

Usmle Club Session No. 3

December 5, 2013

1

A 20-year-old woman presents to the Emergency Department after being dumped in the ambulance bay with a note that said only that “she was doing Ecstasy at a party when she became unconscious.” This patient currently remains unconscious, with a heart rate of 140 bpm, temperature of 103.5°F, pinpoint pupils, absent bowel sounds, blood pressure of 85/40 mm Hg, profuse sweating, and oxygen saturation of 86 percent on room air. Which of the following would not be a clinical manifestation of an Ecstasy patient?

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- C. Pinpoint pupils.
- D. Diaphoresis.
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Correct answer = **C. Tachycardia, hyperthermia, diaphoresis, and unconsciousness** are typical signs and symptoms of **ecstasy overdose**. **Pinpoint pupils** as well as **absent bowel sounds, low oxygen saturation** (respiratory depression), and **hypotension** are good indicators of **opioid overdose**. This is likely a multidrug overdose.

2

A 41-year-old male pocketwatch maker reports to the Emergency Department after he was found unconscious on the floor of the shop by a coworker. The coworker states that the patient complained of being cold this morning around 8 a.m. (the central heat was broken, and the outdoor temperature was 34°F) and that since noon, he had been complaining of headache, drowsiness, confusion, and nausea. The clinician notices that he has cherry red lips and nail beds. What is the most likely toxin causing his signs and symptoms?

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- B. Cyanide.
- C. Chloroform.
- D. Carbon monoxide.
- E. Ecstasy.

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Correct answer = **D**. Although watch makers and other professionals who use electroplating may be at higher risk for cyanide exposure because many plating baths use cyanide-containing ingredients, this patient shows **classic signs of carbon monoxide poisoning**, such as **cherry red lips and nail beds, headache, confusion, nausea, and drowsiness** leading to **unconsciousness**.

The history also leads us to believe that this person may have been using a **stove or space heater** to stay warm. **Asbestos** poisoning commonly first presents as lung cancer or mesothelioma. **Cyanide** in low doses can present with loss of consciousness, headache, and confusion and there is typically giddiness in the early stages, breathing with difficulty, and pink skin (not just lips and nails), and then later rapidly progresses to deep coma and death. **Chloroform** can cause dizziness, fatigue, and unconsciousness, but these patients do not present with cherry red lips and nails. These symptoms are not consistent with Ecstasy overdose, in which hyperthermia, not “feeling cold” is typically seen.

3

An elderly diabetic patient is admitted to the hospital with pneumonia. The sputum culture stains for a gram-negative rod. The patient is started on IV ampicillin. Two days later, the patient is not improving, and the microbiology laboratory reports the organism to be a β -lactamase producing *H. influenzae*. What course of treatment is indicated?

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Correct answer = **B. Cefotaxime**, a third-generation cephalosporin, is **not susceptible to hydrolysis by β -lactamase**, is bactericidal, and has few adverse effects. To continue the ***ampicillin*** is not appropriate, because the organism is resistant to it. ***Vancomycin*** is used in the treatment of serious infections caused by β -lactamase resistant, gram-positive microorganisms (*H. influenzae* is gram-negative). Although ***gentamicin*** has some activity against *H. influenzae*, it also causes adverse effects, such as nephrotoxicity, which may harm the patient.

4

A patient with degenerative joint disease is to undergo insertion of a hip prosthesis. To avoid complications due to postoperative infection, the surgeon will pretreat this patient with an antibiotic. This hospital has a significant problem with MRSA. Which of the following antibiotics should the surgeon select?

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Correct answer = **D**. The only antibiotic on the list that is **effective against MRSA** is **vancomycin**.

5

A 45-year-old male who received a renal transplant 3 months previously and is being maintained on prednisone, cyclosporine, and mycophenolate mofetil is found to have increased creatinine levels, and a kidney biopsy indicating severe rejection. Which of the following courses of therapy would be appropriate?

- A. Increased dose of prednisone.
- B. Hemodialysis.
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- D. Treatment with sirolimus.
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Correct answer = **C**. This patient is apparently undergoing an **acute rejection of the kidney**. The most **effective treatment** would be administration of an **antibody**. Increasing the dose of **prednisone** may have some effect, but would not be enough to treat the rejection. **Sirolimus** is used prophylactically with cyclosporine to prevent renal rejection but is less effective when an episode is occurring. Furthermore, the combination of cyclosporine and sirolimus is more nephrotoxic than cyclosporine alone. **Azathioprine** has no benefit over mycophenolate.

6

A 9-year-old girl has severe asthma, which required three hospitalizations in the last year. She is now receiving therapy that has greatly reduced the frequency of these severe attacks. Which of the following therapies is most likely responsible for this benefit?

- A. Albuterol by aerosol.
- B. Ipratropium by inhaler.
- C. Fluticasone by aerosol.
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Correct answer = **C**. Administration of a **corticosteroid directly to the lung significantly reduces the frequency of severe asthma attacks**. This benefit is accomplished with minimal risk of the severe systemic adverse effects of corticosteroid therapy. ***Albuterol*** is only used to treat acute asthmatic episodes. The ***other agents*** may reduce the severity of attacks but not to the same degree or consistency as fluticasone (or other corticosteroids).

7

A couple celebrating their fortieth wedding anniversary is given a trip to Peru to visit Machu Picchu. Due to past experiences while traveling, they ask their doctor to prescribe an agent for diarrhea. Which of the following would be effective?

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Correct answer = **B**. Loperamide is the only drug in this set that has **antidiarrheal activity**. **Omeprazole** is a proton-pump inhibitor, **famotidine** antagonizes the H₂ receptor, and **lorazepam** is a benzodiazepine that is a sedative and anxiolytic agent.

8

A 57-year-old man complains of fever, headache, confusion, aversion to light, and neck rigidity. A presumptive diagnosis of bacterial meningitis is made. Antimicrobial therapy should be initiated after which one of the following occurrences?

- A. Fever is reduced with antipyretic drugs.
- B. Sample of blood and cerebrospinal fluid have been taken.
- C. A Gram stain has been performed.
- D. The results of antibacterial drug susceptibility tests are available.
- E. Infecting organism(s) have been identified by the microbiology laboratory.

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Correct answer = **B**. Bacterial meningitis is a medical **emergency** that requires immediate diagnosis and treatment. **Specimens** for possible microbial identification must be **obtained before drugs are administered**. Therapy should not be delayed until laboratory results are available.

9

A 31-year-old white intravenous drug user was admitted to the hospital with a 4-week history of cough and fever. A chest radiograph showed left upper lobe cavitory infiltrate. Cultures of sputum yielded *M. tuberculosis* susceptible to all antimycobacterial drugs. The patient received isoniazid, rifampin, and pyrazinamide. The patient's sputum remained culture-positive for the subsequent 4 months. Which one of the following is the most likely cause of treatment failure?

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- D. Noncompliance by the patient.**

Correct answer = **D**. Although **malabsorption** of the drugs and the emergence of **drug resistance** are possibilities, the **most common cause of treatment failure** is **patient's nonadherence** to the treatment protocol. Better treatment completion rates occur with "directly observed therapy." **False-positive** cultures is a possible but unlikely explanation.

10

A soldier's unit has come under attack with a nerve agent. The symptoms exhibited are skeletal muscle paralysis, profuse bronchial secretions, miosis, bradycardia, and convulsions. The alarm indicates exposure to an organophosphate.

What is the correct treatment?

- A. Do nothing until you can confirm the nature of the nerve agent.
- B. Administer atropine, and attempt to confirm the nature of the nerve agent.
- C. Administer atropine and 2-PAM (pralidoxime).
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Correct answer = **C**. Organophosphates exert their effect by **irreversibly binding to acetylcholinesterase (AChE)** and, thus, can cause a **cholinergic crisis**. Administration of **atropine** will block the muscarinic sites, but it will not reactivate the enzyme, which will remain blocked for a long period of time. Therefore, it is essential to also administer **pralidoxime** as soon as possible to reactivate the enzyme before aging occurs. Administering pralidoxime alone will not protect the patient against the effects of acetylcholine resulting from AChE inhibition.

11

A 50-year-old male farm worker is brought to the emergency room. He was found confused in the orchard and since then has lost consciousness. His heart rate is 45, and his blood pressure is 80/40 mm Hg. He is sweating and salivating profusely. Which of the following treatments is indicated?

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Correct answer = **D**. The patient is exhibiting signs of **cholinergic stimulation**. Because he is a farmer, insecticide poisoning is a likely diagnosis. Thus, either intravenous or intramuscular doses of **atropine** are indicated to antagonize the muscarinic symptoms. **Physostigmine** and **edrophonium** are cholinesterase inhibitors and would exacerbate the problem. **Norepinephrine** would not be effective in combating the cholinergic stimulation. **Trimethaphan**, being a ganglionic blocker, would also worsen the condition.

12

A patient with a gunshot wound to the abdomen, which has resulted in spillage of intestinal contents, is brought to the emergency room. Which antibiotic would you select to effectively treat an infection due to *Bacteroides fragilis*?

- A. Aztreonam.
- B. Clindamycin.
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Correct answer = B. *Bacteroides fragilis* is an anaerobic organism. The only drug on the list that is effective against it is clindamycin. **Aztreonam** is effective against aerobic, not anaerobic organisms. **Gentamicin** works against *Francisella tularensis*, a gram-negative organism rarely causing infection, and in combination with penicillin G against Enterococci. **Azithromycin** is used for respiratory infections. The only anaerobic organisms that **tetracyclines (doxyxycline)** are effective against are *Clostridium perfringens* and *Clostridium tetani*.

13

A very agitated young male was brought to the emergency room by the police. Psychiatric examination revealed that he had snorted cocaine several times in the past few days, the last time being 10 hours previously. He was given a drug that sedated him, and he fell asleep. The drug that was used to counter this patient's apparent cocaine withdrawal was very likely:

- A. Phenobarbital.
- B. Lorazepam.
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Correct answer = B. The **anxiolytic properties of benzodiazepines, such as lorazepam**, make them the **drugs of choice** in treating the anxiety and agitation of **cocaine withdrawal**. Lorazepam also has hypnotic properties. **Phenobarbital** has hypnotic properties, but its anxiolytic properties are inferior to those of the benzodiazepines. **Cocaine** itself could counteract the agitation of withdrawal, but its use would not be proper therapy. **Hydroxyzine**, an antihistamine, is effective as a hypnotic, and it is sometimes used to deal with anxiety, especially if emesis is a problem. **Fluoxetine** is an antidepressant with no immediate effects on anxiety.

14

A 58-year-old male has been effectively treated for Paget disease for approximately 6 months. He is now beginning to experience renewed bone pain and radiologic evidence of advancing disease. Which of the following drugs is most likely to have resulted in this failure of therapy?

- A. Alendronate.
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Correct answer = B. Paget disease can be treated effectively with either a bisphosphonate or calcitonin. Calcitonin therapy is complicated by the fact that tolerance develops to the action of the hormone when administration is continuous over a long period of time. The **other drugs** are not effective in the treatment of Paget disease.

15

Patient presents with salivation, lacrimation, urination and defecation as side effects of a medication. Which one of the following receptors mediates the actions of this drug?

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- B. α Receptors.
- C. Muscarinic receptors.
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Correct answer = C. The muscarinic receptors of the **parasympathetic** nervous system maintain essential **body functions such as digestion and waste elimination**. The **nicotinic receptors** are a receptor for acetylcholine. It plays a major role in skeletal muscles, ganglia and synthesis of catecholamines in the adrenal medulla. **α and β receptors** are receptors for norepinephrine and epinephrine and activation of these receptors does not produce these effects.

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