Factitious Catheter-Associated Urinary Tract Infections (CAUTI) in a Neuroscience ICU

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ABSTRACT

Background: Catheter-associated urinary tract infections (CAUTI) is a common complication experienced by critically ill patients. Unfortunately, the surveillance definition for CAUTI is imprecise and institutions may be financially penalized or suffer degradation of reputation as a result of inaccurate CAUTI diagnosis.

Methods: Retrospective review of cases meeting CDC-NHSN CAUTI definition in a neuroscience ICU from January 2013-February 2015. Data collected included: body temperature, duration of urinary catheterization, while blood cell count (WBC), urinalysis results, urine culture results, blood culture results, neurologic response, diagnosis to antibiotics, and presence of other potential causes for fever.

Results: Forty-one patients met the CDC-NHSN definition for CAUTI. The mean age of the patients was 55.4 ± 13 years and 76% were women. CAUTI was diagnosed at hospital day 9.6 ± 5.5 days after a mean of 7.2 ± 5.2 days of urinary catheterization. Thirty-five patients had a urinalysis performed and 16 (48%) did not exhibit pyuria (>10 WBC/hpf). Twenty patients (48.8%) remained febrile at 72 hours despite administration of antibiotics that had no activity against the bacteria recovered from the urine. Three patients (7.3%) had resolution of fever without administration of antibiotics. Thirteen patients (31.7%) had another cause of infection (pneumonia 6), C. difficile infection (1), skin (1), ventriculitis (1), influenza (1)) and 33 patients (80.5%) had a possible noninfectious cause for fever (subarachnoid or other intracerebral hemorrhage, 3), central nervous system accident (2)). Thirty-eight patients (93%) had blood cultures, of which five (13%) revealed bacteremia. The bloodstream isolate was the same species as the urine isolate in three patients.

Conclusion: Despite meeting CDC-NHSN surveillance definition criteria for CAUTI in this neuroscience ICU population, 63.4% of the patients most likely did not have a UTI (39% lack of pyuria, 19.5% of patients with pyuria did not resolve fever with antibiotics, 4.9% of patients with pyuria resolved fever without antibiotics). In addition, most patients (80.5%) had a well-defined noninfectious potential etiology for fever. There is great opportunity to improve the surveillance definition for CAUTI as well as institutional opportunity to better utilize laboratory resources.

INTRODUCTION

Urinary catheters are frequently used in the care of critically ill patients. Approximately 2/3 of patients in neurologic and neurosurgical ICUs have indwelling urinary catheters. Despite widespread efforts to prevent CAUTI, the US rate of CAUTI remained unchanged from 2009 through 2014. Presence of an urinary catheter, fever, and bacteriuria together satisfy the National Healthcare Safety Network (NHSN) surveillance definition for CAUTI. CAUTI rates are reported to the public, are considered an indicator of hospital quality, and are used to impact hospital reimbursement through pay-for-performance programs. Patients in neurologic ICUs frequently have well-recognized alternative reasons for fever such as subarachnoid hemorrhage. Pyuria is a sensitive marker for UTI and the absence of pyuria in a symptomatic catheterized patient suggests a diagnosis other than CAUTI. The purpose of this project was to retrospectively assess whether patients in a neuroscience ICU meeting the NHSN definition of CAUTI more likely had asymptomatic bacteriuria and fever due to an alternative cause.

METHODS

• Retrospective case review of patients with CDC NHSN defined CAUTI in the Neuroscience ICU from January 2013 – January 2015
• CDC NHSN definition of CAUTI:
  • Catheter in place for > 2 days; at least one of the following signs/symptoms: fever, suprapubic tenderness, CVA tenderness, urinary urgency/frequency/dysuria; urine culture with no more than 2 species with at least one of which with > 10⁵ cfu/mL
• Data collected: patient demographics, neurologic diagnosis, body temperature, potential cause for fever, duration of urinary catheterization, WBC count, urinalysis, urine culture, blood cultures, antibiotic treatment, response to antibiotic treatment.
• Patients were considered unlikely to have a CAUTI if they 1) did not have pyuria (>10 WBC/hpf) at the time of CAUTI diagnosis or 2) did not respond to antibiotic therapy (receipt of an agent which the microbe recovered in the urine was susceptible) within 72 hours.

RESULTS

• 41 patients met CDC NHSN criteria for symptomatic CA-UTI
• Mean age of patients with CAUTI was 55.4 ± 13 years
• Gender: 76% Female
• CAUTI was diagnosed on hospital day 9.6 ± 5.5 d
• Duration of catheterization at time of CAUTI diagnosis: 7.2 days ± 5.1 d
• 93% of patients with CAUTI also had blood cultures performed; 5 patients (12%) were bacteremic; 3 patients (7%) had same species of bacteria recovered from urine and blood.
• 13 patients (31.7%) had other potential infections diagnosed by providers: pneumonia (22%), C. difficile infection (24%), skin/soft tissue infection (24%), ventriculitis (24%), influenza (24%).
• 80.5% patients had noninfectious causes of fever noted: subarachnoid hemorrhage (75.6%), CVA (4.8%)
• The mean hospital length of stay was 25.1 days

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• Results: Forty-one patients met the CDC-NHSN definition for CAUTI. The mean age of the patients was 55.4 ± 13 years and 76% were women. CAUTI was diagnosed at hospital day 9.6 ± 5.5 days after a mean of 7.2 ± 5.2 days of urinary catheterization. Thirty-five patients had a urinalysis performed and 16 (48%) did not exhibit pyuria (>10 WBC/hpf). Twenty patients (48.8%) remained febrile at 72 hours despite administration of antibiotics that had no activity against the bacteria recovered from the urine. Three patients (7.3%) had resolution of fever without administration of antibiotics. Thirteen patients (31.7%) had another cause of infection (pneumonia 6), C. difficile infection (1), skin (1), ventriculitis (1), influenza (1)) and 33 patients (80.5%) had a possible noninfectious cause for fever (subarachnoid or other intracerebral hemorrhage, 3), central nervous system accident (2)). Thirty-eight patients (93%) had blood cultures, of which five (13%) revealed bacteremia. The bloodstream isolate was the same species as the urine isolate in three patients.

• Conclusion: Despite meeting CDC NHSN surveillance definition criteria for CAUTI in this neuroscience ICU population, 63.4% of the patients most likely did not have a UTI (39% lack of pyuria, 19.5% of patients with pyuria did not resolve fever with antibiotics, 4.9% of patients with pyuria resolved fever without antibiotics). In addition, most patients (80.5%) had a well-defined noninfectious potential etiology for fever. There is great opportunity to improve the surveillance definition for CAUTI as well as institutional opportunity to better utilize laboratory resources.

CONCLUSIONS & FUTURE DIRECTION

• Despite meeting CDC NHSN criteria for CAUTI, 63.4% of patients in this NSICU most likely did not have a UTI (39% lacked pyuria, 19.5% with pyuria did not experience resolution of fever with antibiotic treatment, and 4.9% experienced spontaneous resolution of fever).
• 31% of patients had another potential infectious explanation for fever and 80.5% had a potential noninfectious explanation for fever.
• There is great opportunity to improve the surveillance definition for CAUTI in this high-risk patient population as well as better utilize institutional laboratory and clinical resources.

REFERENCES