Bacterial Meningitis Concerns in Collegiate Athletics
.
.5 hr. CEU

This unit is designed to increase your understanding of a highly dangerous infection, and help you protect your student athletes from its potentially fatal consequences.

List of Objectives:
1. Participants will be able to identify predisposing factors and modes of transmission.
2. Participants will be able to recognize signs, symptoms, and combinations thereof, specific to bacterial meningitis.
3. Participants will be able to identify populations in which the disease may occur and with whom vaccination may be warranted.

Meningitis is an inflammation of the meninges, the dual membranes lining the brain and spinal cord. This can be of viral or bacterial origin. The majority of meningitis cases in athletes are viral; however, it is crucial to be aware of both due to the morbidity of bacterial pathogens. The New England Journal of Medicine states that bacterial meningitis has decreased by 55% in the United States since the early 1990s, which may be linked to the introduction of the Hib conjugate vaccine. Even with this decrease, the disease still often results in death. While pneumococcal and Hib conjugate vaccines have reduced the risk in young children, older adults are now the risk group.

When looking at cases from 2003-2007, death occurred in 13% of bacterial meningitis cases. Every year in the United States approximately 2,500 are infected, and 300 die from meningococcal disease. Viral meningitis, or aseptic meningitis is the clinical syndrome with negative gram stain and bacterial culture of Cerebral Spinal Fluid. This form of meningitis is more common, but less severe. Both cases of meningitis can occur either acute, with presentation within 24 hours after onset of symptoms, or sub-acute, over 1 to 7 days. Viral meningitis most often occurs during the summer and fall months.

Neisseria meningitides (meningococcus) and streptococcus pneumoniae (pneumococcus) are the leading causes of bacterial, or septic meningitis. This is a medical emergency. If mortality does not result, intracranial complications are significant and include cerebral edema, hearing loss, hydrocephalus, myelitis, and subarachnoid hemorrhage.

The primary symptoms of meningitis include fever, headache, and neck stiffness (meningismus). These may also present with nausea, vomiting, photophobia, malaise, drowsiness, and skin lesions. Septic cases will display worse symptoms, but bacterial meningitis should always be assumed. Any decrease in neck suppleness should cause suspicion of meningitis.
The CDC warns of a few predisposing factors that may lead to bacterial meningitis. Antecedent viral infection, household crowding, chronic underlying illness, and both active and passive smoking may all increase risk.\(^6\) High level athletes are more susceptible to both types of meningitis than the general population. They are frequent travelers, which may cause them to get an infection not prevalent in their home country. They also have contact with teammates or opponents from different countries with a different profile of endemic diseases. Athletics is an environment that can easily transmit many diseases, especially respiratory-transmitted diseases due to close contact.\(^4\) Also, once a virus or bacteria is introduced to a team, there is an increased risk for others on the team to contract the disease when compared to other athletic teams at the same school.\(^3\) These factors may cause team physicians to modify recommended vaccination schedules.\(^4\) Common everyday activities of college athletes can facilitate the transmission of bacteria found in nose and throat discharges. These include kissing, sharing utensils and water bottles, being in close quarters, physical contact, and equipment sharing.\(^3,5\)

Athletes who are recovering from meningitis need to be cleared by a physician before returning to play. There are currently no evidence-based guidelines outlining the process. They should be afebrile and have complete resolution of all other symptoms before returning. For septic meningitis specifically, a neurologic exam should be performed after symptom resolution. An athlete with a change in neurologic function should discuss this with his/her team physician to determine if it safe to return to athletic participation.\(^2,3\)

Prevention of the spread of meningitis is very important. Reported infection rates range from 30-60% among high school football teams.\(^3\) With athletics, strategies need to look at preventing spreading to the team, as well as the surrounding community. Team physicians and medical staff can minimize transmission of meningitis with the following strategies:

1. Emphasize the use of universal precautions, specifically hand washing.
2. Teams should implement single use cups, or individual water bottles.
3. Isolate infected players.
4. Disinfect communal areas in the athletic facility and dorms.
5. Inform school and local public health authorities of any outbreaks.
6. “High Risk” individuals who have “close contact” with the primary case should be considered to be given antibiotic prophylaxis.\(^2\)

Passive immunization can also prevent the spread of meningococcus. The Advisory Committee on Immunization Practices has constantly updated the guidelines for meningitis vaccines. The most recent update was in 2013. Immunization is recommended for first-year college students living in dormitories. They have at least a three times greater risk from contracting meningococcal infection than students living off campus.\(^3\) The vaccine was found to be 97% effective when compared with non-vaccinated individuals.\(^2\) Those at high risk for contraction should receive a booster every 5 years.\(^3\)
Staff members should also be vaccinated to help prevent a potential outbreak. Any team traveling abroad to countries with high endemicity should make sure to have the team and staff vaccinated ahead of time. Vaccinations should be administered to athletes during the off-season, or when they will have time to rest. Some side effects of the vaccine include myalgia, arthralgia, headache and fever, and can last up to 14 days.  

Serogroups B, C, and Y are the most common causes of meningitis in the United States. Four vaccines are licensed in the United States (serogroups A, C, W and Y). Serogroup B is not licensed by the FDA yet; however, it is available for limited use, such as exposure cases, and also those at risk in the age group 16-18. This is the result of outbreaks on college campuses. From 2008-2010, a prolonged outbreak of serogroup B on a university campus in Ohio led to 13 cases and one death. In 2013, two universities in New Jersey and California experienced serogroup B outbreaks with a combined 13 cases and one death reported.  

It is clear that healthcare professionals who provide acute or preventative care to college students should stay up to date on the latest changes and recommendations of bacterial meningitis. Information on the subject should be made readily available for both college students and their parents.

Up to date information on the current use of vaccines and bacterial meningitis can be found at the Centers for Disease Control website at www.cdc.gov, or the American College of Health Association at www.acha.org.

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References
8. Centers for Disease Control. Interim—guidance for Control of Serogroup B Meningococcal Disease Outbreaks in Organizational Settings. 


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1. A B C D  8. A B C D
3. A B C D  10. A B C D
4. A B C D  11. A B C D
5. A B C D  12. A B C D
6. A B C D  13. A B C D
Mark Answers Above.

1. What is/are the leading cause of bacterial meningitis in the United States?
   a. Meningococcal
   b. Aseptic
   c. Pneumococcal
   d. Both A and C

2. Which of the following is NOT a complication seen in survivors bacterial meningitis?
   a. Deafness/hearing loss
   b. Myelitis
   c. High Blood Pressure
   d. Cerebral Edema

3. Meningitis should be suspected if fever and headaches are paired with what other symptom?
   a. Ringing in the ears
   b. Tingling in their extremities
   c. Productive cough
   d. Neck pain and stiffness

4. Which of the following is TRUE about Viral Meningitis?
   a. It is more common than bacterial meningitis
   b. It is also known as septic meningitis
   c. It occurs in the winter months
   d. It is more severe than bacterial meningitis

5. Which of the following does NOT predispose you to contracting meningitis?
   a. Chronic Illness
   b. High Cholesterol
   c. Smoking
   d. Living in close quarters

6. Before returning to play following bacterial meningitis the athlete must:
   a. Be afebrile
   b. Pass a neurological exam
   c. Follow a return to play meningitis protocol
   d. Both A and B

7. College students living in dormitories have a ______more likely chance of contracting bacterial meningitis.
   a. 1x
   b. 3x
   c. 5x
   d. 10x
8. Which serogroup is only licensed by the FDA in the U.S. for use during outbreaks?
   a. A
   b. B
   c. C
   d. Y

9. Sub-acute meningitis could take up to _____ days to show full symptoms.
   a. 25
   b. 10
   c. 12
   d. 7

10. Which of the following is the best method for prevention of the spread of meningitis on a college campus?
    a. Vaccines
    b. Personal hygiene
    c. Single use cups
    d. Non-contact practices

11. High Risk individuals should receive a meningitis booster every______?
    a. 6 months
    b. 1 year
    c. 5 years
    d. 10 years

12. What statement best describes the ACIP recommendation on meningococcal vaccination?
    a. All first year college students living in dormitories should receive meningococcal vaccine
    b. College healthcare providers must provide vaccinations to all students wishing to reduce the risk of meningococcal infection
    c. College health care providers should require meningococcal vaccination for college freshman admissions.
    d. Individuals who provide care to college freshman should provide information on meningococcal infection

13. In the case of a bacterial meningitis infection, in order to prevent an outbreak what should be considered?
    a. Hospitalization of all those who have contact with the infected person
    b. Nothing
    c. Prophylactic antibiotics to those considered “high risk” for “close contact”
    d. Isolation of all those considered “high risk” for “close contact”

14. Which case of meningitis should be considered a medical emergency?
    a. Septic
    b. Aseptic
    c. Pneumococcal
    d. All of the above