) weight loss since delivery but no fatigue or heat intolerance. The patient has no medical problems and takes a multivitamin daily. She does not use tobacco, alcohol, or illicit drugs. Blood pressure is 110/70 mm Hg and pulse is 68/min. BMI is 19 kg/m². On pelvic examination, the external genitalia are normal. The vagina has decreased rugation and the IUD strings are properly placed. A urine pregnancy test is negative. Serum FSH level is low, but prolactin and TSH levels are normal. A progesterone challenge test is performed, and there is no uterine bleeding. What is the most likely cause of this patient's amenorrhea?


- A. Copper intrauterine device use (11%)
- ✓ B. Functional hypothalamic amenorrhea (72%)
- C. Lactational amenorrhea (0%)
- D. Postpartum thyroiditis (0%)
- E. Primary ovarian insufficiency (10%)
- ✗ F. Sheehan syndrome (3%)

Incorrect

Correct answer
B

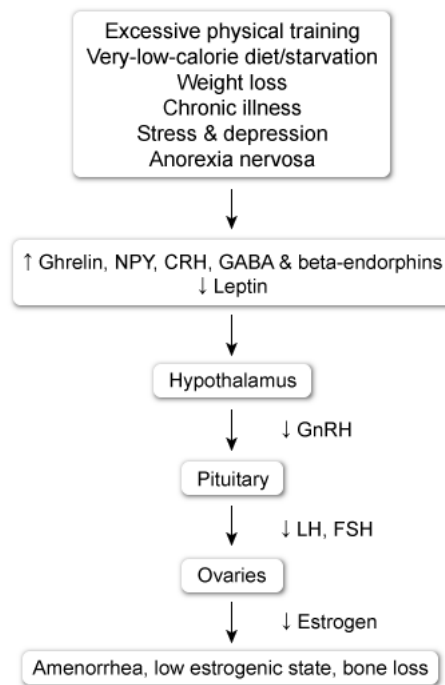
 72%
Answered correctly

 01 min, 53 secs
Time Spent

 05/23/2021
Last Updated

Explanation

Pathophysiology of functional hypothalamic amenorrhea



CRH = corticotropin-releasing hormone; GnRH = gonadotropin-releasing hormone; NPY = neuropeptide Y.

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This patient with a recent 20-kg (44.1-lb) weight loss, low BMI, and secondary amenorrhea most likely has **functional hypothalamic amenorrhea**. This form of amenorrhea is due to disruption of the hypothalamic-pituitary-ovarian axis, with a decrease in gonadotropin-releasing hormone leading to decreased levels of LH, FSH, and estrogen. A **progesterone challenge** would produce **no withdrawal bleeding** as low endogenous estrogen results in a thin endometrial lining that will not shed. Risk factors outside of **significant weight loss** (eg, caloric deficiency) include strenuous exercise, chronic illness, and stress.

In addition to amenorrhea, patients often have conditions secondary to hypoestrogenemia, including infertility, vaginal dryness, and stress fractures. Treatment is first behavioral (eg, increased caloric intake) but should also include estrogen repletion for those unable or unwilling to treat the underlying etiology (eg, unable to decrease stress levels, refuse to modify exercise patterns).

(Choice A) Amenorrhea is a typical side effect of a progestin-containing intrauterine device (IUD), but a patient with a copper IUD should maintain regular menses.

(Choice C) Lactational amenorrhea is a common finding in women who are breastfeeding. This patient ceased breastfeeding a year prior, so menses should have resumed.

(Choice D) Postpartum thyroiditis occurs within a year of delivery with symptoms such as fatigue, heat intolerance, and tachycardia. This patient is asymptomatic and has a normal TSH level.

(Choice E) A patient with primary ovarian insufficiency typically has amenorrhea and vasomotor symptoms. Unlike this patient, the patient with primary ovarian insufficiency would have high serum FSH levels.

(Choice F) This patient has no risk factors for Sheehan syndrome, a pituitary infarction commonly associated with significant postpartum hemorrhage. This condition typically presents immediately postpartum with the inability to breastfeed and decreased anterior pituitary (eg, TSH, FSH) hormone levels. This patient was able to breastfeed and has a normal TSH, making this diagnosis unlikely.

Educational objective:

Functional hypothalamic amenorrhea should be suspected in a patient with significant weight loss and low BMI. A progesterone challenge test results in no withdrawal bleeding due to low endogenous levels of estrogen.

References

- Functional hypothalamic amenorrhea and its influence on women's health.

(<http://www.ncbi.nlm.nih.gov/pubmed/25201001>)

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| Obstetrics & Gynecology | Female Reproductive System & Breast | Amenorrhea |
| Subject | System | Topic |

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Item 6 of 40
Question Id: 12221



A 43-year-old woman comes to the postoperative clinic due to persistent abdominal pain, nausea, and vomiting after undergoing an elective laparoscopic cholecystectomy 4 days ago. During the procedure, she had an episode of hypotension that resolved with intravenous fluids; there were no other intraoperative complications. The patient has no medical history and has been taking acetaminophen-hydrocodone for pain control. Temperature is 38.2 C (100.8 F), blood pressure is 122/84 mm Hg, and pulse is 92/min. Abdominal examination demonstrates mild abdominal distension with decreased bowel sounds and healing surgical incisions without erythema. Right upper quadrant tenderness with guarding and rebound is present. Laboratory results are as follows:

| | | |
|----------------------------|--|------------------------|
| Complete blood count | | |
| Hematocrit | | 33% |
| Leukocytes | | 13,000/mm ³ |
| Liver function studies | | |
| Total bilirubin | | 3.2 mg/dL |
| Direct bilirubin | | 2.0 mg/dL |
| Alkaline phosphatase | | 420 U/L |
| Aspartate aminotransferase | | 62 U/L |
| Alanine aminotransferase | | 74 U/L |

Right upper quadrant ultrasonography demonstrates normal-size biliary ducts. Which of the following is the most likely cause of this patient's current condition?

- ✓ A. Biliary leakage (42%)
- B. Drug-induced hepatotoxicity (2%)
- C. Gilbert syndrome (1%)
- D. Ischemic hepatitis (8%)
- E. Retained gallstone (33%)
- F. Small-bowel obstruction (10%)

Omitted
Correct answer
A

42%
Answered correctly

07 mins, 25 secs
Time Spent

05/09/2021
Last Updated

Explanation

This patient with a low-grade fever, **right upper quadrant tenderness**, nausea, and vomiting after recently undergoing a **laparoscopic cholecystectomy** has findings concerning for a **bile leak**, one of the most common complications after this surgery. Associated **leukocytosis** and **obstructive-appearing liver enzymes** (eg, elevated bilirubin, alkaline phosphatase) are often present. The bilirubin is usually only mildly

elevated as the peritoneum is able to reabsorb much of the leak; however, at times and especially with large leaks, there can be bilious ascites.

Most cases present 2-10 days after the procedure. On imaging, most patients have relatively **normal-appearing biliary ducts** or only mild dilation (which can be from the postoperative state alone). A biliary surgeon should be consulted for evaluation and treatment to prevent further complications.

(Choice B) Acetaminophen-induced liver toxicity can manifest as a low-grade fever, nausea, and vomiting as well as right upper quadrant pain. However, patients with this form of hepatotoxicity tend to have an associated transaminase elevation >3,000 IU/L or even higher; they also commonly have prolonged prothrombin time and can have progressive renal failure.

(Choice C) Gilbert syndrome causes an isolated unconjugated elevated bilirubin that is typically asymptomatic (occasional jaundice). It would be unlikely to cause an elevated alkaline phosphatase, fever, or abdominal pain.

(Choice D) Ischemic hepatitis could occur from the hypotension the patient experienced intraoperatively and could be associated with nausea, vomiting, and abdominal pain. However, the associated transaminase elevation is generally quite significant (eg, 25-250x the upper limit of normal).

(Choice E) The incidence of a retained gallstone is approximately 10% after cholecystectomy. It can occur if a gallstone moves out of the gallbladder during the cholecystectomy, but, unlike in this patient, would likely manifest as significant biliary dilation on imaging.

(Choice F) Small-bowel obstruction could present postoperatively as nausea, vomiting, and abdominal pain, but it is generally a long-term complication due to adhesions from prior surgeries. Small-bowel obstruction is less likely to cause right upper quadrant pain and elevated liver function tests.

Educational objective:

Bile leaks should be suspected in patients who develop fever, nausea, vomiting, and vague abdominal pain 2-10 days after laparoscopic cholecystectomy. Laboratory studies often reveal an elevated alkaline phosphatase and mildly elevated bilirubin with normal-appearing bile ducts on imaging.

References

- Biliary injury following laparoscopic cholecystectomy: why still a problem?
(<http://www.ncbi.nlm.nih.gov/pubmed/17854607>)
- Frequency of biliary complications after laparoscopic cholecystectomy detected by ERCP: experience at a large tertiary referral center.
(<http://www.ncbi.nlm.nih.gov/pubmed/17258983>)
- Current management of bile duct injury.
(<http://www.ncbi.nlm.nih.gov/pubmed/18320537>)

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|---------|------------------------------|-------------------|
| Surgery | Gastrointestinal & Nutrition | Gallstone disease |
| Subject | System | Topic |

REVIEW

- ✗ 1
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- ✗ 3
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- ✗ 5
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- ✗ 40

Item 7 of 40

Question Id: 12550



A pharmaceutical company researcher is working on drugs X, Y, and Z proposed for the treatment of diabetes mellitus. She selects a group of 300 patients with diabetes mellitus from a county hospital in Jackson, TN. She randomizes them into 3 groups of 100 patients each (groups A, B, and C). Patients in group A receive drug X, those in group B receive drug Y, and those in group C receive drug Z. The researcher follows these groups prospectively for 12 months and tabulates the following results:

| Drug | Group | Mean serum glucose values (mg/dL) | Standard deviation | 95% confidence interval |
|------|-------|-----------------------------------|--------------------|-------------------------|
| X | A | 85.0 | 2.00 | 84.6-85.4 |
| Y | B | 87.0 | 2.33 | 86.5-87.5 |
| Z | C | 83.0 | 3.32 | 82.3-83.7 |

Based on these results, which of the following statements is correct?

- A. Drug X is likely the most potent of the 3 drugs (9%)
- B. Drug Y will result in a significant increase in mortality in diabetic patients if used on a regular basis (1%)
- ✓ C. Drug Z likely has the widest range of effects on serum glucose values (77%)
- D. The 3 groups are different because sample selection is improper (4%)
- E. There is no statistically significant difference between the effects of drug X and drug Z (7%)

Correct

77% Answered correctly

04 mins, 01 sec Time Spent

04/26/2021 Last Updated

Explanation

Mean results from a sample estimate the true mean in the larger population. **Confidence intervals** (CIs) account for some of the variability. The 95% CI of the mean is calculated by the following formula:

$$95\% \text{ CI of mean} = \text{mean} \pm 1.96 * \text{standard error of mean}$$

where standard error (SE) is calculated by dividing the standard deviation (SD) by the square root of the sample size (N). Therefore, as the SD (numerator) increases, the SE and CI also increase; conversely, as N (denominator) increases, the SE and CI decrease. A **larger** (wider) CI indicates that there is a **wider** range of possible effects; a smaller (narrower) CI indicates that there is a narrower range of possible effects.

The 95% CI for the groups in the study are as follows:

- Group A (drug X): 95% CI = 85.4 - 84.6 = 0.8
- Group B (drug Y): 95% CI = 87.5 - 86.5 = 1.0
- Group C (drug Z): 95% CI = 83.7 - 82.3 = 1.4

Drug Z has the widest CI, which suggests that, if this drug is used in a population of patients with diabetes mellitus, it will have the widest range of effects on glucose levels (compared to drugs X and Y). In this particular example, it is difficult to comment on the clinical significance of this finding, as the mean serum glucose values for all 3 groups – including the group taking drug Z – suggest relatively well-controlled diabetes; the study also compares the 3 drugs to one another with no control group.

Although the 95% CI is given in the table, it is possible to calculate it manually for all 3 groups using the mean values and SD (with $N = 100$). A 99% CI would be calculated using the same formula but with 1.96 (Z-score corresponding to 95% of a normal distribution) replaced by 2.58 (Z-score corresponding to 99% of a normal distribution).

(Choices A and B) This study does not give any information about the drugs' relative potencies (amount required to produce a given effect), which are usually determined by log-dose response curves. Comments about mortality cannot be made, as mortality rates are not mentioned.

(Choice D) The researcher has selected patients with diabetes mellitus from the same county hospital and randomized them into 3 equal groups; this likely reflects adequate sampling and should help account for any differences between the groups.

(Choice E) Because the CIs of groups A and C are nonoverlapping (the intervals 84.6-85.4 and 82.3-83.7 do not overlap), this suggests that there is a statistically significant difference between these 2 groups.

Educational objective:

The 95% confidence interval (CI) of the mean is calculated by the following formula:

$$95\% \text{ CI of mean} = \text{mean} \pm 1.96 * \text{standard error of mean}$$

| | | |
|----------|------------------------------|---------------------------------|
| Medicine | Biostatistics & Epidemiology | P-value and confidence interval |
| Subject | System | Topic |

REVIEW

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- ✗ 40

Item 8 of 40

Question Id: 12277



A 34-year-old woman comes to the office due to several days of low-grade fever, headache, malaise, and myalgias. This morning, the patient's face appeared twisted and she had difficulty closing her eyes. She drinks alcohol socially and does not use tobacco or recreational drugs. The patient has had several sexual partners and uses condoms inconsistently. She relocated to Rhode Island a year ago for work and is active outdoors. Temperature is 37.9 C (100.2 F), blood pressure is 124/80 mm Hg, and pulse is 78/min. Physical examination shows bilateral facial muscle weakness and resistance to passive neck flexion. Which of the following findings is most likely associated with this patient's current condition?

- A. Cerebrospinal fluid positive for herpes virus polymerase chain reaction (11%)
- B. Cerebrospinal fluid with increased protein and normal cell count (4%)
- ✗ C. Intraerythrocytic parasites on peripheral smear (2%)
- D. MRI of the brain showing demyelinating plaques (3%)
- ✓ E. Positive *Borrelia burgdorferi* serology (75%)
- F. Reactive rapid plasma reagin test (2%)

Incorrect

Correct answer
E

75%
Answered correctly

02 mins, 31 secs
Time Spent

03/22/2021
Last Updated

Explanation

| Early Lyme disease | |
|-----------------------|---|
| Epidemiology | <ul style="list-style-type: none"> • Endemic to northeastern United States • <i>Ixodes scapularis</i> tick transmits <i>Borrelia burgdorferi</i> |
| Manifestations | <ul style="list-style-type: none"> • Erythema migrans (80%) • Systemic symptoms: malaise, fatigue, arthralgia • Regional lymphadenopathy • Neurologic: meningitis, CN palsy, radiculoneuritis • Carditis: atrioventricular block |
| Diagnosis | <ul style="list-style-type: none"> • Clinical (if erythema migrans) • <i>B burgdorferi</i> serology (if neurologic/cardiac disease) |
| Treatment | <ul style="list-style-type: none"> • Oral antibiotics (eg, doxycycline) – skin/mild disease • IV antibiotics (eg, ceftriaxone) – neurologic/cardiac disease |

CN = cranial nerve; IV = intravenous.

Lyme disease is a spirochetal infection caused by *Borrelia burgdorferi* after zoonotic transmission from the *Ixodes scapularis* tick. Patients in endemic areas often develop symptoms without being aware of a previous tick bite. Most infections manifest with erythema migrans, a spreading, annular, erythematous rash with central clearing. However, a minority of patients present with symptoms of early disseminated disease, including multiple erythema migrans lesions, carditis, and/or neurologic findings.

Neurologic manifestations of Lyme disease often occur within the first several weeks of infection and may include lymphocytic meningitis, cranial nerve palsies, and/or radiculoneuritis. **Facial nerve palsy** is particularly common, occurring in ~8% of infected individuals. Patients develop rapid-onset facial weakness that is often **bilateral**. Diagnosis is made with *B burgdorferi* serology (ELISA, then Western Blot). Most patients recover completely after oral or intravenous antibiotics (eg, doxycycline, ceftriaxone).

(Choice A) Herpes encephalitis often affects the temporal lobe and may cause fever, headache, seizures, focal deficits (including cranial nerve palsy due to meningeal irritation), and altered mental status. Bilateral facial nerve palsy with mild flu-like symptoms is more likely to be a result of Lyme disease.

(Choice B) Guillain-Barré syndrome may cause rapidly progressive bilateral symmetric weakness (including bilateral facial nerve palsies) and is classically associated with albuminocytologic dissociation (cerebrospinal fluid analysis showing increased protein level with normal cell count). However, most cases begin with lower extremity involvement (~90%) and occur after a preceding gastrointestinal (eg, *Campylobacter*) or respiratory infection. Fever and meningeal signs would be atypical. Lyme disease is much more common in endemic areas.

(Choice C) Babesiosis is also transmitted by *I scapularis* and may cause intraerythrocytic parasites. Patients are often asymptomatic, but symptoms can include high fever (>38 C [100.4 F]), fatigue, malaise, and weakness. Facial palsy is not typical.

(Choice D) Multiple sclerosis may cause demyelinating plaques in the central nervous system. Symptoms include vision defects, gait disturbance, voiding issues, and/or sensory changes. Cranial nerve palsy is almost always caused by a peripheral (not central) nervous system deficit.

(Choice F) Syphilis is caused by the spirochete *Treponema pallidum* and may result in neurologic disease, including meningitis (early) and tabes dorsalis/general paresis (late). Meningeal irritation can occasionally result in cranial nerve palsies, but Lyme disease is much more likely to cause bilateral facial palsy in a Lyme-endemic area.

Educational objective:

Facial nerve palsy is a common manifestation of early disseminated Lyme disease and may occur alone or in combination with erythema migrans, systemic flu-like symptoms, and/or cardiac manifestations.

| | | |
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| Medicine | Nervous System | Lyme disease |
| Subject | System | Topic |

REVIEW

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Item 9 of 40


Question Id: 11941


 Mark


A physician has become increasingly concerned about her colleague and mentor. Over the past few months, she has noticed that he has become more forgetful, not recalling conversations they have had. On 2 occasions, he asked to borrow her prescription pad after misplacing his own. Last week, while covering her colleague's practice, the physician noticed that he had prescribed 2 different doses of lorazepam to a patient suffering from anxiety. When he returns, the physician clarifies the dose and asks if everything is okay. Her mentor chuckles, "Yes, it is just me being absent-minded in my old age." The physician recommends that her colleague have an assessment done, but he assures her that everything is fine. Which of the following is the most appropriate course of action by the physician?

- A. Continue to monitor the colleague's behavior and intervene if things worsen (4%)
- B. Do not intervene further as there is no clear evidence of patient harm (0%)
- C. Do not intervene further out of respect for the colleague's seniority (0%)
- D. Recommend to her colleague that he consider early retirement (0%)
- E. Recommend to her colleague that he have a full neurological workup (17%)
- F. Report her concerns to the hospital's physician health program (67%)
- G. Report the colleague to the state licensing board (8%)

Omitted

Correct answer
F
 67%
Answered correctly

 02 mins, 04 secs
Time Spent

 03/19/2021
Last Updated

Explanation

An **impaired physician** is one who has a **medical, psychiatric, or substance use** condition that affects ability to practice according to accepted and **safe standards**. This physician's increasing forgetfulness has already resulted in a prescribing mistake that could have caused patient harm (**Choice B**).

Although this physician may be uncomfortable reporting her mentor, physicians are **ethically and legally obligated to report impaired colleagues (Choice C)**. Most hospitals have a designated hospital committee, commonly called a **physician health program (PHP)**. It is this committee's responsibility to gather all the facts and arrange for a comprehensive assessment with intervention and treatment if necessary. With treatment, many impaired physicians are able to return to either full or modified practice. If such a body does not exist or if the physician does not accept the PHP's recommendations, then the state licensing board should be contacted (**Choice G**).

(Choice A) The colleague's forgetfulness is already causing problems. The physician should not wait any longer to report the issue as patient care is at risk.

(Choice D) It is inappropriate to recommend retirement as the colleague's cognitive condition may be reversible or improve with treatment. It would be more appropriate to inform the PHP.

(Choice E) The physician has already recommended that her colleague get help, but he has denied having a problem. Repeatedly asking the colleague to have an assessment could be seen as confrontational, and he may become more defensive.

Educational objective:

Physicians are obligated to report impaired colleagues. Reporting protects patient safety and can assist the impaired physician in receiving appropriate evaluation and treatment.

References

- Impaired physicians.
(<http://www.ncbi.nlm.nih.gov/pubmed/24873127>)
- Physicians' willingness to report impaired colleagues.
(<http://www.ncbi.nlm.nih.gov/pubmed/15882920>)
- Doctors' health and fitness to practise: performance problems in doctors and cognitive impairments.
(<http://www.ncbi.nlm.nih.gov/pubmed/18676426>)

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| Medicine | Social Sciences (Ethics/Legal/Professional) | Physician misconduct |
| Subject | System | Topic |

REVIEW

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- ✗ 40

Item 10 of 40

Question Id: 12333

 Mark


A 3-month-old boy is brought to the office for a well-child visit. His mother is concerned about a red skin lesion on his head. She first noticed a reddish patch on the patient's scalp at age 3 weeks, and the lesion has progressively grown. It recently has become more raised and brighter red in color. He is exclusively breastfed and up to date with routine vaccinations. The patient has a social smile, coos, and recently started reaching for toys. He is not yet rolling over. The patient was born at term after an uncomplicated pregnancy and delivery. Weight and height are at the 50th percentile. Examination findings of the lesion are shown in the image below:





The remainder of the examination shows no abnormalities. Which of the following is the most appropriate next step in management of this patient's skin lesion?

- ✗ A. Biopsy (0%)
- B. Intralesional corticosteroid (0%)
- C. MRI of the head (2%)
- ✓ D. Serial observation (96%)
- E. Surgical excision (0%)

Incorrect
Correct answer
D

 96%
Answered correctly

 05 mins, 30 secs
Time Spent

 04/26/2021
Last Updated

Explanation

| Infantile hemangioma | |
|------------------------|---|
| Natural history | <ul style="list-style-type: none"> • Appears days to weeks after birth • Proliferation (age 0-6 months): growth of bright red, soft, raised plaque • Involution (age >6 months): deep red/violet lesion that regresses in size |
| Evaluation | <ul style="list-style-type: none"> • Clinical diagnosis • Special considerations: <ul style="list-style-type: none"> ◦ ≥5 cutaneous lesions → liver ultrasound ◦ Facial/segmental → echocardiography & MRI of the head (ie, PHACE) ◦ Cervicofacial (beard distribution) → laryngoscopy ◦ Lumbosacral → spinal ultrasound |
| Management | <ul style="list-style-type: none"> • Observation for most lesions • Beta-blocker therapy (eg, propranolol) for high-risk features: <ul style="list-style-type: none"> ◦ Large, facial, segmental, &/or rapidly growing (ulceration/scarring) ◦ Periorbital (visual impairment) ◦ Hepatic (high-output heart failure) ◦ Subglottic (airway obstruction) |

PHACE = posterior fossa anomalies, hemangioma, arterial anomalies, cardiac anomalies, eye anomalies.

Infantile hemangiomas are common, benign, vascular tumors that present days to weeks after birth. During the first 6 months of life, hemangiomas **proliferate** (due to vasculogenesis) into **bright red, raised nodules** or plaques that increase in size. Hemangiomas then typically **involute** and regress (due to increasing apoptosis) over subsequent years, during which time they may appear patchy and deeper red/violet in color.

Diagnosis is **clinical** for hemangiomas with a classic history and appearance, as in this case. Due to the natural history of involution in early childhood, the management of such lesions is reassurance and **serial observation**.

Beta-blocker therapy, which works via local vasoconstriction, should be considered for lesions with high-risk features, such as periorbital involvement that can lead to visual impairment or large (>5 cm) hemangiomas with increased risk of scarring.

(Choices A and B) Biopsy is rarely required for diagnosis of a hemangioma but can be considered for atypical lesions with increased risk of malignancy, such as those that are present since birth or appear deep (ie, raised subcutaneous nodule with blue hue). Intralesional corticosteroids can also be considered for hemangiomas that extend deep into the subcutaneous tissue but are not indicated for simple superficial hemangiomas, as in this case.

(Choice C) MRI of the head and echocardiogram should be performed for patients with a segmental hemangioma on the face/scalp due to an association of this subtype with PHACE syndrome (posterior fossa anomalies; hemangioma; arterial, cardiac, and eye anomalies). In contrast to this patient's single, well-circumscribed nodule, segmental hemangiomas have a geographic appearance with clusters of lesions extending over a large area.

(Choice E) Excision of a cutaneous hemangioma is generally avoided due to risk of bleeding and scarring, and most hemangiomas involute without complications.

Educational objective:

Infantile hemangiomas are benign, vascular tumors that present as bright red, raised nodules that proliferate in early infancy and regress in early childhood. Management of uncomplicated hemangiomas is serial observation.

References

- Treatment of infantile hemangiomas: recommendations of a European expert group.
(<http://www.ncbi.nlm.nih.gov/pubmed/26021855>)
- Infantile hemangioma: a review of current pharmacotherapy treatment and practice pearls.
(<http://www.ncbi.nlm.nih.gov/pubmed/33041713>)

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|------------|-------------|------------|
| Pediatrics | Dermatology | Hemangioma |
| Subject | System | Topic |

REVIEW

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- ✗ 40

Item 11 of 40
Question Id: 12371



A 26-year-old man comes to the office due to a right scrotal mass. Two months ago, the patient had pain in that area following an injury during a football game. The pain and tenderness resolved, but the patient notes that the right scrotum seems enlarged. He has had no fever, dysuria, or urethral discharge. The patient has no chronic medical conditions and takes no medications. He is sexually active with his girlfriend, who takes an oral contraceptive for birth control. Vital signs are normal. Physical examination shows a firm, nontender, 2-cm nodule in the right testis that does not transilluminate. The left testis is normal. There is no inguinal lymphadenopathy. The penis is normal without urethral discharge. Which of the following is the most likely cause of this patient's current condition?

- ✗ A. Cystic epididymal accumulation of sperm (6%)
- B. Dilatation of pampiniform venous plexus (2%)
- C. Herniation of abdominal content (1%)
- ✓ D. Malignant proliferation of germinal epithelium (70%)
- E. Serous fluid collection outside the testes (1%)
- F. Vascular injury and blood accumulation (17%)

Incorrect
Correct answer
D

70%
Answered correctly

14 secs
Time Spent

07/30/2021
Last Updated

Explanation

| Testicular cancer | |
|-----------------------|---|
| Epidemiology | <ul style="list-style-type: none"> • Age 15-35 • Risk factors: family history, cryptorchidism |
| Manifestations | <ul style="list-style-type: none"> • Unilateral, painless testicular nodule or swelling • Dull lower abdominal ache • Metastatic symptoms (eg, dyspnea, neck mass, low back pain) |
| Diagnosis | <ul style="list-style-type: none"> • Examination: firm, ovoid mass or unilateral swelling • Scrotal ultrasound • Tumor markers (AFP, β-hCG) • Staging imaging (CT scan, chest x-ray) |
| Treatment | <ul style="list-style-type: none"> • Radical orchiectomy • Chemotherapy • Cure rate ~95% |

AFP = alpha-fetoprotein.

This patient with a nontender nodule in the testis that does not transilluminate likely has **testicular cancer**, the most common solid organ malignancy in men age 15-35. The vast majority of cases (~95%) are due to malignant transformation of the **seminiferous germinal epithelium** (germ cell tumor); sex cord stromal tumors (eg, Leydig cell, Sertoli cell) can also occur but are much less common.

Testicular tumors generally present with nontender, unilateral testicular swelling or a **painless nodule**, which is often first noticed after a groin injury or during sexual activity with a partner. Physical examination usually reveals an **ovoid lesion** within the tunica albuginea that is firm, hard, or fixed. Transillumination does not occur because light cannot penetrate solid tumors.

Diagnostic workup includes bilateral **scrotal ultrasound**, serum tumor markers (alpha-fetoprotein, β -hCG), and **radical inguinal orchiectomy** for histopathologic confirmation and initiation of treatment. Most cases require subsequent chemotherapy. Cure rates are >95%.

(Choice A) Spermatoceles are cystic epididymal accumulations of sperm that form superiorly to (not within) the testicle. They are usually asymptomatic and do not require treatment.

(Choice B) Varicoceles are due to pampiniform venous plexus dilation and typically feel like a "bag of worms" on examination. Most decompress with recumbency and increase in size with standing.

(Choice C) Inguinal hernias usually cause a painless bulge in the groin, not a firm testicular mass.

(Choice E) A hydrocele is a collection of serous fluid between layers of the tunica vaginalis (surrounding the testicle and spermatic cord). Most are asymptomatic and painless. Unlike testicular tumors, hydroceles transilluminate.

(Choice F) Testicular trauma can cause blood accumulation in the tunica vaginalis (hematocele), leading to significant testicular pain. Although this patient initially had a traumatic testicular injury, the presence of a firm, nonpainful mass 2 months later strongly suggests testicular cancer. Testicular trauma sometimes alerts patients to an underlying testicular tumor.

Educational objective:

Germ cell tumors of the testicle are the most common solid malignancy in young men. Manifestations typically include a painless, ovoid, unilateral testicular mass that does not transilluminate. Scrotal ultrasound and serum tumor markers help support the diagnosis, but radical orchiectomy is required for tissue diagnosis and initiation of treatment.

| | | |
|---------|--------------------------|-------------------|
| Surgery | Male Reproductive System | Testicular cancer |
| Subject | System | Topic |

REVIEW

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Item 12 of 40

Question Id: 11931



A 28-year-old woman comes to the office due to weight gain. Her chart shows that she has gained 2.7 kg (6 lb) since her last yearly visit. She has been depressed over her weight but denies other symptoms of depression. She says her worst fear is becoming fat and points to her cheeks saying, "Even my face is fat." The patient has recently started a diet that restricts her caloric intake to less than 1200 kcal daily, but adds, "Most days I'm good, but several times a week I lose control and eat everything in sight." Review of systems indicates menstrual irregularity and occasional dizziness. She has no other medical problems. With the exception of a potassium level of 3.1 mEq/L, routine laboratory values including thyroid function tests are normal. Pregnancy test is negative. The patient weighs 59 kg (130 lb) and is 157.5 cm (5' 2") tall. Blood pressure is 90/70 mm Hg and heart rate is 96/min. Physical examination shows swollen cheeks and bad breath. In addition to psychotherapy, which of the following medications would be most effective in treating this patient?

- A. Amphetamine (0%)
- B. Bupropion (4%)
- ✓ C. Fluoxetine (78%)
- D. Mirtazapine (3%)
- E. ~~No pharmacotherapy is effective~~ (10%)
- F. Nortriptyline (0%)
- G. Olanzapine (1%)

Correct

78% Answered correctly

06 secs Time Spent

03/15/2021 Last Updated

Explanation

| Eating disorders | | |
|------------------------------|---|---|
| Diagnosis | Clinical features | Treatment |
| Anorexia nervosa | <ul style="list-style-type: none"> • BMI <18.5 kg/m² • Intense fear of weight gain • Distorted views of body weight & shape | <ul style="list-style-type: none"> • Cognitive-behavioral therapy • Nutritional rehabilitation • Olanzapine if no response to above |
| Bulimia nervosa | <ul style="list-style-type: none"> • Recurrent episodes of binge eating • Binge eating & inappropriate compensatory behavior to prevent weight gain • Excess worrying about body shape & weight | <ul style="list-style-type: none"> • Cognitive-behavioral therapy • Nutritional rehabilitation • SSRI (fluoxetine), often in combination with above |
| Binge-eating disorder | <ul style="list-style-type: none"> • Recurrent episodes of binge eating • No inappropriate compensatory behaviors • Lack of control during eating | <ul style="list-style-type: none"> • Cognitive-behavioral therapy • Behavioral weight loss therapy • SSRI • Lisdexamfetamine |

SSRI = selective serotonin reuptake inhibitor.

A history of **bingeing**, restrictive **dieting**, **excessive preoccupation with weight**, and **hypokalemia** (likely due to vomiting) in an otherwise healthy young female of **normal weight** is suggestive of **bulimia nervosa**. Other bulimic features in this patient include swollen cheeks (possible parotid gland enlargement), menstrual irregularity, and hypotension. In addition to hypokalemia, other signs of self-induced vomiting can include erosion of dental enamel (with resultant bad breath), abrasions on the dorsum of hands, hypochloremia, hyperamylasemia, and metabolic alkalosis.

Pharmacotherapy is effective for bulimia nervosa when combined with nutritional rehabilitation (establishing a structured and consistent meal pattern) and cognitive behavioral psychotherapy (CBT). The selective serotonin reuptake inhibitor, **fluoxetine**, is considered **first-line treatment**. It effectively targets the behavioral and cognitive symptoms of bulimia nervosa and is better tolerated than other medications. Although it can be used alone when therapy is unavailable, fluoxetine in combination with CBT has shown the greatest efficacy.

(Choice A) Amphetamines are primarily used in the treatment of attention-deficit hyperactivity disorder and narcolepsy. They may be abused in patients attempting to lose weight due to the side effect of appetite suppression.

(Choice B) The antidepressant bupropion is a norepinephrine dopamine reuptake inhibitor that carries less risk of weight gain and sexual side effects than other antidepressants. It is contraindicated for use in eating disorders due to increased risk of seizures.

(Choice D) Mirtazapine is useful to treat major depression but has no demonstrated efficacy in treating bulimia nervosa. It can cause sedation and weight gain.

(Choice E) Fluoxetine is an evidenced-based treatment for bulimia nervosa. In contrast, there is little evidence to support the use of pharmacotherapy as primary treatment for anorexia nervosa.

(Choice F) Tricyclic antidepressants such as nortriptyline are not a first-line treatment for bulimia nervosa.

(Choice G) Olanzapine, an antipsychotic associated with weight gain, has been used as adjunctive treatment to psychotherapy for anorexia nervosa. It has no role in treatment of bulimia nervosa.

Educational objective:

Fluoxetine, in combination with nutritional rehabilitation and psychotherapy (CBT), is a first-line treatment for bulimia nervosa.

References

- Bulimia nervosa treatment: a systematic review of randomized controlled trials.
(<http://www.ncbi.nlm.nih.gov/pubmed/17370288>)

| | | |
|------------|--|-----------------|
| Psychiatry | Psychiatric/Behavioral & Substance Abuse | Bulimia nervosa |
| Subject | System | Topic |

REVIEW

- ✗ 1
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- ✗ 40

Item 13 of 40
Question Id: 11928



A 23-year-old woman comes to the psychiatrist for a check-up. She has been on fluoxetine for depression for 3 months and reports that she is feeling much better, with more energy than she has had in many years. She is sleeping through the night and does not feel so sad all the time. The patient says, "I have even made a couple of new friends." The woman then looks down and appears uncomfortable. When asked what is wrong, she replies, "Well I think it's just normal jealousy, but my friend said I should tell you." The doctor encourages the patient to continue. She says, "It's just that my husband said he would throw out my medication and hurt me if I went out with my friends anymore, so I stopped going out and now everything is fine. He has never hurt me and I don't think he ever would." Which of the following is the most appropriate response by the physician?

- A. "I encourage you to stand up for yourself and explain that you have a right to see your friends." (1%)
- B. "Threats often turn into action, and you are in danger for your life; you need to do something now." (2%)
- C. "Would you like me to speak with your partner? I can encourage him to change his behavior." (2%)
- ✓ D. "You are brave to tell me; being threatened is abusive and I will help you in any way I can." (76%)
- E. "Your husband may feel threatened by your new friends; please let me know if you become concerned that he will hurt you." (15%)
- ✗ F. "Your situation is not uncommon; I will refer you to a battered woman's counseling group for help." (2%)

Incorrect
Correct answer
D

76%
Answered correctly

02 secs
Time Spent

09/09/2021
Last Updated

Explanation

| Intimate partner violence | |
|---|--|
| Risk factors for escalating violence | <ul style="list-style-type: none"> • Perpetrator <ul style="list-style-type: none"> ◦ Increasing threats or controlling behavior ◦ Violence outside the home/to children ◦ Threatening homicide &/or suicide ◦ Drug use ◦ History of injuring partner/pregnant partner ◦ Access to firearms • Victim <ul style="list-style-type: none"> ◦ Admitting fear for life ◦ Attempting to leave ◦ Seeking outside help ◦ Threatening or attempting suicide |

| | |
|-------------------|--|
| Management | <ul style="list-style-type: none"> • Ensure privacy • Do not confront perpetrator • Provide nonjudgmental support & validation without pressure • Assess for safety & create a safety plan • Offer assistance (counseling, resources) |
|-------------------|--|

Intimate partner violence (IPV) is a serious public health concern that affects both men and women but is more common in women, with lifetime estimates at 40% in the United States. It includes not only actual abuse (physical, emotional, or sexual), but threatened abuse as well.

The most important **first step** for a physician to take when assessing IPV is to be **supportive** of the patient's courage and struggle to talk about the violence. This should be accompanied by validation that any threatening and abusive behavior is wrong and undeserved. The next step is to **assess for safety** and help to refer or assist in establishing a **safety plan**. This patient's willingness to accept and pursue referrals will depend on her stage of acceptance and may only happen after subsequent visits. It is important **not to pressure** her to take a specific action (**Choice B**) and to assure her that she will not be abandoned no matter what her choice.

(Choices A and C) IPV is associated with a risk for abuse and even death at the hands of the perpetrator. Risk factors for increasing violence include attempts by the victim to leave the relationship and any confrontations experienced by the perpetrator. Neither of these actions should be taken without a safety plan in place.

(Choice E) This patient has already expressed fears of being hurt. Threats often turn into action and should not be ignored.

(Choice F) The patient has just divulged what is happening (precontemplative stage) and is ambivalent (alternately expressing concern, then denial). The first step is for the physician to encourage discussion, rather than make a referral that the patient most likely would not pursue at this time.

Educational objective:

When a patient divulges intimate partner violence, the physician's most important first step is to provide support, validation, and assurance that the patient will not be abandoned. This is followed by assessing the patient's safety and making a safety plan.

References

- Intimate partner violence: prevalence, health consequences, and intervention.
(<http://www.ncbi.nlm.nih.gov/pubmed/25841604>)
- The State of Intimate Partner Violence Intervention: Progress and Continuing Challenges.
(<http://www.ncbi.nlm.nih.gov/pubmed/26489351>)

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| Psychiatry | Psychiatric/Behavioral & Substance Abuse | Intimate partner violence |
| Subject | System | Topic |

REVIEW

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- ✗ 40

Item 14 of 40
Question Id: 7499



A 14-month-old girl is brought to the office by her mother due to sleep and behavioral concerns. Over the past several months, the patient has started screaming in the middle of the night for no reason. The mother says, "Nothing I do consoles her. She used to listen, say our names, and answer yes or no, but now she hardly speaks at all and never seems to be paying attention." The patient was born at term with no complications and has no significant medical history. Vital signs are within normal limits. On physical examination, she does not make eye contact with the physician and sits on the floor periodically rubbing and clapping her hands. She does not reach for nearby toys. Which of the following is the most appropriate diagnostic test?

- ✗ A. *FMR1* DNA analysis (6%)
- ✓ B. *MECP2* gene analysis (73%)
- ✗ C. No diagnostic testing is indicated (12%)
- ✗ D. Serum hexosaminidase A level (4%)
- ✗ E. Serum phenylalanine level (2%)

Incorrect
Correct answer
B

73%
Answered correctly

02 secs
Time Spent

09/04/2021
Last Updated

Explanation

| Rett syndrome | |
|----------------------------|--|
| Key features | <ul style="list-style-type: none"> • Rare neurodevelopmental disorder, greater incidence in females, onset 6-18 months • Initially normal development followed by: <ul style="list-style-type: none"> ◦ Loss of speech ◦ Loss of purposeful hand use, stereotypical movements ◦ Gait abnormalities |
| Additional findings | <ul style="list-style-type: none"> • Head growth deceleration • Seizures • Breathing abnormalities • Sleep disturbance • Autistic features |
| Etiology | <ul style="list-style-type: none"> • <i>MECP2</i> gene mutations |

This patient's presentation is most suggestive of **Rett syndrome**, a rare neurodevelopmental disorder that occurs almost exclusively in females.

Affected individuals typically have **normal development** for the first few months. **Subsequently**, at age 12-18 months, **loss of communicative** and **fine motor skills** follows and may be sudden or slow in onset. In addition to stereotypical **hand movements** (eg, hand rubbing, clapping), **sleep disturbances** (eg, waking up screaming), and **autistic features** (eg, lack of eye contact and social reciprocity), other

characteristics of Rett syndrome include gait disturbance, deceleration in head growth, seizures, and breathing abnormalities.

Diagnostic evaluation for suspected Rett syndrome should include **MECP2 gene** analysis because most cases are caused by de novo mutations in the *MECP2* gene, located on the X chromosome. The mutations are virtually always on paternal genes. **Females** are almost exclusively affected. A diagnosis is made if an *MECP2* mutation is found in a patient with characteristic clinical features.

(Choice A) *FMR1* DNA analysis is indicated when fragile X syndrome (FXS) is suspected. FXS is more common in males, and diagnosis is based on detection of an alteration in the fragile X mental retardation 1 (*FMR1*) gene. Clinical features include intellectual disability; a long, narrow face; large, protruding ears; macrocephaly; and macroorchidism.

(Choice C) Not pursuing further testing would be inappropriate because this patient has characteristic signs of Rett syndrome in addition to autistic features. It is especially important to pursue genetic testing in patients with developmental regression or dysmorphic features because these patients are more likely to have a genetic abnormality.

(Choice D) Serum hexosaminidase A levels are indicated in suspected cases of Tay-Sachs disease, a neurodegenerative lysosomal storage disease predominantly found in the Ashkenazi Jewish population. Development is generally normal until age 6 months. Findings include macrocephaly and a characteristic cherry-red spot on the macula.

(Choice E) Elevated serum concentrations of phenylalanine are found in classic phenylketonuria (PKU), an autosomal recessive disorder caused by phenylalanine hydroxylase deficiency. PKU affects both sexes and may present with intellectual disability, musty odor, seizures, skin diseases, and microcephaly.

Educational objective:

Rett syndrome is a rare neurodevelopmental disorder that mostly affects females. Key features include loss of speech, stereotypical hand movements, and gait abnormalities after a period of normal development. Autistic features are common. Most cases are caused by mutations in the *MECP2* gene.

References

- Genetic landscape of Rett syndrome spectrum: improvements and challenges.
(<http://www.ncbi.nlm.nih.gov/pubmed/31409060>)
- MeCP2 mutations: progress towards understanding and treating Rett syndrome.
(<http://www.ncbi.nlm.nih.gov/pubmed/28212680>)

| | | |
|------------|----------------|---------------|
| Pediatrics | Nervous System | Rett syndrome |
| Subject | System | Topic |

REVIEW

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- ✗ 3
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Item 15 of 40

Question Id: 12367



A 68-year-old woman with a history of breast cancer is evaluated due to poorly controlled chest, abdominal, and limb pain. The patient underwent a bilateral mastectomy 4 years ago but now has several skeletal and liver metastases that have not responded to chemotherapy. She takes an as-needed nonsteroidal anti-inflammatory drug and short-acting oral morphine every 4 hours. The dosing frequency of the morphine was increased 3 weeks ago, but the patient says the effects wear off before her next dose. She sleeps well but awakens frequently due to pain; she says, "I can't bear this. I'm frustrated and sometimes even wonder if it's worth living with this pain, but when I see all the support from my family, I know it is." The patient has lost 4.6 kg (10.1 lb) over the past 3 months. Blood pressure is 120/70 mm Hg and pulse is 92/min. She appears tired and tearful. There is tenderness to palpation of several ribs. Which of the following is the most appropriate initial intervention for this patient?

- ✓ A. Add extended-release morphine (100%)
- B. Increase short-acting morphine frequency to every 2 hours (0%)
- C. Refer her to a cancer patient support group (0%)
- D. Start antidepressant therapy (0%)
- ✗ E. Start stimulant therapy (0%)

Incorrect

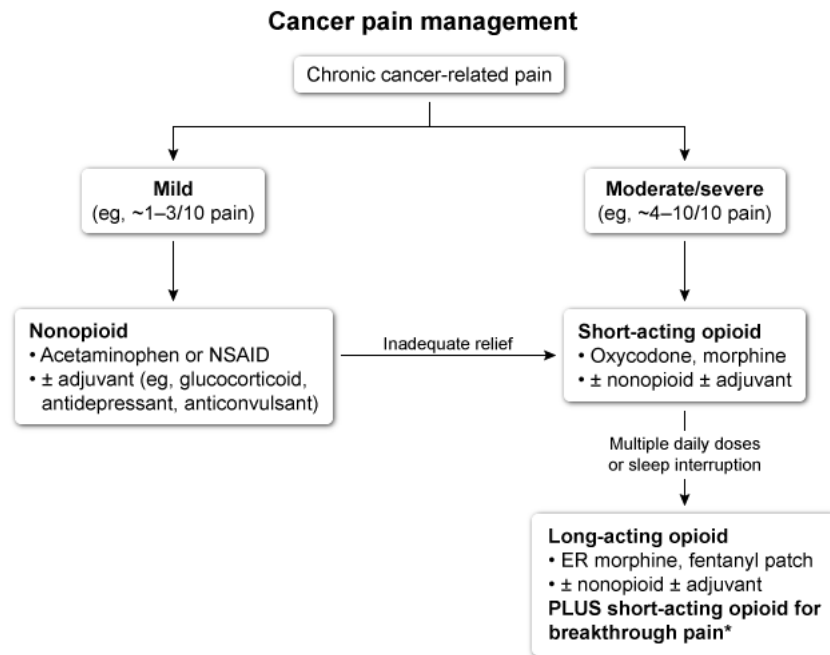
Correct answer
A

Collecting Statistics

🕒 02 secs
Time Spent

📅 09/10/2021
Last Updated

Explanation



*Short-acting opioids for breakthrough pain should always be available.
ER = extended-release; NSAID = nonsteroidal anti-inflammatory drug.

©UWorld

This patient has uncontrolled, **severe cancer-related** pain despite taking scheduled short-acting opioids (eg, morphine), resulting in breakthrough pain, disrupted sleep, and affective symptoms (eg, distress, frustration). **Opioids** are **first-line** therapy (alone or with acetaminophen or nonsteroidal anti-inflammatory drugs) for moderate to severe cancer-related pain; when as-needed **short-acting** opioids are insufficient due to frequent or continuous pain, fixed-schedule dosing usually provides adequate relief.

However, in patients with **persistent breakthrough** pain (eg, analgesia wears off) or inadequate overnight relief (eg, frequent awakening) despite taking scheduled short-acting opioids, **adding long-acting opioids** can improve convenience (eg, less frequent dosing) and help **stabilize pain control** (eg, steady drug levels). Typically, the total daily opioid requirement is split between the long- and the short-acting formulations. As such, even after transition to long-acting medications (eg, extended-release morphine, transdermal fentanyl), short-acting opioids should still be available as needed for the treatment of breakthrough pain.

(Choice B) Fixed-schedule regimens of short-acting opioids at very short intervals (eg, every 2 hr) are unfeasible to maintain long-term, create an excessive pill burden, and are unlikely to provide relief throughout the night.

(Choice C) Although cancer support groups can help patients with coping strategies, quality of life, and psychologic response to cancer-related pain, they would not address ongoing pain uncontrolled by the current opioid regimen.

(Choice D) Antidepressants with analgesic properties (eg, duloxetine) are often used as adjuvant therapy for chronic cancer-related pain associated with depressed mood, and they should be considered for this patient with tearfulness and possible passive suicidality (eg, wondering "if it's worth living"). However, poorly controlled pain can cause many affective symptoms, and adequate pain control is an essential initial intervention for this patient that would not be immediately addressed by antidepressants, which would not take effect for weeks.

(Choice E) Stimulant therapy (eg, modafinil) can be used for treatment-resistant depression and cancer-related fatigue. However, it may worsen this patient's weight loss and would not address the uncontrolled cancer-related pain.

Educational objective:

Opioids are first-line therapy for moderate to severe cancer-related pain; when as-needed, short-acting opioids are insufficient, fixed-schedule dosing usually provides adequate relief. However, in patients with persistent breakthrough pain or inadequate overnight relief despite scheduled dosing, adding long-acting opioids can improve convenience (eg, less frequent dosing) and help stabilize pain control.

References

- Oral morphine for cancer pain.

(<http://www.ncbi.nlm.nih.gov/pubmed/27105021>)

| | | |
|---------------------|---------------------------------|-----------------------|
| Medicine Subject | Hematology & Oncology System | Chronic pain Topic |
|---------------------|---------------------------------|-----------------------|

REVIEW

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- ✗ 40

Item 16 of 40

Question Id: 12334



A 55-year-old man is brought to the emergency department with shortness of breath and generalized weakness since yesterday. This morning he could not get out of bed. He has also had several episodes of midline chest pain but currently is chest pain free. Medical history includes hypertension, hyperlipidemia, type 2 diabetes mellitus, and peripheral vascular disease. The patient is an active smoker with a 20-pack-year history. He appears to be in respiratory distress, and his extremities are cold and clammy. Temperature is 37.5 C (99.5 F), blood pressure is 80/50 mm Hg, pulse is 120/min, and respirations are 30/min. There is visible jugular venous distension with the patient in a sitting position. Chest auscultation reveals bilateral crackles. The abdomen is soft and nontender. ECG shows sinus tachycardia with left bundle branch block. Initial laboratory results are as follows:

Complete blood count

| | |
|------------|-------------------------|
| Leukocytes | 12,000/mm ³ |
| Hemoglobin | 11 g/dL |
| Platelets | 240,000/mm ³ |

Serum chemistry

| | |
|---------------------|-----------------------------|
| Blood urea nitrogen | 18 mg/dL |
| Creatinine | 1.1 mg/dL |
| Lactate | 3.5 mg/dL (normal <2 mg/dL) |

Which of the following sets of parameters is most likely to be seen in this patient?

| | | Left ventricular preload | Cardiac output | Systemic vascular resistance | |
|---|----|--------------------------|----------------|------------------------------|-------|
| ✗ | A. | ↑ | ↑ | ↓ | (1%) |
| ✓ | B. | ↑ | ↓ | ↑ | (68%) |
| ✗ | C. | ↓ | ↓ | ↑ | (21%) |
| ✗ | D. | ↓ | ↑ | ↓ | (3%) |
| ✗ | E. | ↓ | ↓ | ↓ | (4%) |

Incorrect
Correct answer
B

68%
Answered correctly

04 secs
Time Spent

03/28/2021
Last Updated

Explanation

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) | ↑ | ↑ | ↑ | ↓ |
| SvO₂ | ↓ | ↓ | ↓ | ↑** |

*In tamponade, left-sided preload is decreased, but measured PCWP is paradoxically increased due to external compression by pericardial fluid.

**Cardiac index & SvO₂ are usually decreased in neurogenic shock due to impaired sympathetic reflexes.

CVP = central venous pressure; **LV** = left ventricular; **PCWP** = pulmonary capillary wedge pressure; **SvO₂** = mixed venous oxygen saturation; **SVR** = systemic vascular resistance.

This patient with numerous risk factors for coronary artery disease (eg, hypertension, diabetes mellitus, active smoking) has likely had an acute **myocardial infarction (MI)**. Patients typically have substernal chest pain (sometimes intermittent) as well as dyspnea, fatigue, nausea, and/or diaphoresis. Low-grade fever may be present, and laboratory results can demonstrate mild leukocytosis. A new left bundle branch block on ECG is suggestive of an acute MI.

Acute MI can lead to profound impairment in left ventricular (LV) contractility, **decreased stroke volume**, and cardiogenic shock.

- **Cardiac output** (stroke volume × heart rate) is low as tachycardia is unable to compensate for the decrease in stroke volume.
- **LV end-diastolic volume**, also known as LV **preload**, is high due to impaired ejection of blood from the left ventricle.
- **Systemic vascular resistance (SVR)**, a major component of LV **afterload**, is high as well due to compensatory peripheral vasoconstriction in an effort to maintain blood pressure.

Patients typically have hypotension, jugular venous distension, and respiratory distress (eg, dyspnea, tachypnea) due to pulmonary edema. Cold extremities are also present due to poor tissue perfusion. Laboratory results typically demonstrate **elevated lactate**, reflective of poor organ and tissue perfusion.

(Choice A) High-output heart failure (eg, thyrotoxicosis, beriberi, arteriovenous fistula) is characterized by low SVR leading to high cardiac output. LV preload is high due to increased venous return.

(Choice C) Hypovolemia leads to low preload and, consequently, low cardiac output. SVR is high due to compensatory vasoconstriction.

(Choices D and E) Distributive shock involves low SVR due to peripheral vasodilation. LV preload is also low. With distributive shock due to sepsis, increased sympathetic drive increases heart rate and LV contractility to cause high cardiac output (hyperdynamic state in the early stages of sepsis), whereas with neurogenic shock the sympathetic response is disrupted and cardiac output is low.

Educational objective:

Myocardial infarction can lead to left ventricular systolic dysfunction and cardiogenic shock. Low cardiac output leads to high left ventricular end-diastolic volume (preload) and a compensatory increase in systemic vascular resistance (a major component of afterload).

References

- Cardiogenic shock: failure of oxygen delivery and oxygen utilization.

(<http://www.ncbi.nlm.nih.gov/pubmed/27509355>)

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|----------|-----------------------|-------------------|
| Medicine | Cardiovascular System | Cardiogenic shock |
| Subject | System | Topic |

REVIEW

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Item 17 of 40

Question Id: 12280

 Mark

A 54-year-old woman comes to the office due to a pruritic rash underneath her breasts for the past 2 weeks. The patient has used several skin moisturizers, but with no relief. She has had no pain or fever. The patient has no prior medical problems, but she has not seen a physician for the past several years. Temperature is 37.1 C (98.8 F), blood pressure is 130/86 mm Hg, and pulse is 82/min. BMI is 36 kg/m². Physical examination findings are shown in the image below.



Further evaluation of this patient's lesion is most likely to reveal which of the following?

- ✗ A. Biopsy showing malignant cells (1%)
- B. Coral-red fluorescence under Wood's lamp (9%)
- ✓ C. Culture growing budding yeasts (40%)
- D. Polymerase chain reaction positive for herpes simplex (0%)
- E. Segmented hyphae on potassium hydroxide preparation (47%)

Incorrect
Correct answer
C

40%
Answered correctly

04 secs
Time Spent

03/31/2021
Last Updated

Explanation

Intertrigo is an inflammatory condition involving occluded skin surfaces such as the axillae, groin, inframammary folds, or abdominal folds. It is most commonly due to **Candida** species (especially *C. albicans*) but can also be caused by a variety of other organisms (eg, *Staphylococcus aureus*). Factors that increase the risk of intertrigo include:

- Disruption of skin barrier function due to friction (eg, obesity)
- Excessive **moisture** (eg, occlusive clothing, high heat/humidity)
- Impaired immune function (eg, HIV, glucocorticoid therapy)
- Local environment conducive to microbial growth (eg, diabetes with hyperglycemia)

Intertrigo presents with erythematous plaques in a symmetric "kissing" or "mirror image" pattern across the skinfold. In addition, *Candida* intertrigo typically also forms **satellite lesions** (vesicles, papules, pustules) near the primary infection. The diagnosis is mainly based on clinical features, but potassium hydroxide (KOH) preparation or fungal culture of skin scrapings can confirm the diagnosis if needed. *Candida* will appear as **pseudohyphae with budding yeast forms** (blastoconidia). Treatment includes topical antifungals (eg, nystatin, miconazole) with good skin hygiene and measures to keep the affected area dry.

(Choice A) Inflammatory breast cancer presents as cutaneous thickening with a "peau d'orange" appearance (superficial dimpling and pitting). The affected breast is edematous, erythematous, and painful. This patient's bilateral lesions and reflection across skinfolds are not consistent with malignancy.

(Choice B) Erythrasma is a superficial skin infection that also affects intertriginous areas. It is caused by *Corynebacterium minutissimum* and presents with well-demarcated, thin, red-brown plaques with wrinkling and a fine scale. It has a coral-red appearance under Wood's lamp.

(Choice D) Herpes simplex causes clustered vesicles and ulcers on an erythematous base. It can occur anywhere on the skin but is most common around the mouth and anogenital area. Bilateral, symmetric lesions would be unusual.

(Choice E) Tinea cruris presents as annular lesions with partial central clearing (may be absent) and a scaly, raised border. It can be caused by a number of dermatophytes, which appear on KOH preparation as septate hyphae rather than pseudohyphae with budding yeasts.

Educational objective:

Intertrigo is an inflammatory condition involving occluded skin surfaces such as the axillae, groin, inframammary folds, or abdominal folds and is most commonly due to *Candida* species. It presents with erythematous plaques with a symmetric "kissing" or "mirror image" pattern across the skinfold and may have satellite lesions.

| | | |
|----------|-------------|---------------------------|
| Medicine | Dermatology | Mucocutaneous candidiasis |
| Subject | System | Topic |