# Management of *Staphylococcus aureus* Bacteremia

(NB Provincial Health Authorities Anti-Infective Stewardship Committee, February 2021)

**Background**

- **URGENT Infectious Diseases consultation strongly recommended – associated with improved patient outcomes and decreased mortality.**
- *Staphylococcus* aureus bacteremia is associated with significant patient morbidity and mortality (mortality rate 10 – 30%).
- *Staphylococcus aureus* can spread from the blood and cause metastatic foci of infection in nearly any organ system including the brain, eye, bone/joint, lung, intraabdominal cavity, liver, spleen, artery/endothelium, endocarditis etc.
- Source control and urgent treatment are essential, never consider *S. aureus* bacteremia to be secondary to contamination (even if only 1 positive blood culture).
- *Staphylococcus aureus* bacteriuria may be an indicator of a *S. aureus* bacteremia – recommend obtaining blood cultures and clinically evaluate for a systemic Staphylococcal infection.

**Most Common Organisms & MRSA Risk Factors**

- Methicillin-susceptible *Staphylococcus aureus* (MSSA)
- Methicillin-resistant *Staphylococcus aureus* (MRSA)
- MRSA Risk factors: history of MRSA infection or colonization; household contact with a MRSA colonized individual; IV drug use; homelessness; incarcerated persons; recent travel to or residing in an MRSA endemic region or community.

**Management & Work-Up**

- Thorough physical examination and careful history required to determine the potential source of infection and possible metastatic foci.
- Diagnostic imaging should be tailored to the findings from history and physical examination (e.g. acute onset lumbar spine pain should prompt an MRI lumbar spine).
- Indwelling prosthetic devices (e.g. cardiac device, orthopedic hardware, central lines, etc.) should be identified and carefully evaluated for infection.
- Transthoracic echocardiogram recommended in all patients with *Staphylococcus aureus* bacteremia to rule out endocarditis. Transesophageal echocardiogram preferred in those at high risk: embolic events, pacemaker, prosthetic valve, previous infective endocarditis, or intravenous drug use. Consult infectious diseases for recommendations.
- Remove the focus of infection if possible (e.g. catheter-associated bacteremia; drainable abscess, etc.). New central lines should NOT be inserted, unless necessary for IV access, until there is documented clearance of the bacteremia.
- Repeat blood cultures every 48 hours until negative to document sterilization and determine duration of therapy
- Persistent bacteremia after initiation of appropriate antimicrobial therapy warrants careful reassessment and suggests inadequate source control or presence of an endovascular infection.

**Empiric Treatment**

| Hemodynamically Stable and no complicating factors (as listed in next column) | Hemodynamically unstable; severe infection; suspected endocarditis; prosthetic or intravascular device infection; or MRSA risk factors |
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| • ceFAZolin 2 g IV q8h<br>  ○ Preferred anti-staphylococcal beta-lactam<br>  ○ Dose adjustment required in renal impairment<br><br><u>Contraindication to receiving a beta-lactam:</u><br>• Vancomycin 25 to 30 mg/kg IV x 1 dose, then 15 mg/kg IV q8-12h<br>  ○ Target trough of 10-15 mg/L<br>  ○ Dose adjustment required in renal impairment | • Combination therapy with ceFAZolin AND vancomycin until susceptibilities known<br><br><u>If cannot take vancomycin (and pulmonary source NOT suspected), then monotherapy:</u><br>• DAPTOmycin IV 10 - 12 mg/kg IV q24h<br>  ○ Dose adjustment required in renal impairment |

**NOTE:**

- **Vancomycin IV is inferior to ceFAZolin and should not be used for treatment of MSSA bacteremia unless patient has a contraindication to receiving both ceFAZolin and cloxacillin.**
- Contraindications to receiving ceFAZolin would be an allergy to ceFAZolin OR severe non-IgE mediated reaction to a β-lactam (i.e. Stevens Johnson Syndrome, toxic epidermal necrolysis, drug rash with eosinophilia and systemic symptoms, serum sickness, etc.)
- CeFAZolin may be used for patients with an immediate type 1 (IgE mediated) hypersensitivity or non-severe delayed reaction to penicillin, see NB-ASC Penicillin and Beta-Lactam Allergy Guideline for more details.
- If evidence of toxic shock syndrome (very rare occurrence), then consider adding clindamycin 900 mg IV q8h (never use clindamycin as monotherapy)
- Staphylococcal toxic shock syndrome is characterized by rapid onset fever, rash, hypotension and multiorgan system involvement (see CDC case definition for more detail: https://wwwn.cdc.gov/nndss/conditions/toxic-shock-syndrome-other-than-streptococcal/case-definition/2011/).

**Duration of Therapy**

- Duration of therapy depends on whether the *S. aureus* bacteremia is uncomplicated or complicated (i.e. presumed metastatic or deep focus of infection requiring a longer duration).
- Complicated *S. aureus* bacteremia: IV therapy for a minimum of 4 to 6 weeks from the first negative blood culture. Consult infectious disease for recommendations.
  - Complicating factors include (only 1 required): Evidence or clinical suspicion of endocarditis; failure to defervesce by 72 hours of antimicrobial therapy; failure to clear blood cultures within 2 to 4 days of initiation of antimicrobial therapy; evidence of a metastatic infection or deep source; indwelling prosthetic device; intravascular catheter source not removed.
- Uncomplicated *S. aureus* bacteremia: IV therapy for a minimum of 14 days from the first negative blood culture
  - Uncomplicated bacteremia (all factors must be met): sterile follow-up blood cultures within 4 days; no permanent intracardiac device or implanted prosthesis; no hemodialysis dependence; no clinical signs of endocarditis or metastatic foci of infection; removable focus of infection removed promptly, if present; defervescence within 72 hours of antimicrobial therapy; and no evidence of endocarditis on a good quality echo.

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