ID CORNER

Methicillin-sensitive *Staphylococcus aureus* (MSSA) Bacteremia Pearls

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Question #1:
What does “methicillin-sensitive” mean?
It means that the isolate is susceptible to beta-lactam antibiotics with anti-
staphylococcal activity such as oxacillin, nafcillin, cefazolin and others. In contrast, methicillin-resistant *Staphylococcus aureus* (MRSA) is resistant to most beta-lactams due to a modification of the penicillin-binding proteins that results in lower avidity. Methicillin is actually not commercially available in the United States but when resistance was described in 1961, methicillin was used to treat *S. aureus* infections. So the terminology remains in use because of its historic role.

Question #2:
Does MSSA bacteremia have better outcomes than MRSA bacteremia?
Yes. Decreased efficacy of vancomycin against *Staphylococcus aureus* (vancomycin is the first line antibiotic for MRSA bacteremia) and delay in appropriate treatment were postulated to be the reasons behind this difference.1, 2 But they are both very serious infections, associated with longer hospital stays and high mortality rates.

Question #3:
What are the first line antibiotic choices for MSSA bacteremia?
Nafcillin (or oxacillin) and cefazolin. Cefazolin is not inferior to nafcillin in terms of outcomes and it is associated to decreased rates of adverse events compared to nafcillin.3, 4 Additionally, cefazolin is less expensive than nafcillin.

Question #4:
In what clinical scenarios should I choose nafcillin or cefazolin over the other?
Cefazolin needs dose adjustment based on renal function, which we use as an advantage in patients with end-stage renal disease on hemodialysis. We usually recommend 2 grams after each dialysis session, with addition of an extra gram before the long interdialytic period. As a bonus, there is no need to place a long-term line.

Patients with history of non-anaphylactic allergy to penicillin may tolerate cefazolin very well.

In patients with central nervous system infection, nafcillin is the choice because cefazolin has inadequate blood-brain barrier penetrability.

Question #5:
Should I always consult Infectious Diseases (ID) in cases of MSSA bacteremia?
Yes. If available at your institution, an ID consult has been associated with better adherence to quality measures, decreased rates of treatment failure, decreased mortality and decreased readmission rates.5-7
Question #6:
Can I use levofloxacin for MSSA bacteremia, if antibiogram shows susceptibility?
No. *Staphylococcus aureus* will rapidly develop resistant and treatment will fail.

Question #7:
Should I treat MSSA bacteremia for 2, 4 or 6 weeks?
With either MSSA or MRSA bacteremia, a two-week duration of therapy should only be used in cases of *Staphylococcus aureus* bacteremia in which all of the following criteria are met:8,9
- No bone or joint infection
- Endocarditis excluded with echocardiography
- Defervescence within 72 hours with negative follow-up blood cultures
- No prosthetic material (pacer, valve, arthroplasty)
- No evidence of metastatic infection
- No diabetes or immunosuppression

Otherwise, *Staphylococcus aureus* bacteremia requires 4-6 weeks of therapy (endocarditis and bone infections will require at least 6 weeks).

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References: