



1

A 14-year-old female collapses while playing basketball in the park. She had a brief loss of conscious and denies hitting her head. This has happened before and she ignored it. The patient says an uncle died of a heart attack at age 24.

Which of the following is the most important test to perform in the ED?

- A. Blood glucose
- B. Chest radiograph
- C. ECG
- D. Echocardiogram
- E. Pregnancy test

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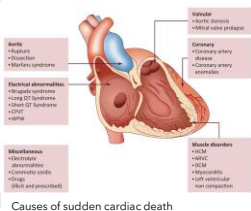
**Explanation:** foils

- While blood sugar **(a)** and pregnancy test **(e)** are important, they may not be diagnostic.
- A chest radiograph **(b)** and echocardiogram **(d)** may be helpful, but may not reveal the diagnosis.

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**Explanation:** answer

- This patient has a family history of a "heart attack" in a young adult, so sudden cardiac death is a concern.
- An **ECG** to check for long QT syndrome, short QT syndrome, WPW or Brugada syndrome should be performed.



### Causes of sudden cardiac death

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A 29-year-old man complains of vague abdominal pain for 2 days with vomiting, diarrhea and anorexia. Vital signs: oral temperature 99.1°F, heart rate 85/min, blood pressure 114/68 mm Hg. He has bilateral lower abdominal tenderness with peritoneal signs. He recounts two previous, similar episodes in the past 5 years that spontaneously resolved. A slice of his abdominal CT is shown in Figure 20-17.

Your next step should be:

- A. Admit for pancreatitis.
- B. Consult surgery for acute appendicitis.
- C. Consult surgery for pneumoperitoneum.
- D. Consult surgery for spontaneous splenic rupture.
- E. Consult to gastroenterology for suspected Crohn's disease.



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### Explanation: foils

- Pancreatitis **(a)** typical findings on CT include focal or diffuse parenchymal enlargement, changes in density because of edema, indistinct pancreatic margins owing to inflammation, and surrounding retroperitoneal fat stranding
- Pneumoperitoneum **(c)** is gas within the peritoneal space. The most common cause is bowel perforation. CT is much more sensitive than plain films at detecting. Gas tends to sit anteriorly and to form small triangles between bowel loops.
- Spontaneous (atraumatic) splenic rupture **(d)** CT findings are are similar to splenic trauma with hemoperitoneum and perisplenic hematoma. The spleen is more likely to be enlarged in atraumatic ruptures.
- The earliest CT finding of Crohn's disease **(e)** is bowel wall thickening, which usually involves the distal small bowel and colon, although any segment of the GI tract can be affected. Typically, the luminal thickening is 5-15 mm.

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### Explanation: answer

- The presence of an appendicolith with appendiceal thickening (>6 mm) and pericecal stranding are used to diagnose **appendicitis** on CT.
- The appendix is a hollow, closed end tube arising from the posterior medial surface of the cecum. It is usually about 10 cm long.
- Abdominal CT has been shown to increase the accuracy of the diagnosis of appendicitis with a sensitivity of 87-100% and specificity of 89-98%.
- Rectal contrast works best but oral contrast with a 90-minute delay is also effective. Although controversy exists about the routine use of CT scanning, for patients with a moderate suspicion and other likely diagnoses, CT is recommended.
- Surgical removal is the treatment of choice (Marx et al., 2006:1451-1457).

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A 45-year-old woman presents to the emergency department (ED) with 1 day of painful rectal bleeding. Review of systems is negative for weight loss, abdominal pain, nausea, and vomiting. On physical examination, you note an exquisitely tender area of swelling with engorgement and a bluish discoloration distal to the anal verge. Her vital signs are blood pressure (BP) 140/70 mm Hg, heart rate (HR) 105 beats/minute, respiratory rate (RR) 18 breaths/minute, and temperature 99°F. Which of the following is the next best step in management?

- A. Incision and drainage under local anesthesia followed by packing and surgical follow-up
- B. Obtain a complete blood cell (CBC) count, clotting studies, type and cross, and arrange for emergent colonoscopy
- C. Perform excision under local anesthesia followed by sitz baths and analgesics
- D. Recommend warm sitz baths, topical analgesics, stool softeners, high-fiber diet, and arrange for surgical follow-up
- E. Surgical consult for immediate operative management

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### Explanation: foils

- Incision of a hemorrhoid (as opposed to excision) leads to incomplete clot evacuation, subsequent rebleeding, and swelling of lacerated vessels **(a)**.
- This patient has a thrombosed external hemorrhoid. The need for further evaluation of the rectal bleeding has not been established **(b)**.
- The symptoms of nonthrombosed external and nonprolapsing internal hemorrhoids can be improved by the WASH regimen **(d)**. Warm water, via sitz baths or by directing a shower stream at the affected area for several minutes, reduces anal pressures; mild oral analgesics relieve pain; stool softeners ease the passage of stool to avoid straining; and a high-fiber diet produces stool that passes more easily.
- Hemorrhoids rarely require immediate operative management, unless there is evidence of thrombus formation with progression to gangrene **(e)**.

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### Explanation: answer

- This patient is suffering from an acutely thrombosed external hemorrhoid.
- Hemorrhoids are dilated venules of the hemorrhoidal plexuses. They are associated with constipation, straining, increased abdominal pressure, pregnancy, increased portal pressure, and a low-fiber diet.
- Hemorrhoids can be either internal or external. Those that arise above the dentate line are internal and painless. Those below the dentate line are external and painful.
- Individuals commonly present with thrombosed external hemorrhoids. On examination, there is a tender mass at the anal orifice that is typically bluish-purple in color.
- **If pain is severe and the thrombosis is less than 48 hours, the physician should excise the thrombus under local anesthesia followed by a warm sitz baths.**
- If not excised, symptoms will most often resolve within several days when the hemorrhoid ulcerates and leaks the dark accumulated blood. Residual skin tags may persist. Excision provides both immediate- and long-term relief and prevents the formation of skin tags.

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A 31-year-old man presents to the ED in July with cough, myalgias, malaise, nausea, vomiting, and diarrhea for 1 week. He just returned from a business trip to Singapore 2 days ago. He is concerned that he contracted food poisoning from meat he purchased at an open-air market. Vital signs include BP 110/80 mm Hg, HR 115 beats/minute, RR 20 breaths/minute, temperature 104°F, and pulse oximetry 96% on 2L nasal cannula. He appears fatigued and exhibits coryza, warm skin, and occasional dry cough. National news reports demonstrate similar cases in multiple geographic regions.

What is the most likely finding on this patient's CXR?

- A. Apical cavity lesions
- B. Bilateral interstitial infiltrates
- C. Normal CXR
- D. Pneumothorax
- E. Single lobar consolidation

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### Explanation: foils

- The patient lacks risk factors (homelessness, incarceration, high-risk exposure, hemoptysis, night sweats, or weight loss) for TB infection, which most commonly presents with apical cavity lesions on CXR **(a)**.
- A normal CXR **(c)** would be an uncommon finding in the setting of Pan flu.
- The patient's presentation is not consistent with pneumothorax **(d)**.
- While the patient could have community-acquired pneumonia (CAP) manifested as a single lobar consolidation **(e)**, his risk factors and symptoms are inconsistent with CAP.

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### Explanation: answer

- The patient is presenting with an influenza-like viral illness, and the most common finding on CXR is **bilateral interstitial infiltrates**.
- The additional characteristics of off-peak flu season, travel to Asia, possible exposure to poultry in an open-air market, symptoms and indication of geographic spread suggest the possibility of pandemic influenza (Pan flu). Birds, poultry, and livestock are known reservoirs for the virus and are theorized to be the site of recombination to virulent strains.

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• A 4-year-old child in full cardiopulmonary arrest has been intubated with an appropriate sized ETT and chest compressions are continued. What is the correct ventilation rate for this intubated child who is still requiring chest compressions?

- A. 1 ventilation every 2-3 seconds
- B. **8-10 ventilations per minute**
- C. 15 compressions to 2 ventilations
- D. 30 compressions to 2 ventilations
- E. 30-40 ventilations per minute

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### explanation

- When a patient has an advanced airway in place, the compressions and ventilations are performed asynchronously.
- The chest compressions are performed at a rate of 100 compressions per minute and ventilations through the advanced airway are performed as a rate of 8-10 ventilations per minute (which is one ventilation about every 6 seconds).
- **(a)** and **(e)** are incorrect because this provides too much ventilation in a patient requiring chest compressions.
- **(c)** and **(d)** are incorrect because these are the compression to ventilation ratios to use in patients in cardiopulmonary arrest who do not yet have an advanced airway in place.

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A 24-year-old man presents complaining of right eye pain. He was punched in the face 2 days ago. Examination reveals a sluggish right pupil with decreased visual acuity and consensual photophobia. His extraocular movements are intact and he denies bony tenderness around the orbit. Which of the following is the most likely diagnosis?

- A. Corneal abrasion
- B. Hyphema
- C. Orbital blowout fracture
- D. Retinal detachment
- E. Traumatic iritis

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### Explanation: foils

- Corneal abrasions **(a)** are accompanied by pain, photophobia, and tearing. The diagnosis is confirmed by visualizing an epithelial defect on fluorescein staining.
- Hyphemas **(b)** generally present earlier (soon after the traumatic event) than traumatic iritis. They cause similar symptoms; however, RBCs will be visualized in the anterior chamber.
- Orbital blowout fracture **(c)** is classically a fracture of the inferior orbital wall manifesting with orbital contusion, soft tissue swelling, bony tenderness, infraorbital paresthesia, and potentially entrapment of the inferior rectus muscle with restricted eye movements and diplopia.
- Retinal detachments **(d)** can occur following blunt eye trauma and manifest with nonpainful visual field defects, floaters, and flashes of light.

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### Explanation: answer

- The patient has acute **traumatic iritis**, which usually occurs within 3 days of experiencing blunt trauma to the eye.
- Symptoms include pain, decreased visual acuity, photophobia, floaters, and tearing.
- Physical examination reveals perilimbic conjunctival injection, decreased visual acuity, and a sluggish pupil.
- The two hallmark findings are consensual photophobia and "cell and flare" on slit lamp examination.
- Treatment is aimed at the prevention of synechiae formation and includes topical cycloplegics and steroids. Treatment should be initiated in conjunction with ophthalmology.

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A 37-year-old man is brought in by EMS from a golf course after a lightning strike. He was rapidly resuscitated on the scene. Which of the following is LEAST likely to be observed in this patient?

- A. Cataracts
- B. Compartment syndrome
- C. ECG abnormalities
- D. Lower extremity paralysis
- E. Tympanic membrane rupture

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### Explanation: foils

- Patients struck by lightning may sustain cardiac and/or respiratory arrest but have a good prognosis with resuscitation. Prolonged CPR may be indicated.
- Lightning injury is associated with cardiac arrhythmias, ST segment abnormalities, and other ECG changes. **(c)**
- Lower extremity paralysis **(d)** following lightning injury is termed keraunoparalysis and is usually temporary.
- Cataracts **(a)** are a common ocular complication of lightning injury, even in patients without evidence of direct injury to head or eyes. Development of cataracts may be delayed for weeks to years.
- Tympanic membrane perforation **(e)** can be seen due to blast injury.

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### Explanation: answer

- Unlike high-voltage electrical injuries, electrical injury from lightning tends to be superficial and skeletal muscle injury is rare in the absence of associated blunt trauma. Hence, compartment syndrome is not associated with lightning injuries.

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Choose the appropriate statement about alcohol ingestion and heart disease:

- A. Chronic alcohol ingestion can lead to a restrictive cardiomyopathy.
- B. High-output congestive heart failure may be due to a thiamine deficiency.
- C. If heart failure does develop, discontinuing alcohol will not change the prognosis.
- D. If a patient with alcoholic cardiomyopathy continues to drink, mortality rate is greater than 70% over the next 3 years.
- E. The most common dysrhythmia associated with a drinking binge is ventricular tachycardia.

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### Explanation: foils

- Chronic alcoholics may develop a clinical picture identical to that of dilated cardiomyopathy, not a restrictive cardiomyopathy **(a)**
- While beriberi heart disease (thiamine deficiency) **(b)** leads to a high-output congestive heart failure, alcoholic cardiomyopathy is associated with a low-output state.
- Stopping the consumption of alcohol can halt the progression of disease, but rarely reverses damage **(c)**
- Binge drinking, or "holiday heart syndrome," causes atrial fibrillation more than any other dysrhythmia. **(e)**

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### Explanation: answer

- Alcoholic cardiomyopathy (ACM) is considered one of the main causes of left ventricular dysfunction and is the leading cause of nonischemic dilated cardiomyopathy (DCM) in developed countries.
- With continued alcohol use, mortality rate approaches 75% within the next 3 years.**
  - Between 40% to 80% of people who continue to drink heavily will not survive more than 10 years after receiving this diagnosis

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A 45-year-old man is brought to the ED after a head-on MVC. Paramedics at the scene report significant front-end damage to the vehicle. The patient's BP is 130/80 mm Hg, HR is 100 beats/minute, RR is 15 breaths/minute, and oxygen saturation is 98% on room air. Radiographs of the cervical spine reveal bilateral fractures of the C2 vertebra. The patient's neurologic examination is unremarkable. Which of the following best describes this fracture?

- Boxer's fracture
- Clay shoveler's fracture
- Colles' fracture
- Jefferson fracture
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### Explanation: foils

- A boxer's fracture **(a)** is a fracture of the neck of the fifth metacarpal. It is one of the most common fractures of the hand and usually occurs from a direct impact to the hand (ie, punching a hard object with a closed fist).
- A Clay shoveler's **(b)** fracture occurs secondary to cervical hyperextension or direct trauma to the posterior neck, resulting in an avulsion fracture of the spinous process.
- Colles' fracture **(c)** is the most common wrist fracture in adults. It is a transverse fracture of the distal radial metaphysis, which is dorsally displaced and angulated. These fractures usually occur from a fall on an outstretched hand.
- A burst fracture of C1 is called a Jefferson fracture **(d)**, which is typically produced by a vertical compression force.

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### Explanation: answer

- The **Hangman fracture**, or traumatic spondylolysis of C2, occurs when the head is thrown into extreme hyperextension because of abrupt deceleration, resulting in bilateral fractures of the C2 pedicles.
- This is considered an unstable cervical spine fracture. Today, the most common cause of a hangman fracture is head-on automobile collisions.

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A 43-year-old woman presents to the ED with a 3-week history of intermittent headache, nausea, and fatigue. She was seen at her private doctor's office 1 week ago along with her husband and children, who also have similar symptoms. They were diagnosed with a viral syndrome and told to increase their fluid intake. She states that the symptoms began approximately when it started to get cold outside. The symptoms are worse in the morning and improve while she is at work. Her BP is 123/75 mm Hg, HR is 83 beats/minute, temperature is 98.9°F, and oxygen saturation is 98% on room air. Physical examination is unremarkable. You suspect her first diagnosis was incorrect. Which of the following is the most appropriate next step to confirm your suspicion?

- A. Consult psychiatry to evaluate for malingering
- B. Order a carboxyhemoglobin (COHb) level
- C. Order a lead level
- D. Order a Mono spot test
- E. Perform a nasal pharyngeal swab to test for influenza

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### Explanation: foils

- Malingering (**a**) is the intentional production of false or exaggerated symptoms motivated by external incentives. It is unlikely to happen in entire families.
- Lead toxicity (**c**) is mainly a disease of children resulting from ingestion of lead-based paints. Adults can be exposed to lead in a variety of occupational circumstances, such as welders, glassmakers, and scrap metal workers. There is no classic presentation of lead toxicity. Therefore, high suspicion and a thorough history are critical. The diagnosis is made by an elevated whole-blood lead level.
- A Mono spot test (**d**) can be helpful in detecting acute mononucleosis. Without pharyngitis, lymphadenopathy and given the duration of symptoms, this choice is not likely.
- CO poisoning is often confused for a viral syndrome (**e**). Patients with influenza usually present to the ED with high fever. The duration of symptoms also makes this less likely.

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### Explanation: answer

- The most useful diagnostic test in suspected CO poisoning is a **COHb level**.
- Normal levels are less than 5% in nonsmokers as CO is a natural by-product of the metabolism of porphyrins. COHb levels may be slightly more elevated in smokers and those who live in large cities.
- CO poisoning should be suspected when multiple patients (usually in the same family) present with flu-like symptoms, and were exposed to products of combustion (ie, home heaters/generators). The level may not be elevated if they have not been exposed recently (<12 hours). This most commonly occurs in colder, winter months.
- The mainstay of treatment is the delivery of oxygen. Hyperbaric oxygen is usually used for patients with COHb levels >25%.

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An asymptomatic young adult was brought to the ED by a police officer after his home was raided. The patient swallowed five small packets of an unknown substance before being arrested. His BP is 125/75 mm Hg, HR is 85 beats/minute, RR is 16 breaths/minute, and temperature is 98.7°F. Physical examination is unremarkable. An abdominal radiograph confirms intraluminal small bowel densities. Which of the following is the most appropriate treatment?

- A. Activated charcoal and polyethylene glycol
- B. Gastric lavage
- C. Magnesium citrate
- D. NAC
- E. Syrup of ipecac

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**Explanation: foils**

- Magnesium citrate (**a**) is a cathartic whose action begins 4 to 6 hours after ingestion. It is contraindicated in patients with renal failure.
- Gastric lavage (**b**) is not indicated for this patient.
- NAC (**d**) is the antidote for acetaminophen toxicity.
- Syrup of ipecac (**e**) is also ineffective for the packets in the small bowel.

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**Explanation: answer**

- Patients who swallow bags of drugs can be classified into two large categories—"body stuffers" and "body packers." Patients being arrested who swallow illicit drugs to conceal the evidence are referred to as "body stuffers." They commonly tend to ingest any and all the drugs they possess, potentially resulting in a polypharmaceutic overdose. Body stuffers are usually seen in the ED before symptoms have developed.
- Sometimes there is radiographic evidence of the swallowed substances as seen in crack vials or staples on the packaging materials.
- **Activated charcoal** should be administered immediately and whole-bowel irrigation may be indicated. Whole-bowel irrigation uses a **polyethylene glycol** electrolyte solution (ie, GoLYTELY), which is not absorbed and flushes drugs or chemicals through the GI tract.
- This procedure seems to be most useful when radiopaque tablets or chemicals, swallowed packets of street drugs, or sustained-released drugs have been ingested.
- "Body packers" are people who transport large amounts of drugs in very tightly wrapped packages. This takes pre-planning and is not done as the police are raiding. "Packers," if symptomatic, may need to go to the OR. Cocaine can lead to bowel perforation.

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A 28-year-old G2P0010 woman presents to the ED complaining of vaginal spotting. She had a positive home pregnancy test 2 weeks ago. Pelvic examination is performed and reveals blood in the vaginal vault and a closed internal os. Transvaginal ultrasound confirms an intrauterine pregnancy with a gestational age of 11 weeks. Her BP is 130/75 mm Hg, HR is 82 beats/minute, RR is 16 breaths/minute, and temperature is 99.1°F. Laboratory results reveal a WBC 10,500/μL, hematocrit 40%, platelets 225/μL and blood type B-negative. Which of the following is the most appropriate intervention prior to discharge from the ED?

- Administer 50 mcg of anti-D immune globulin
- Administer 2 g of IV magnesium sulfate
- Administer IV penicillin G
- Administer oral ferrous sulfate
- Administer 300 mcg of anti-D immune globulin

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**Explanation: foils**

- Eclampsia is a syndrome of hypertension, proteinuria, generalized edema, and seizures that usually occurs after the second trimester in pregnancy and is treated with IV magnesium sulfate (**b**).
- There is no indication for treatment with antibiotics (**c**).
- Ferrous sulfate (**d**) is used as a supplement to help treat anemia, however this patient is not anemic.

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**Explanation: answer**

- Rh isoimmunization occurs when an Rh-negative female is exposed to Rh-positive fetal blood during pregnancy, miscarriage, or delivery. Initial exposure leads to primary sensitization with production of immunoglobulin M antibodies placing the current and future pregnancies at risk.
- Patients with threatened abortions, who have Rh-negative blood, are at increased risk for Rh isoimmunization and therefore should receive **anti-D immune globulin (RhoGAM)**.
- A **50-mcg** dose is used prior to 12 weeks gestational age and a **300-mcg** dose thereafter (**d**).

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A 31-year-old woman with a history of schizophrenia presents to the ED for altered mental status. A friend states that the patient is on multiple medications for her schizophrenia. Her BP is 150/80 mm Hg, HR is 122 beats/minute, RR is 20 breaths/minute, and temperature is 104.5°F. On examination, the patient is diaphoretic with marked rigidity of her musculature.

Which of the following abnormalities associated with this condition leads to the greatest morbidity and mortality?

- A. Elevated creatine phosphokinase (CPK)
- B. Hyperpyrexia
- C. Hypertension
- D. Muscle rigidity
- E. Tachycardia

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### Explanation: foils

This patient has neuroleptic malignant syndrome (NMS), a rare but potentially life threatening condition. The primary trigger of NMS is dopamine receptor blockade and the standard causative agent is an antipsychotic. Potent typical neuroleptics such as haloperidol, fluphenazine, chlorpromazine, trifluoperazine, and prochlorperazine have been most frequently associated with NMS and thought to confer the greatest risk.

- Muscle rigidity and an elevated CPK (**d & a**) go hand in hand NMS and may be markers of severity, but are not independently associated with mortality in NMS.
- NMS can cause hypertension and tachycardia (**c & e**); however, hypotension and autonomic instability would be the greater concern. The presence of these are concerning, but not predictors of mortality.

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### Explanation: answer

- **Hyperpyrexia** is the symptom of NMS that is most associated with severe morbidity and mortality. The patient's temperature must be controlled and frequently with active cooling in addition to pharmacologic agents.
- NMS and serotonin syndrome are rare, but potentially life-threatening, medicine-induced disorders. Features of these syndromes may overlap making diagnosis difficult. However, NMS is characterized by 'lead-pipe' rigidity, while serotonin syndrome is characterized by hyperreflexia and clonus.

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