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Closing the Brief Case: Bacteremia and Vertebral Osteomyelitis Due to *Staphylococcus schleiferi*

Melanie L. Yarbrough,[a] Yasir Hamad,[b] Carey-Ann D. Burnham,[a] Ige A. George[b]

Department of Pathology & Immunology, Division of Laboratory and Genomic Medicine, Washington University School of Medicine, St. Louis, Missouri, USA[a]; Department of Medicine, Division of Infectious Diseases, Washington University School of Medicine, St. Louis, Missouri, USA[b]

ANSWERS TO SELF-ASSESSMENT QUESTIONS

1. What is detected by a tube coagulase test using rabbit plasma?
   A. Free coagulase
   B. Bound coagulase
   C. Protein A
   D. Hemolysin

   Answer: A. The tube coagulase test detects the presence of free coagulase that is secreted by *S. aureus* and other coagulase-positive *Staphylococcus* species. The slide coagulase test detects the presence of bound coagulase (also known as clumping factor), which reacts with fibrinogen to form a clump (agglutination). Protein A is a constituent of the *S. aureus* cell wall that can be detected by latex agglutination testing methods.

2. A Gram-positive coccus in clusters tests positive for catalase and PYR but negative for urease and ornithine decarboxylase. What is the most likely identity of this organism?
   A. *S. aureus*
   B. *S. schleiferi* subsp. *schleiferi*
   C. *S. schleiferi* subsp. *coagulans*
   D. *S. lugdunensis*.

   Answer: B. *S. schleiferi* subsp. *schleiferi* is PYR positive and ornithine decarboxylase and urease negative. *S. schleiferi* subsp. *schleiferi* is distinct from *S. schleiferi* subsp. *coagulans*, which is tube coagulase and urease positive. *S. aureus* is PYR negative and *S. lugdunensis* is ornithine decarboxylase positive.

3. Which of the following methods is a rapid test that could be used to predict methicillin resistance in *S. schleiferi*?
   A. PBP2a testing by immunochromatographic assay
   B. Cefinase test
   C. Cefoxitin disk diffusion
   D. Oxacillin disk diffusion

   Answer: A. An immunochromatographic method for detection of the PBP2a protein, which is encoded by the *mecA* gene, is a rapid method to predict methicillin resistance in *S. aureus*. The test can be completed in less than half an hour. This method was recently found to have good diagnostic performance with *S. schleiferi* isolates. While the disk diffusion method is used to predict methicillin resistance in *Staphylococcus* species, this method is not considered rapid, as it requires a day for bacterial growth prior to the interpretation of assay results.

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Editor Alexander J. McAdam, Boston Children's Hospital

Address correspondence to Melanie L. Yarbrough, myarbro@wustl.edu.

See page 3157 in this issue (https://doi.org/10.1128/JCM.00500-17) for case presentation and discussion.

Current guidelines use cefoxitin breakpoints to predict methicillin resistance, but there is evidence to suggest that oxacillin may be the best surrogate for *S. schleiferi*. The cefinase test is a rapid method used to detect the production of β-lactamase-producing bacteria and is sometimes used to test for BlaZ activity in staphylococci but does not detect PBP modifications associated with methicillin resistance.

TAKE-HOME POINTS

- *S. schleiferi* is a component of the normal skin microbiota of dogs but can cause zoonotic infections.
- *S. schleiferi* is an uncommon but important cause of human infections that is associated with endocarditis, device infections, bacteremia, osteomyelitis, and skin and soft tissue infections.
- *S. schleiferi* may be mistaken for *S. aureus* because of characteristics such as beta-hemolysis on blood agar and a positive coagulase test. However, *S. schleiferi* is PYR positive, while *S. aureus* is PYR negative.
- Accurate identification of *S. schleiferi* is clinically relevant, as *mecA* is relatively common in this species, but methods for detection of methicillin resistance differ between staphylococcal species.