

Closing the Brief Case: *Anaerobiospirillum succiniciproducens* Bacteremia and Pyomyositis

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ANSWERS TO SELF-ASSESSMENT QUESTIONS

1. What is the most well-established risk factor for *Anaerobiospirillum succiniciproducens* bacteremia?
 - A. Chronic disease, including alcoholism
 - B. Contact with dogs or other canine species
 - C. Recent travel to Southeast Asia
 - D. Recent abdominopelvic surgery, including hysterectomy

Answer: A. *A. succiniciproducens* has been typically associated with chronic disease, including alcoholism. Though its reservoir seems to be the gastrointestinal tracts of dogs, animal contact is not an established risk factor, and the means of transmission remains unknown. Infection has been reported from diverse settings without obvious geographic predilection.

2. Which of the following antimicrobial agents is likely the most reliably active against *A. succiniciproducens*?
 - A. Ceftriaxone
 - B. Metronidazole
 - C. Clindamycin
 - D. Doxycycline

Answer: A. Second-, third-, and fourth-generation cephalosporins are generally active against *A. succiniciproducens*, which is typically resistant to the other agents listed. Resistance to metronidazole is somewhat unexpected, as the drug is highly active against most Gram-negative anaerobes.

3. *A. succiniciproducens* is characterized by which of the following properties, which allows it to be distinguished from *Campylobacter*?
 - A. Beta-hemolytic colonies on blood agar plates
 - B. Growth in chocolate agar but not in standard blood agar media
 - C. Microscopy showing spiral-shaped, Gram-negative organisms
 - D. Oxidase- and catalase-negative reactions

Answer: D. *A. succiniciproducens* is oxidase and catalase negative, whereas most *Campylobacter* species are oxidase and catalase positive. Both organisms have

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See page 665 in this issue (<https://doi.org/10.1128/JCM.01351-16>) for case presentation and discussion.

similar appearances by light microscopy. *A. succiniciproducens* produces nonhemolytic colonies and can grow on blood agar under anaerobic conditions.

TAKE-HOME POINTS

- *A. succiniciproducens* is an uncommon though increasingly recognized cause of bacteremia. Patients with *A. succiniciproducens* bacteremia typically suffer from alcoholism or other chronic diseases. Common manifestations include fever, other nonspecific constitutional signs and symptoms, and gastrointestinal complaints. However, focal pyogenic infections can also occur.
- *A. succiniciproducens* grows on blood agar incubated under anaerobic conditions, producing small, translucent, spreading, nonhemolytic colonies. By light microscopy, *A. succiniciproducens* bacteria appear as Gram-negative spiral-shaped organisms similar to *Campylobacter*, but unlike *Campylobacter*, they are oxidase and catalase negative. Since both organisms are thin, counterstain with fuchsin, instead of safranin, might be necessary for Gram staining.
- MALDI-TOF MS can be helpful in identifying *A. succiniciproducens*, which allows for early optimization of antimicrobial treatment. Differences in commercial databases of organisms can contribute to variable success in identification of isolates. Traditional tests based on biochemical and enzymatic reactions are variably limited by long turnaround time, lack of automation, and misidentifications, though in many cases, these tests can successfully identify *A. succiniciproducens*. Isolates unable to be confidently identified with these techniques can be subjected to 16S rRNA gene sequencing.
- *A. succiniciproducens* is frequently resistant to metronidazole and clindamycin but is generally susceptible to combined beta-lactam and beta-lactamase inhibitors, to second-, third-, and fourth-generation cephalosporins, to carbapenems, and to fluoroquinolones.