

AJIC and NHSN Collaborative Case Study 1

Introduction

Welcome to the first in a series of case studies.

AJIC and NHSN have teamed up to present a series of case studies over the next several months, beginning in this issue. These cases reflect some of the complex patient scenarios IPs have encountered in their daily surveillance of HAIs using NHSN definitions.

All individual participant answers will remain confidential. You may choose to record your answers as you proceed through the exercise, as only the correct answer will be displayed during the feedback.

Because the content development was a partnership between the authors, all cases, answers, and explanations have been reviewed and approved by NHSN.

For each question, please select the **most correct answer**. Unless otherwise specified, each question has only one correct answer.

Case Study and Questions

A 27-year-old man is admitted on 8/22 from another hospital with alcohol-induced pancreatitis. Admission abdominal CT showed severe pancreatitis with peripancreatic inflammatory changes. 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 few polymorphonuclear cells and a negative bacterial culture.
- On 9/11, a repeat abdominal CT revealed unchanged pancreatitis but interval development of multi-loculated fluid collections in the abdomen.
- On 9/14, patient is taken to the OR for pancreatic debridement and placement of drains. Later that evening, patient had 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:
 - o Pancreatic fluid = no growth
 - o Catheter tip = <15 CFU/ml of Enterococcus species
 - o Blood cultures = 2 for 2 positive for Enterococcus faecalis.
- No other sites of suspected infection were identified.

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

- Yes, a central line-associated BSI (CLABSI) because the blood and catheter tip cultures grew the same organisms.
- No, these organisms are contaminants.
- Yes, an intrabdominal (IAB) infection with secondary bloodstream infection (BSI) with Enterococcus species.
- 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.

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* **2. What if instead, the intraoperative cultures obtained on 9/14 grew Escherichia coli. What HAI(s) would be reported?**

- Both "IAB infection with E. coli" and "CLABSI because the blood and catheter tip are the same species"
- Both "IAB infection with E. coli" and "CLABSI with Enterococcus faecalis"
- CLABSI because the blood and catheter tip are the same species
- CLABSI with Enterococcus faecalis
- IAB infection with E. coli

* **3. In further revising the scenario, let's say that the patient was afebrile on 9/14 (i.e., has no temperature spike). Does this finding change your assessment of the blood culture results?**

- Yes
- No

* **4. Finally, let's revise the scenario again such that the IJ and subclavian lines are removed on 9/9. Then on 9/13 a femoral catheter is placed. If the pancreatic fluid, catheter tip, and blood collected on 9/14 have the results shown in the initial scenario above on 9/16, what HAI(s) would be reported?**

- CLABSI with E. faecalis associated with the use of the femoral line
- CLABSI with E. faecalis associated with the use of the IJ and subclavian lines
- BSI with E. faecalis; not central line-associated because a femoral line is not considered a central line
- 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

Case Study and Answers

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Case 1

A 27-year-old man is admitted on 8/22 from another hospital with alcohol-induced pancreatitis. Admission abdominal CT showed severe pancreatitis with peripancreatic inflammatory changes. 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 few polymorphonuclear cells and a negative bacterial culture.
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- On 9/14, patient is taken to the OR for pancreatic debridement and placement of drains. Later that evening, patient had 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 for 2 positive for Enterococcus faecalis.
- No other sites of suspected infection were identified.

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

- o No, these organisms are contaminants.
- o Yes, an intrabdominal (IAB) infection with secondary bloodstream infection (BSI) with Enterococcus species.
- o Yes, a central line-associated BSI (CLABSI) because the blood and catheter tip cultures grew the same organisms.
- o **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-confirmed BSI criterion 1.1 Further, the IJ and 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.² Catheter tip cultures are not part of the BSI surveillance criteria and therefore are not used to determine whether a BSI was present.

2. What if instead, the intraoperative cultures obtained on 9/14 grew Escherichia coli. What HAI(s) would be reported?

- o IAB infection with E. coli
- o CLABSI because the blood and catheter tip are the same species
- o CLABSI with Enterococcus faecalis
- o **Both IAB infection with E. coli and CLABSI with Enterococcus faecalis**
- o Both IAB infection with E. coli and CLABSI because the blood and catheter tip are the same species

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Explanation

In the revised scenario, the patient now has an IAB (criterion 1) and a CLABSI (criterion 1) because the blood isolate is distinct from the pancreatic fluid isolate, and the patient meets criteria for healthcare-associated IAB (criterion 1).³

3. In further revising the scenario, let's say that the patient was afebrile on 9/14 (i.e., has no temperature spike). Does this finding change your assessment of the blood culture results?

- Yes
- No

Explanation

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

4. Finally, let's revise the scenario again such that the IJ and subclavian lines are removed on 9/9. Then on 9/13 a femoral catheter is placed. If the pancreatic fluid, catheter tip, and blood collected on 9/14 have the results shown in the initial scenario above on 9/16, what HAI(s) would be reported?

o CLABSI with E. faecalis associated with the use of the femoral line

- BSI with E. faecalis; not central line-associated because a femoral line is not considered a central line
- CLABSI with E. faecalis associated with the use of the IJ and subclavian lines
- 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

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 catheters are all considered central lines because they terminate at or near the heart or in one of the great vessels.² However, 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 culture results cannot be associated with the use of those central lines.⁴ Instead, since the femoral central line was in place at the time of the blood sample collection, the positive results are associated with its use. There is no minimum amount of time that a central line must be in place in order for a subsequent BSI to be considered a CLABSI.⁵

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References

¹Centers for Disease Control and Prevention *The National Healthcare Safety Network Manual*. March, 2009. p. 4-3.

Retrieved from National Healthcare Safety Network website:

http://www.cdc.gov/nhsn/PDFs/pscManual/4PSC_CLABScurrent.pdf

²Centers for Disease Control and Prevention *The National Healthcare Safety Network Manual*. March, 2009. p. 4-2.

Retrieved from National Healthcare Safety Network website:

http://www.cdc.gov/nhsn/PDFs/pscManual/4PSC_CLABScurrent.pdf

³Horan TC, Andrus M, Dudeck M . CDC/NHSN surveillance definition of health care-associated infection and criteria for specific types of infection in the acute care setting. *American Journal of Infection Control*. 2008, **36** pp. 322-3.

Available at: http://www.cdc.gov/nhsn/PDFs/pscManual/4PSC_CLABScurrent.pdf

⁴Centers for Disease Control and Prevention *The National Healthcare Safety Network Manual*. March, 2009. p. 4-1.

Retrieved from National Healthcare Safety Network website:

http://www.cdc.gov/nhsn/PDFs/pscManual/4PSC_CLABScurrent.pdf

⁵Centers for Disease Control and Prevention *The National Healthcare Safety Network Manual*. March, 2009. p. 4