Practice Cases
Central Line-Associated Blood Stream Infections

CLABSI #1

A 27 year-old man is admitted on 8/22 to the Medical ICU from another hospital with alcohol-induced pancreatitis. Admission abdominal CT showed severe pancreatitis with pancreatic inflammatory changes. The patient is ventilator dependent requiring a tracheostomy and has vascular catheters in place in the right subclavian and right internal jugular (IJ) veins.

On 9/3, an ultrasound-guided aspiration of pancreatic fluid revealed a negative bacterial culture.

On 9/11, a repeat abdominal CT revealed unchanged pancreatitis, but interval development of fluid collections in the abdomen.

On 9/14, the patient is taken to the OR for pancreatic debridement and placement of drains. A culture was ordered on the pancreatic fluid. Later that evening, the patient has a temperature spike to 102˚ F. The right IJ line was discontinued and the catheter tip and blood specimens x 2 were sent for culture.

On 9/16, culture results were reported as follows:

- Pancreatic fluid = no growth
- Catheter tip = <15 CFU/ml of Enterococcus species
- Blood cultures = 2 of 2 positive for Enterococcus faecalis.

1. **Does this patient have a healthcare-associated infection?**
   
   a. No, these organisms are contaminants.
   
   b. Yes, there is an Intraabdominal (IAB) infection with a secondary bloodstream infection (BSI) with Enterococcus species.
   
   c. Yes, a central line-associated BSI (CLABSI) because the blood and catheter tip cultures grew the same organism.
   
   d. Yes, a CLABSI because the blood cultures are positive for a pathogen (E. faecalis), there is no evidence of infection at another site, and the patient had a central line in place.

2. **Scenario Revision: The patient was afebrile on 9/14 (there was no temperature spike). Does this finding change your assessment of the blood culture results?**
   
   a. Yes
   
   b. No

3. **Scenario Revision: The IJ and subclavian lines are removed on 9/9. On 9/13 a femoral triple lumen catheter (TLC) is placed. If the pancreatic fluid, catheter tip, and blood collected on 9/14 have the same results as shown in the initial scenario on 9/16, what HAI(s) would be reported?**
   
   a. CLABSI with E. faecalis associated with the use of the femoral TLC
   
   b. CLABSI with E. faecalis associated with the use of the IJ and subclavian lines.
   
   c. BSI with E. faecalis, not central line associated because the line was not in place for at least 48 hours before the blood specimen was collected for culture.

Answers:
- **#1 – (d) Yes, a CLABSI because the blood cultures are positive for a pathogen (E. faecalis), there is no evidence of infection at another site, and the patient had a central line in place.**
Explanation: There is no evidence that the pancreatitis was infectious in origin, therefore the bloodstream is considered the primary infection site and the findings meet laboratory BSI criterion 1.

The IJ and the subclavian lines are considered to be central lines because they terminate at or near the heart or in a great vessel, and were in place within 48 hours before the onset of infection (taken to be the date of the temperature spike and the date the blood samples were obtained for culture), thus meeting the definition of central line-associated.

Catheter tip cultures are not part of the BSI surveillance criteria and are not used to determine if a BSI was present.

• #2 – (b) No

Explanation: No, signs and symptoms are not part of criterion 1 for laboratory confirmed BSI with a recognized pathogen. Presence or absence of fever does not change the CLABSI determination.

• #3 – (a) CLABSI with E. faecalis associated with the use of the femoral TLC

Explanation: Since the pancreatic fluid culture was negative and the blood cultures were positive, there is no primary infection site, other than the blood. The IJ, subclavian, and femoral lines are all considered central lines because they terminate at or near the heart or in one of the great vessels.

Since the IJ and subclavian lines had been discontinued for more than 48 hours before the onset of infection (taken to be the date of the temperature spike and the date the blood samples were obtained for culture, (9/14), positive blood cultures results cannot be associated with the use of those central lines.

Instead, since the femoral line was in place at the time of the blood sample collection, the positive results are associated with its use. There is no minimum time that a central line must be in place in order for a subsequent BSI to be considered a CLABSI.

CLABSI #2

A 35-year-old man is involved in a multi-vehicular accident and sustains multiple internal and external traumatic injuries. On 12/5 in the emergency department, a triple lumen catheter (TLC) line and Foley catheter are placed and the stabilized patient is transferred to the Surgical Intensive Care Unit.

On 12/8, the patient spikes a temperature to 101˚ F and is “pan” cultured, including blood cultures x 2.

On 12/10, the subclavian line is discontinued and the catheter tip is sent for culture. Later that afternoon, the blood culture results from 12/8 are reported as Staphylococcus hominis in both sets with identical susceptibility profiles. The physician notes: “positive blood culture = contaminant; no antibiotics required”. All other cultures are negative.

On 12/12, catheter tip results are reported as Staphylococcus epidermidis.

1. **Does this patient have a healthcare-associated infection (HAI)?**

   a. No, because the blood cultures grew only common skin contaminant organisms.
   b. Yes, a central line-associated bloodstream infection (CLABSI) because both the blood and catheter tip cultures grew coagulase-negative staphylococci.
   c. No, because the ID consulting physician stated that the blood culture results were contaminants and did not treat the patient with antibiotics.
d. Yes, a CLABSI because the patient had a central line in place, had a fever, and there were 2 positive blood cultures with common skin contaminant organisms, with the same antibiotic susceptibilities, collected, within two days of each other.

2. In revising the scenario, the subclavian line tip grows *Staphylococcus hominis*. Does this finding change your HAI assessment?
   a. Yes
   b. No

Answers:

- #1 – (d) Yes, a CLABSI because the patient had a central line in place, had a fever, and there were 2 positive blood cultures with common skin contaminant organisms, with the same antibiotic susceptibilities, collected, within two days of each other.

  **Explanation:** *S. hominis*, a skin colonizing organism, grew in both sets of blood cultures which were drawn within 2 days of each other. Isolates from both sets of culture had matching antibiotic susceptibilities, and the patient is symptomatic (fever) without evidence of infection at another site; meeting criterion 2 for a laboratory-confirmed bloodstream infection (LCBI).

  The fact that the line tip grows another skin colonizing organism aids in the clinical diagnosis, but is irrelevant for surveillance purposes, as is the physician’s note. This BSI is associated with the use of the subclavian line, which is a central line because it terminates at or near the heart or in one of the great vessels.

- #2 – (b) No

  **Explanation:** No, catheter tip culture results are not part of the surveillance criteria for BSI. A CLABSI is reported based on the presence of the central line, the absence of infection at another site with the same organism as was growing in the blood, presence of fever, and 2 blood cultures positive for the same common skin contaminant organism.