AJIC and NHSN Collaborative Case Study 4

Introduction

Welcome to the fourth publication of a joint effort between the American Journal of Infection Control and the Centers for Disease Control and Prevention's National Healthcare Safety Network (NHSN).

This collaboration is a series of case studies representing surveillance scenarios faced everyday by infection preventionists (IPs) 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.

All cases, answers, and explanations have been reviewed and approved by NHSN.

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

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Case Study and Questions

A 64 year-old man who is status-post orthotopic heart transplant 16 years ago is admitted on 2/1 for an elective percutaneous endoscopic gastrostomy (PEG) tube placement. Medical history is significant for respiratory failure due to H1N1 influenza pneumonia resulting in a tracheostomy and ventilator dependency, end-stage renal disease on hemodialysis three times/week, and hypertension. He was transferred from the ventilator unit of a long-term acute care facility (LTAC). A left internal jugular (IJ) tunneled catheter was in place for dialysis and a condom catheter was present, draining clear amber urine.

• On 2/2 patient was taken to the Operating Room for elective placement of a PEG feeding tube and tolerated the procedure well. He was transferred to the Surgical ICU due to his ventilator requirement. Temperature range: 37.2°C - 37.6°C. Lungs clear bilaterally. PEG site oozing serosanguinous drainage. Call received from the LTAC facility that a stool specimen collected for abdominal pain and diarrhea prior to transfer was reported as positive for. *C.difficile* .Metronidazole started.

• On 2/4 the patient remains in the SICU due to lack of a bed at the LTAC facility. At 2300, the patient has a temperature of 38.3°C. PEG site is clean and dry. No evidence of inflammation or drainage at the left IJ tunneled catheter site. Lungs clear bilaterally. Blood, urine and sputum cultures are sent.

• On 2/5 in the AM, the urinalysis is reported as 3+ leukocyte esterase, WBC- too numerous to count and moderate bacteria. Patient continues with fever to 38°C. Co-trimoxazole is initiated. Patient receives hemodialysis.

• On 2/6, the urine culture from 2/4 is reported as positive for 60,000 CFU/ml gram–negative bacilli which are subsequently identified as *Providencia stuartii*. Blood and sputum cultures are negative. Plans to send the patient back to the LTAC facility are cancelled due to increasing watery stools and complaints of abdominal pain with an increase in peripheral WBC from 11,000 to 25,000. CT of the abdomen suggestive of colitis. Continues with temperatures of 38°C.

• On 2/9 the patient is moved to the intermediate care unit. Late that evening, he has a temperature spike to 38.8°C. Blood cultures are repeated.

• On 2/10 the blood culture from 2/9 is reported as positive for gram-negative bacilli, which are subsequently identified as *Providencia stuartii*.

* Does this patient have a healthcare-associated infection (HAI) associated with the SICU?

◯ Yes, this patient meets criterion 2b of symptomatic UTI with *Providencia stuartii*, and the bacteremia is secondary to the UTI.

◯ No, the patient does not have a HAI associated with the SICU. The *C. difficile* infection was present on admission and his positive urine culture had <100,000 CFU/ml of an organism without the necessary clinical symptoms for a UTI. The positive blood culture is related to the intermediate care unit.

◯ Yes, this patient meets criterion 2b of symptomatic UTI with *Providencia stuartii* and also has a central line-associated bloodstream infection (CLABSI) with *Providencia stuartii* since the BSI occurred 5 days after the UTI.

* Does the patient have a catheter-associated UTI (CAUTI)?

◯ No, the patient wasn't catheterized.

◯ Yes, this is a CAUTI.

◯ No, there were no symptoms present so the patient does not have a CAUTI.

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*** What if we altered the scenario and set the patient's maximum temperature on 2/4 as 38.0°C. Does the patient have an HAI?**

- ◯ Yes, the patient meets criterion 2b of symptomatic UTI (SUTI) with *Providencia stuartii* and the bacteremia secondary to the UTI.
- ◯ Yes, this is an asymptomatic bacteremic urinary tract infection (ABUTI).
- ◯ Yes, this is a CLABSI with *Providencia stuartii*.
- ◯ No, the patient was never symptomatic.

*** Let's alter the scenario again and set the patient's maximum temperature on 2/6 to 38.6° C. The CT scan of the abdomen reveals free air and a developing abscess. On 2/10 the blood culture grows *Enterococcus* species rather than *Providencia stuartii*. Which of the following HAI categories best fits?**

- ◯ Symptomatic UTI with *Providencia stuartii* and CLABSI with *Enterococcus* species.
- ◯ A CLABSI with *Enterococcus* species.
- ◯ Symptomatic UTI with *Providencia stuartii* and an intra-abdominal infection (IAB) with *Enterococcus* (bacteremia secondary to the IAB).
- ◯ The patient does not have an HAI.

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Demographics: Optional

The following questions are optional but would be considered particularly useful for determining educational needs. Please respond with regards to your role and geographic location of your usual place of employment. The next page contains the answers to this case study.

State:

Country if not US:

Which of the following best describes your title/position?

- ◯ Infection Preventionist (IP)
- ◯ Medical Director of Infection Prevention
- ◯ Public Health (EIS, state based HAI program etc)

Other (please specify)

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Case Study and Answers

Case 4

A 64 year-old man who is status-post orthotopic heart transplant 16 years ago is admitted on 2/1 for an elective percutaneous endoscopic gastrostomy (PEG) tube placement. Medical history is significant for respiratory failure due to H1N1 influenza pneumonia resulting in a tracheostomy and ventilator dependency, end-stage renal disease on hemodialysis three times/week, and hypertension. He was transferred from the ventilator unit of a long-term acute care facility (LTAC). A left internal jugular (IJ) tunneled catheter was in place for dialysis and a condom catheter was present, draining clear amber urine.

• On 2/2 patient was taken to the Operating Room for elective placement of a PEG feeding tube and tolerated the procedure well. He was transferred to the Surgical ICU due to his ventilator requirement. Temperature range: 37.2°C - 37.6°C. Lungs clear bilaterally. PEG site oozing serosanguinous drainage. Call received from the LTAC facility that a stool specimen collected for abdominal pain and diarrhea prior to transfer was reported as positive for. C.difficile.Metronidazole started.

• On 2/4 the patient remains in the SICU due to lack of a bed at the LTAC facility. At 2300, the patient has a temperature of 38.3°C. PEG site is clean and dry. No evidence of inflammation or drainage at the left IJ tunneled catheter site. Lungs clear bilaterally. Blood, urine and sputum cultures are sent.

• On 2/5 in the AM, the urinalysis is reported as 3+ leukocyte esterase, WBC- too numerous to count and moderate bacteria. Patient continues with fever to 38°C. Co-trimoxazole is initiated. Patient receives hemodialysis.

• On 2/6, the urine culture from 2/4 is reported as positive for 60,000 CFU/ml gram–negative bacilli which are subsequently identified as Providencia stuartii. Blood and sputum cultures are negative. Plans to send the patient back to the LTAC facility are cancelled due to increasing watery stools and complaints of abdominal pain with an increase in peripheral WBC from 11,000 to 25,000. CT of the abdomen suggestive of colitis. Continues with temperatures of 38°C.

• On 2/9 the patient is moved to the intermediate care unit. Late that evening, he has a temperature spike to 38.8°C. Blood cultures are repeated.

• On 2/10 the blood culture from 2/9 is reported as positive for gram-negative bacilli, which are subsequently identified as Providencia stuartii.

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

o No, the patient does not have a HAI associated with the SICU. The C. difficile infection was present on admission and his positive urine culture had <100,000 CFU/ml of an organism without the necessary clinical symptoms for a UTI. The positive blood culture is related to the intermediate care unit.
o Yes, this patient meets criterion 2b of symptomatic UTI with Providencia stuartii and also has a central line-associated bloodstream infection (CLABSI) with Providencia stuartii since the BSI occurred 5 days after the UTI.
o **Yes, this patient meets criterion 2b of symptomatic UTI with Providencia stuartii, and the bacteremia is secondary to the UTI.**

Explanation

This patient meets criterion 2b of symptomatic UTI.[1] He did not have an indwelling urinary catheter at the time of specimen collection nor within 48 hours prior to specimen collection. He had a fever of 38.3°C, a positive urinalysis with leukocyte esterase, pyuria, and a urine culture positive for Providencia stuartii with 60,000 CFU/ml. The C. difficile infection was present on admission. The bacteremia is associated with the SICU as it occurred within 48 hours of transfer, but is secondary to the UTI.

2. Does the patient have a catheter-associated UTI (CAUTI)?

o No, there were no symptoms present so the patient does not have a CAUTI.
o Yes, this is a CAUTI.
o No, the patient wasn't catheterized.

Explanation: Although this patient meets the criteria for a UTI, it is not a catheter-associated UTI because no indwelling catheter was present in the 48 hours before infection. An indwelling catheter is defined as "a drainage tube that is inserted into the urinary bladder through the urethra…". [2] A condom catheter does not meet this definition.

3. What if we altered the scenario and set the patient's maximum temperature on 2/4 as 38.0°C. Does the patient have an HAI?

o Yes, the patient meets criterion 2b of symptomatic UTI (SUTI) with Providencia stuartii and the bacteremia secondary to the UTI.
o No, the patient was never symptomatic.
o Yes, this is an asymptomatic bacteremic urinary tract infection (ABUTI).
o Yes, this is a CLABSI with Providencia stuartii.

Explanation: Symptoms are required to meet criterion 2b of symptomatic UTI, and include fever which is defined as >38°C or >100.4°F. The patient's temperature never surpassed 38°C. [1] The left IJ was inserted on 2/2 and was in place within the 48 hours prior to culture. Providencia stuartii is not a common skin commensal organism, therefore BSI criterion 1, which does not require the presence or absence of symptoms is met, making this a healthcare-associated CLABSI. [3] Asymptomatic bacteriuria was removed from the NHSN specific infection types in Spring 2009. NHSN criteria are not met for an asymptomatic bacteremic urinary tract infection (ABUTI), because the patient lacks sufficient quantity of organisms in the urine specimen (must be >100,000 CFU/ml) [4].

4. Let's alter the scenario again and set the patient's maximum temperature on 2/6 to 38.6°C. The CT scan of the abdomen reveals free air and a developing abscess. On 2/10 the blood culture grows Enterococcus species rather than Providencia stuartii. Which of the following HAI categories best fits?

o A CLABSI with Enterococcus species.
o **Symptomatic UTI with Providencia stuartii and an intra-abdominal infection (IAB) with Enterococcus (bacteremia secondary to the IAB).**
o Symptomatic UTI with Providencia stuartii and CLABSI with Enterococcus species.
o The patient does not have an HAI.

Explanation: The patient has a symptomatic UTI, criteria 2b[1]. He has a fever (and he is <65 years of age and did not have a catheter in the 48 hours prior to infection) and also has a urinalysis which is positive for 3+ leukocyte esterase, and there were too many white blood cells seen in the urine by microscopy to count. He also has a positive urine culture of between $>10^3$ and $<10^5$ CFU/ml with no more than 2 species of microorganisms. Although the left IJ was present and Enterococcus, which is not a common skin commensal organism, was cultured from the blood, this is not a primary BSI. The patient instead meets criteria 3c for IAB. He has fever of >38°C and organisms cultured from blood and radiographic evidence of infection (CT scan).[5] The patient's abdominal pain is additional evidence of the IAB infection, though not needed to meet the criteria for IAB.

References

[1]Centers for Disease Control and Prevention *The National Healthcare Safety Network Manual.* March,2009. p. 7-5. Retrieved from National Healthcare Safety Network website: http://www.cdc.gov/nhsn/pdfs/pscManual/7pscCAUTIcurrent.pdf

[2] Centers for Disease Control and Prevention *The National Healthcare Safety Network Manual.* March, 2009. p. 7-2. Retrieved from National Healthcare Safety Network website: http://www.cdc.gov/nhsn/pdfs/pscManual/7pscCAUTIcurrent.pdf

[3] Centers 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

[4] Centers for Disease Control and Prevention *The National Healthcare Safety Network Manual.* March, 2009. p. 7-5. Retrieved from National Healthcare Safety Network website: http://www.cdc.gov/nhsn/pdfs/pscManual/7pscCAUTIcurrent.pdf

[5] Centers for Disease Control and Prevention *The National Healthcare Safety Network Manual.* March, 2009. Cahpter 17 p 322. Retrieved from National Healthcare Safety Network website: http://www.cdc.gov/nhsn/PDFs/pscManual/17pscNosInfDef_current.pdf