Zika Virus and Its Effects in Pregnancy

EDUCATIONAL OBJECTIVES

Upon completion of this activity, participants should be better able to:

1. Describe the characteristics of Zika virus and its various modes of transmission.
2. Recognize the clinical presentation of Zika infections, including signs and symptoms, and discuss the tools used to definitively diagnose a Zika infection.
3. Identify the potential complications that could affect the fetus as a result of Zika infection during pregnancy.

Post-Test/Rationale

1. When can Zika virus be definitively diagnosed by urine reverse transcriptase polymerase chain reaction?

   A. 15 days after the patient becomes symptomatic
   B. <14 days after onset of symptoms, along with a positive serologic test
   C. <14 days after onset of symptoms, along with a negative serologic test
   D. A definitive diagnosis cannot be made

Correct Answer: B

The type of diagnostic tool used depends on how soon after the onset of symptoms the patient presents. Because reverse transcriptase PCR (RT-PCR) is effective only for a 3- to 7-day window (i.e., while the patient is viremic), RT-PCR urine and serum should be performed when a patient presents on days 1 to 6. A negative RT-PCR does not equate to absence of disease. Patients who present between day 7 and day 14 after the onset of symptoms should undergo both urine RT-PCR and Zika virus serologic testing (Zika virus IgM and neutralizing antibody titers). Zika virus serologic testing is an appropriate diagnostic tool for patients who present 15 or more days after symptom onset.

2. Which statement about male-to-female sexual transmission is true?

   A. It is less common than female-to-male transmission
   B. It is not yet known whether it is more or less common than female-to-male transmission
   C. It is equally as common as female-to-male transmission
   D. Male-to-female transmission does not occur

Correct Answer:

Zika infection may be sexually transmitted by males and females who have been infected. Sexual exposure includes vaginal sex, anal sex, oral sex, and other activities that might expose a partner to genital secretions. It is important to note that the transmitting partner does not have to be symptomatic to infect the other person. There have been at least 15 instances of sexual transmission of Zika in the U.S., and additional reports from other countries; however, it has not
yet been determined whether Zika virus is more readily transmitted by a female with Zika to a male, or vice versa, or exactly how long the virus remains in bodily fluids.

3. Ocular effects of Zika virus include which of the following?

   A. Ocular lesions
   B. Conjunctivitis
   C. Both a and b***
   D. Zika virus has no ocular effects

Correct Answer: C

Ocular Findings: Zika virus can cause symptoms such as nonpurulent conjunctivitis. Other ocular abnormalities have been observed in infants with microcephaly, according to a case series conducted in December 2015 in Salvador, Brazil. Ocular lesions, the most common of which were macular pigment mottling and chorioretinal scarring, were presumed to be due to exposure to Zika virus in utero.

4. When can Zika virus be sexually transmitted?

   A. Only during an active infection
   B. Before symptoms present***
   C. Only after the carrier is symptomatic
   D. It is not known whether Zika virus can be sexually transmitted

Correct Answer: B

Zika infection may be sexually transmitted by males and females who have been infected. Sexual exposure includes vaginal sex, anal sex, oral sex, and other activities that might expose a partner to genital secretions. It is important to note that the transmitting partner does not have to be symptomatic to infect the other person.

5. Which of the following is a prevention method for sexually transmitted Zika virus?

   A. The use of dental dams
   B. Abstinence
   C. Protected sex for 6 months if diagnosed male partner lives in an area with Zika virus
   D. All of the above***

Correct Answer: D

Patients who are at risk for Zika virus exposure should be advised to use barrier prophylactics, such as condoms, with their sexual partners. The CDC recommends that pregnant women practice abstinence or use condoms correctly and consistently to reduce the risk of sexual transmission. Another recommended prevention strategy is to use a dental dam for any oral sexual contact. If a sexual partner has recently traveled to an area with Zika virus, the CDC recommends protected sex or abstinence for at least 8 weeks after the female partner is diagnosed with Zika virus or presents with symptoms, or for 6 months if the partner is male.
6. Which statement characterizes Zika virus?

A. It is related to the influenza virus
B. It is an arbovirus in the \textit{Flavivirus} genus of the Flaviviridae family***
C. It is a bacterium
D. None of the above

Correct Answer: B
Zika virus is an arbovirus of the \textit{Flavivirus} genus of the Flaviviridae family, which includes dengue, yellow fever, West Nile, Japanese encephalitis, and tickborne encephalitis viruses.

7. Zika has been detectable for up to 6 months in which type of bodily fluid?

A. Saliva
B. Vaginal secretions
C. Semen***
D. Sweat

Correct Answer: C
The precise duration and pattern of infectious Zika virus in semen remain unknown. However, viral RNA has been detected in semen approximately 60 days after infection. In one case, the virus was isolated from semen at least 2 weeks, and possibly up to 10 weeks, after symptom onset; in another case, it was 6 months after symptom onset.

8. Which of these terms is applicable to Zika virus transmitted via a mosquito bite?

A. Maternal transmission
B. Blood-borne transmission
C. Vector-borne transmission***
D. Sexual transmission

Correct Answer: C
Vector-Borne Transmission: As noted, Zika virus can be transmitted by mosquitoes. The \textit{Ae aegypti} mosquito is considered the main vector.

9. Which statement regarding microcephaly in babies born to Zika-infected mothers is true?

A. All such babies will have microcephaly
B. Only babies born in Brazil will have microcephaly
C. Only babies born in South America will have microcephaly
D. Only some babies will have microcephaly***

Correct Answer: D
Microcephaly can be detected by ultrasound at 18 to 20 weeks' gestation, but it may not be evident until late in the second trimester or early in the third trimester. The causal relationship
between Zika virus and microcephaly or other adverse outcomes does not mean that if a woman is infected with Zika virus during pregnancy, the infant will definitely have health problems; it means simply that the infant is at increased risk for microcephaly or other health problems.

10. Which pregnancy trimester poses the greatest risk of Zika-related abnormalities in a fetus?

   A. 1st trimester***
   B. 2nd trimester
   C. 3rd trimester
   D. All of the above

**Correct Answer: A**

Congenital infections caused by viruses such as Zika can be transmitted to a fetus at any time during pregnancy and can affect multiple organ systems. The greatest risk of abnormalities is associated with Zika infection contracted in the first trimester.

11. Which symptom is not characteristic of Zika infection?

   A. Low-grade fever
   B. Muscle pain
   C. Maculopapular pruritic rash
   D. All of the above are characteristic of Zika infection***

**Correct Answer: D**

Zika infection is characterized by low-grade fever (37.8°C-38.5°C) and, frequently, a maculopapular pruritic rash. Other common symptoms include asthenia, myalgia, arthralgia with possible swelling (notably in the small joints of the hands and feet), and conjunctivitis. Clinical illness is consistent with Zika infection if two or more symptoms are present.

12. When should nonsteroidal anti-inflammatory drugs and aspirin be implemented for symptoms of Zika virus?

   A. Immediately
   B. When dengue has been ruled out***
   C. Never
   D. On a case-by-case basis

**Correct Answer: B**

The treatment of Zika virus involves primarily supportive care, such as rest, hydration, antipyretics, and analgesics for symptom management. Nonsteroidal anti-inflammatory drugs and aspirin should not be initiated until dengue has been ruled out because they may increase the risk of hemorrhage in these patients.

13. By what time period does immunoglobulin M develop?
A. Week 4
B. Week 1***
C. Month 1
D. None—IgM never develops

Correct Answer: B
Virus-specific immunoglobulin M (IgM) and neutralizing antibodies develop after symptoms have occurred for 1 week.

14. The clinical presentation of a Zika infection is similar to that of which other disease?

A. Ebola virus
B. Dengue
C. Chikungunya
D. B and C***

Correct Answer: D
The symptoms are similar to those in other arbovirus infections, such as dengue and chikungunya.

15. Pharmacists counsel patients about Zika infections by reviewing which of the following?

A. Preventive measures
B. Signs and symptoms
C. Risk of infection
D. All of the above***

Correct Answer: D
Pharmacist role: Because there is no treatment for Zika infection, pharmacist counseling should focus on prevention, particularly in pregnant women. Patients will have many questions related to travel, signs and symptoms, risk of infection, and preventive measures. It is important for the pharmacist to be aware of the most common questions that may be posed, as well as suitable and relevant responses.

Pharmacy technician role: The identification of potential signs and symptoms of infection is crucially important for the pharmacy technician to be aware of when working in partnership with the pharmacist. A thorough knowledge of Zika virus, methods of transmission, and preventive measures, as well as potential effects during pregnancy, is critical to successful engagement with the patient. As methods of transmission and the spread of new cases continue to be reported, the involvement of all health-care providers is of paramount importance.

16. Once a mosquito acquires Zika virus, for up to how long can it be infective?

A. 10 days
B. 20 days
C. 30 days
D. 60 days

**Correct Answer: D**
Mosquitoes may be infective for up to 60 days after acquiring the virus.

17. **Which statement about Zika infection is true?**

A. Every person with Zika virus will develop an infection
B. Not all people with Zika virus will develop an infection  
C. All women with Zika virus will develop an infection
D. All men with Zika virus will develop an infection

**Correct Answer: B**
About one in five people exposed to Zika virus will develop symptomatic Zika infection.

18. **What sort of care is required for Zika patients with Guillain-Barré syndrome?**

A. Hospitalization
B. Supportive care
C. Neither A nor B
D. Both A and B

**Correct Answer: B**
Zika-infected patients rarely require hospitalization. The exception is a patient who presents with Guillain-Barré syndrome (GBS) as a result of contracting Zika virus. GBS, a condition that affects the peripheral nervous system, may be extremely debilitating and is the leading cause of paralysis that is not the result of trauma. A genetic predisposition to GBS may be less of a concern than was once theorized. Although there is no cure or treatment for GBS, supportive care may reduce the effects of GBS. Treatment options for GBS patients include IV immunoglobulin, ICU admission, and possibly respiratory support.

19. **Which statement about testing is true for a pregnant woman who has recently traveled to an area with Zika virus?**

A. Perform fetal ultrasound if her Zika test is negative
B. Do not perform fetal ultrasound if her Zika test is negative
C. Do not perform fetal ultrasound if her Zika test is positive
D. Do not perform a Zika test

**Correct Answer: A**
Pregnant women who have had possible exposure to Zika virus and do not reside in an area with active transmission should be evaluated for Zika infection. Figure 1 in the article provides the testing algorithm for pregnant women who have recently traveled to an area with Zika virus. This includes performing fetal ultrasound if her Zika test is negative.
20. What type of care is appropriate for a pregnant woman residing in an area with Zika virus who has no clinical illness and tests negative for the virus?

A. Zika virus retesting in 2nd trimester  
B. Routine prenatal care  
C. Ultrasound at 18-20 weeks' gestation  
D. A and C***

Correct Answer: D

Pregnant women who reside in an area with active Zika virus transmission should be evaluated and tested in accordance with the CDC interim guidance. As noted in Figure 2 of this article, the algorithm for pregnant women who reside in an area with active Zika virus transmission (with or without clinical illness consistent with Zika virus), Zika testing in the 2nd trimester and an ultrasound at 18-20 weeks’ gestation is appropriate who has no clinical illness and tests negative for the virus.