Bugs, Bites, and Botulism

Authors: Scott DeBoer, MSN, RN, CPEN, CEN, CCRN, CFRN, EMT-P, and Michael Seaver, BA, RN, Dyer, IN, and Chicago, IL
Section Editors: Scott DeBoer, MSN, RN, CPEN, CEN, CCRN, CFRN, EMT-P, and Michael Seaver BA, RN

Review questions and answers on topics about which nurses should be knowledgeable

QUESTIONS

1. Three children and their parents simultaneously present with a chief complaint of "itchy rashes." Their history is significant for having spent the weekend at a local hotel with a swimming pool and a hot tub. The rash is found to be most prevalent in the areas that were covered by their bathing suits. You can anticipate that the probable diagnosis will be:

A. allergic contact dermatitis.
B. folliculitis.
C. chicken pox.
D. eczema exacerbation.

2. Your patient is a 3-month-old infant who presents with a variety of issues, including apparent weakness as evidenced by poor head control and an unusually relaxed facial muscle tone, possible swallowing problems as evidenced by increased drooling and poor feeding, and a reported decrease in bowel elimination possibly related to constipation or the poor feeding previously noted. The infant doesn't seem to react to your attempts to elicit a smile and her eyelids are drooping, although she does kick her legs in an active and age-appropriate manner. The child's mother states that the baby is fed only natural and home-canned organic foods. Given the infant's age and history, which disease should be seriously considered?

A. Botulism
B. Epiglottitis
C. Guillain-Barré syndrome
D. Respiratory syncytial virus

3. Severe reactions resulting from stings from fire ants may be treated with any of the following options except:

A. EpiPen Auto-Injector (epinephrine).
B. Benadryl (diphenhydramine).
C. antivenin.
D. corticosteroids.

4. The most significant sequelae to West Nile virus (WNV) infection are:

A. end organ failure and renal compromise.
B. pulmonary edema and acute respiratory distress syndrome.
C. endocarditis and pericarditis.
D. encephalitis and meningoencephalitis.

5. If a patient tests positive for smallpox, which of the following treatments should be anticipated?

A. Utilization of a Mark-1 Kit (nerve agent antidote kit)
B. Multiple atropine boluses
C. Palliative care only because the patient most likely will not survive the hospital admission
D. Supportive care including IV fluids, antibiotics, and antiviral agents

ANSWERS

1. Correct answer: B

Hot tub + bathing suit + itchy rash = folliculitis—specifically pseudomonas in this case. In breaking down the word folliculitis, we have "follicul" referring to a hair follicle and "itis" meaning inflammation, a symptom very commonly associated with infection. Therefore, folliculitis is an inflammation or infection of the hair follicles. It usually starts with friction from clothing or shaving or from some process or action that produces a blocking of the follicles. In addition, as in this case, it also is found commonly after swimming in pools or using hot tubs that are not properly chlorinated. In most cases, the diagnosis is made by history and physical examination. For uncomplicated superficial folliculitis, use of antibacterial soaps and good hand washing technique may be all that is needed.

If oral and/or IV antibiotic therapy is indicated, coverage for particularly "icky" bugs such as methicillin-resistant *Staphylococcus aureus* or pseudomonas is suggested. If patients do

Scott DeBoer is Critical Care Transport Nurse, MedEx Chicago, Chicago, IL, and Founder, Pedi-Ed-Trics Emergency Medical Solutions, Dyer, IN.

Michael Seaver is Senior Healthcare Informatics Consultant, Chicago, IL.

For correspondence, write: Scott DeBoer, MSN, RN, CPEN, CEN, CCRN, CFRN, EMT-P, 9052 Beall St, Dyer, IN 46311; E-mail: Scott@PediEd.com.

J Emerg Nurs 2019;45:e27-9.
0099-1767

https://doi.org/10.1016/j.jen.2019.06.010

not bounce back/get better after initial antibiotic therapy, then a gram stain and culture should be performed. Once the diagnosis is made, preventing the spread of the disease is important; the family should wash their linens, their bodies, and especially their hands! The essentially isolated location of the rash should help eliminate the other possible answers. *Gilmore,[1] 313-334; DeBoer,[2] 705; Toner.[3]*

2. Correct answer: A

Infant botulism, which is the most common presentation of botulism in the United States, is caused by ingestion of botulism spores that release toxins into the gut. If you encounter a test question that includes the words "baby" and "honey" (note the part of the question that referred to "only natural and organic foods"), the answer is probably botulism. It is interesting to note that honey or corn syrup are the culprits for only 15% of cases of botulism; the causes of the other 85% of cases are unknown. Botulism was first described in health care by a German physician in the 1820s when he found that many of his patients experienced symptoms after eating improperly prepared sausages. The Latin translation for sausage is botulus!

Botulism toxin affects neuromuscular junctions from the head down. Patients present with blurred or double vision, along with the much more common symptoms of nausea, vomiting, and diarrhea (then constipation and urinary retention as the motor nerves of the colon and bladder are affected). After the visual and gastrointestinal symptoms kick in, weakness and paralysis commonly develop in a rapid and anatomically descending fashion. Airway management is crucial not only to prevent aspiration but to ensure that the patient can breathe. Antibiotics are not indicated unless the patient has a complicating infection and can actually worsen the patient's condition if aminoglycosides are used. Diagnosis is made by history, physical examination, and stool culture, which might be sent to the Centers for Disease Control and Prevention (CDC; in most cases, stool will be positive for toxin or culture for *Clostridium botulinum*). Treatment is supportive in nature (think airway!), and it is imperative to initiate treatment upon clinical suspicion without delay for confirmatory testing.

Can Guillain-Barré syndrome kick in at this young age? Anything seems possible, but keep in mind that the average age for Guillain-Barré syndrome is 4 to 8 years, although some cases have been reported as young as 1 year. A distinct presentation in Guillain- Barré syndrome is symmetric, ascending weakness or paralysis. Drooling is a classic presentation of epiglottitis, yet this condition usually presents with high fever and respiratory distress as a result of stridor from upper airway compromise. Respiratory syncytial virus seemingly is always the answer in winter for all things respiratory, yet this infant did not present with pulmonary findings. When you hear honey, corn syrup, or improperly prepared German sausages, think botulism! *DeBoer,[2] 720-721; Waseem.[4]*

3. Correct answer: C

As with other hymenoptera (such as bees and wasps), there is no antivenin for fire ant envenomation. Treatment is supportive, paying particular attention to the risk of anaphylaxis, which can be deadly. The EpiPen Auto-Injector is the first-line treatment for patient self-management of anaphylaxis in the prehospital setting. Antihistamines and corticosteroids are third-line treatments for acute anaphylaxis and are also common treatments for symptom management of less serious allergic reactions from envenomation. Swarming of fire ants and multiple sting locations are common as with other hymenoptera. Of note, the queen fire ant may live for 6 to 7 years and can produce up to 3500 eggs in a single day, which is approximately 9 million eggs in her lifetime. Male fire ants mate with the queen (and do nothing else) for their 4- to 5-day life span. Although their life is short, some (men) would say that the male fire ant has a good life with a singular purpose. On the other hand, consider the very, very busy life of the fire ant obstetrics nurse! *DeBoer,[2] 738; Finzer[5]; Ralston.[6]*

4. Correct answer: D

Although 80% of WNV infections are asymptomatic, WNV is now one of the most common causes of epidemic viral encephalitis in the United States. Symptoms of severe WNV infection commonly include stiff neck, severe headache, and confusion. Just hearing "stiff neck" in the history certainly should make one think of ruling out meningitis. Treatment is supportive because there is no vaccine or specific antiviral medication for WNV infection. Prevention efforts should be community based, focusing on the reduction of mosquito populations and educating the community regarding risks and symptoms. WNV is a reportable disease under the CDC category of arboviral diseases. Follow your institutional policy regarding the reporting of diseases to the CDC or state department of health. *DeBoer,[2] 738; Cennimo.[7]*

5. Correct answer: D

Although prevention of smallpox infection is certainly preferred, if a patient in your emergency department has signs

of smallpox, supportive care is the focus. After a 7- to 17-day incubation period, the poxlike rash will start to form. The classic rash begins on the head and extremities (as opposed to chickenpox, which typically starts on the trunk) and is characterized by deep, firm, hard pustules or vesicles. The patient becomes contagious around day 14. Vaccination within 3 days of known exposure, although not curative, will lessen the severity of smallpox significantly. Management may include ventilator support, wound care, and strict infection control measures. Although currently no medication is approved specifically for treating smallpox, studies have suggested that the antiviral drug used in the management of HIV retinitis, cidofovir (Vistide), might be useful. Smallpox is transmitted via respiratory droplets during close contact and is considered to be in its most contagious state during the first 10 days of the rash. Although palliative care (for relief of pain) is indicated, the mortality rate (around 30%) is not anywhere near a certainty. Large doses of atropine are given for organophosphate exposure, and the Mark-1 Kit (a dual autochamber containing atropine sulfate and 2-pyridine aldoxime methyl chloride) is indicated for nerve agent exposure. *DeBoer,[2] 759-760; Hussain.[8]*

REFERENCES

1. Gilmore L. Dermatologic emergencies. In: Beecher D, ed. *Emergency Nursing Pediatric Course*. 5th ed. Des Plaines, IL: Emergency Nurses Association; 2018:313-334.
2. DeBoer S. *Certified Pediatric Emergency Nurse Review: Putting It All Together. 3rd ed.* Dyer, IN: Pedi-Ed-Trics Emergency Medical Solutions; 2013:720-721, 738, 759-760.
3. Toner CB. Pseudomonas folliculitis. https://emedicine.medscape.com/article/1053170-overview. Updated July 31, 2018. Accessed June 25, 2019.
4. Waseem M. Pediatric botulism. https://emedicine.medscape.com/article/961833-overview. Updated February 23, 2018. Accessed June 25, 2019.
5. Linzer JF. Pediatric anaphylaxis. https://emedicine.medscape.com/article/799744-overview. Updated September 15, 2016. Accessed June 25, 2019.
6. Ralston JP. Fire ant bites. https://emedicine.medscape.com/article/1089027-treatment. Updated October 4, 2016. Accessed June 25, 2019.
7. Cennimo D. West Nile virus (WNV) infection and encephalitis (WNE) clinical presentation. https://emedicine.medscape.com/article/234009-clinical. Updated November 30, 2018. Accessed June 25, 2019.
8. Hussain N. Smallpox treatment and management. https://emedicine.medscape.com/article/237229-treatment. Updated July 20, 2018. Accessed June 25, 2019.