CATHETER-RELATED BLOODSTREAM INFECTION (CRBSI)

Definition

Positive blood culture via line **OR** line tip > 15 cfu of an organism **AND** positive peripheral blood culture for same organism

AND no other site of infection.

OR Time to positivity: blood culture via the line is positive 2 or more hours before the peripheral blood culture.

If catheter related infection is suspected: Draw blood culture via catheter **AND** peripherally

- NEVER draw a single blood culture.
- NEVER culture a catheter tip in the absence of signs/symptoms of infection.
- NEVER culture a catheter tip without also obtaining a peripheral blood culture.

Management

ID CONSULT MANDATORY for candidemia and *Staphylococcus aureus* bacteremia. It is recommended for ESBL, highly resistant pseudomonas infection, persistent (> 72h) symptoms or bacteremia despite appropriate antibiotics, tunnel infections or for use of antibiotic lock therapy.

Removing Lines:

- All non-tunneled central lines including PICC's should be removed if possible

- Tunneled and non-tunneled central lines[2] **MUST** be removed if:
  - Certain pathogens isolated: *Staphylococcus aureus, Candida spp* or other fungi
  - Persistent bacteremia or fungemia, signs/symptoms of ongoing infection > 72h despite appropriate antibiotics
  - Tunnel infection: induration, erythema +/- tenderness extending > 2 cm beyond catheter insertion point
  - Clinical deterioration despite appropriate antimicrobial coverage

Special considerations

***Staphylococcus aureus* CRBSI**

- Removal of infected catheter
- Duration of therapy is 2-6 weeks depending on risk status, clinical response and duration of bacteremia
  - Low risk patients: line-related *S aureus* bacteremia with rapid (< 4 days) clearance and **NO** permanent implanted cardiac device, endocarditis or metastatic foci of infection. Consider 14 days IV therapy
  - High risk patients: presence of risk factors listed above

Coagulase-negative *Staphylococcus* CRBSI

- Treat 5-7 days if uncomplicated infection and if catheter removed
- Consider ID consult if other hardware in situ (prosthetic valves, joints, aortic grafts) or persistently positive blood cultures
- Treat 10-14 days with IV antibiotics and antibiotic lock therapy if catheter retained

***Enterococcus* CRBSI**

- Treat 7-10 days if uncomplicated infection
- Consider TEE if: new murmur or septic emboli, bacteremia or fever > 72 hours of appropriate antibiotics, radiographic evidence of septic pulmonary emboli, presence of a prosthetic valve or other endovascular foreign body

Gram-negative bacilli CRBSI

- Patients with suspected CRBSI should receive empiric Gram-negative antibiotic therapy if they are critically ill, septic , neutropenic, have a femoral line or have a known focus of Gram-negative infection elsewhere.
- Antibiotic selection depends on patient's risk for multi drug-resistant organisms
- Treat 7-14 days if uncomplicated infection

***Candida* CRBSI**

- **Always** remove the catheter if *Candida* CRBSI
- A positive catheter tip for *Candida* is considered to represent a positive blood culture
- All patients with candidemia should be treated for a minimum of 14 days after the first negative blood culture and resolution of signs and symptoms of infection.
- All patients with candidemia need a retinal exam to rule out endophthalmitis.

References:
[1] IDSA Guideline: Management of Intravascular Catheter-related Infections. CID 2009;40: 000
[2] Tunneled line: VasCath, Groshong, Hickman, Broviac, Port-a-Cath
[3] *Corynebacterium JK* is treated with vancomycin. Penicillin-sensitive diptheroids are rarely true pathogens.