Presented at APIC 44th Annual Conference in Portland, Oregon; June 14-16, 2017

Taking the Next Steps for Patient Safety and Excellence in CAUTI Prevention

Brenda L. Quayle, RN, VA-BC

Kindred Chicago Central Hospital

INTRODUCTION AND RATIONALE

Catheter associated urinary tract infections (CAUTIs) are classified as "never events" by the Centers for Medicare and Medicaid services, and are associated with increased morbidity[1-3] and mortality.[4] Antimicrobial resistant organisms have also been reported to be prevalent in CAUTIs.[5]

Evidence-based CAUTI prevention requires an intervention bundle and inter-professional collaboration.[6] Guidelines have been published with interventions for CAUTI prevention, appropriateness criteria for Foley catheter use, and the use of external continence devices (ECDs) in men as an alternative to indwelling catheter when appropriate.[6-11]

A nurse driven quality improvement (QI) initiative was designed to reduce urinary device days, decrease the Foley Utilization Rate (FUR), and lower the CAUTI rate.

METHODS

Clinical Setting: This project was conducted in a107-bed long-term acute care hospital.

Definitions: The definitions provided by the National Healthcare Surveillance Network are utilized by this hospital's infection prevention department.

Symptomatic CAUTI any age: The patient must meet the following criteria:

1. Patient had an indwelling urinary catheter that had been in place for > 2 days on the date of event (day of device placement = Day 1) AND was either: Still present for any portion of the calendar day on the date of event, OR Removed the day before the date of event
2. Patient has at least one of the following signs or symptoms:
   - fever (>38.0°C)
   - suprapubic tenderness
   - costovertebral angle pain or tenderness
   - urinary urgency
   - urinary frequency
   - dysuria
3. Patient has a urine culture with no more than two species of organisms, at least one of which is a bacterium of ≥105 CFU/ml. All elements of the UTI criterion must occur during the Infection Window Period.

Asymptomatic CAUTI any age: The patient must meet the following criteria:

1. Patient with or without an indwelling urinary catheter has no signs or symptoms of SUTI 1 or 2 according to age (Note: Patients > 65 years of age with a non-catheter-associated ABUTI may have a fever and still meet the ABUTI criterion)
2. Patient has a urine culture with no more than two species of organisms, at least one of which is a bacterium of ≥105 CFU/ml
3. Patient has a positive blood culture with at least one matching bacterium to the urine culture, or meets LCBI criterion 2 (without fever) and matching common commensal(s) in the urine. All elements of the ABUTI criterion must occur during the Infection Window Period

Root Cause Analysis: The findings revealed Foley catheters were being replaced after removal in patients who required accurate monitoring of intake and output (I&O) due to problems with condom catheters leaking. The need for multiple applications of condom catheters per shift and associated bed linen changes was a deterrent from regular use of ECDs in males as a viable alternative to indwelling catheter.

Intervention: A nurse-driven QI initiative was implemented which included use of a different male ECD and staff education on appropriate application and removal of the device. Education also included guidance on appropriate utilization of male ECDs as part of the CAUTI prevention bundle of care as an alternative to Foley catheter.

METHODS *continued*

Foley Catheter Appropriateness Criteria: Indwelling Foley catheters were utilized in male patients who met the following inclusion criteria (as deemed appropriate by nursing staff): Benign prostatic hypertrophy; neurogenic bladder; stage 3 and 4 sacral pressure injury; and strict I&O.

ECD Appropriateness Criteria: ECDs were considered for male patients with the following inclusion criteria: No restraints; no neurogenic bladder; no benign prostatic hypertrophy; and cooperative with no urinary issues.

ECDs were contraindicated in the following circumstances:
Patient was unable to void spontaneously and/or had known urinary retention
- Unhealed wound on glans
- Active inflammation or infection of the glans, foreskin or urethra
- Severe phimosis or severe hypospadias

Timeline: The QI initiative started on 02/21/16.

Appropriate ECD Application: The nursing team was educated on appropriate assessment of male anatomy for ECD placement.

The ECD was able to be applied to patients with circumsized, uncircumsized, and/or retracted anatomy. If the patient was uncircumsized, the nurse would always begin by retracting the foreskin and returning to its natural resting position immediately following device application.

Appropriate Placement of the ECD was Determined by Ensuring:

- The drainage bag tubing was positioned in a way that reduced or eliminated risk of a device-related pressure injury (might involve re-positioning the tubing when turning the patient).
- Use of a securement device was recommended to reduce the risk of premature device removal and device-related pressure injury. Location of the securement device varied depending on each patient, but was often placed on the patient's inner thigh.
- The drainage bag was always placed below the level of the patient's bladder.

Adherence to CAUTI Prevention Bundle: Throughout the intervention, the clinical team adhered to the CAUTI prevention bundle.

Metrics: Metrics monitored included number of urinary device days (Foley catheter and ECD days), the FUR, and the male CAUTI rate. A survey was conducted (N=30) to assess adherence to best practices. A CAUTI goal rate for the QI initiative was set at 1.76 with a FUR goal of 0.33. Historical metrics were used as a comparison to assess the effectiveness of the intervention.

CAUTI PREVENTION BUNDLE - FOLEY GUIDELINES

- ☐ Secure tubing with a stat lock to the patients thigh at all times. It should be changed q 7 days or PRN (Saturday am preferably, dated and timed).
- ☐ Foley tubing not kinked, to prevent back-flow of urine.
- ☐ Foley bag should have 300 cc or less urine.
- ☐ Observe sterile technique during Foley insertion at all times. Process used in Foley insertion.
- ☐ Observe aseptic technique during urine collection. Process used in urine collection.
- ☐ Secure tubing with a clip attached to the bed linens.
- ☐ Do not alter the seal (green plastic wrapped around the tip of the tube).
- ☐ Two person strategy during foley insertion.
- ☐ Graduated, cylinder to be changed q 7 days (every Sunday am shift preferably, dated and timed, with patient's sticker).
- ☐ Clean Foley tubing from top to bottom.
- ☐ Rationale behind why patient needs a Foley (e.g. neurogenic bladder, sacral wound, etc...)
- ☐ Drainage bag below the level of the bladder.

RESULTS

Figure 1 demonstrates a 46% decrease in total urinary device days from January 2016 to February 2017. The FUR for 2016 ranged from a high of 0.41 in January 2016 to a low of 0.19 in June of 2016, with an average rate of 0.25 from February 2016 through end-February 2017. The average wear time for the male ECD was 48-72 hours. The male CAUTI rate decreased from 2.97 per 1000 catheter days in January 2016 and 1.81 in February 2016 to 0 from March 2016 through end-February 2017 (Figure 2). Increased adherence to best practices was reported on staff surveys (N=30; [15 RNs, 15 CNAs]) (Figure 3).

Figure 1. Total urinary device days.

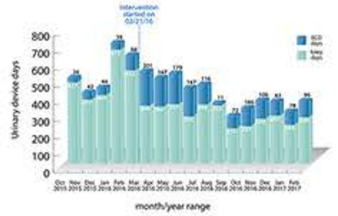

Figure 2. Male CAUTI rate

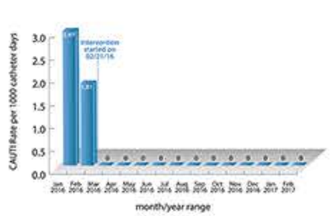

Figure 3.

DISCUSSION

The QI initiative was deemed successful and the concerns identified on the initial root cause analysis were addressed. Prior to the intervention, patients who required accurate measurement of I&O were receiving indwelling catheterization. The use of the new ECD provided a viable alternative for monitoring I&O without increasing patient risk for CAUTI. In addition, the nurse-led QI initiative empowered nurses to adhere to best practices for CAUTI prevention.

CLINICAL IMPLICATIONS

- Nurse-led QI initiatives can empower nurses to reduce patient risk for CAUTI.
- Adherence to appropriateness criteria for indwelling catheter placement can help prevent unnecessary risk for CAUTIs.
- Use of an ECD as an alternative to indwelling Foley catheters may reduce the CAUTI incidence rate.
- The intervention resulted in an overall decrease in total urinary device days and Foley catheter days.

REFERENCES

1. Ramanathan R, Duane TM. Urinary tract infections in surgical patients. Surg Clin North Am. 2014;94(6):1351-1368.
2. Jacobsen SM, Stickler DJ, Mobley HL, Shirtliff ME. Complicated catheter-associated urinary tract infections due to Escherichia coli and Proteus mirabilis. Clin Microbiol Rev. 2008; 21(1): 26-59.
3. Centers for Disease Control and Prevention. Urinary Tract Infection (Catheter-Associated Urinary Tract Infection [CAUTI] and Non-Catheter-Associated Urinary Tract Infection [UTI] and Other Urinary System Infection [USI]) Events. http://www.cdc.gov/nhsn/PDFs/pscManual/7pscCAUTIcurrent.pdf
4. Klevens RM, Edward JR., et al. "Estimating Healthcare-associated Infections and Deaths in U.S. Hospitals". Public Health Reports 122: (2007):160-166.
5. Chitnis AS, Edwards JR, Ricks PM, Sievert DM, Fridkin SK, Gould CV. Device-associated infection rates, device utilization, and antimicrobial resistance in long-term acute care hospitals reporting to the National Healthcare Safety Network, 2010. Infect Control Hosp Epidemiol. 2012;33(10):993-1000.
6. Gray M, Skinner C, Kaler W, External Collection Devices as an Alternative to the Indwelling Urinary Catheter: Evidence-Based Review and Expert Clinical Panel Deliberations. J Wound Ostomy Continence Nurs. 2016;43(3):301-7.
7. Saint S, Kowalski CP, Kaufman SR, et al. Preventing hospital-acquired urinary tract infection in the United States: a national study. Clin Infect Dis. 2008; 46 (2): 243-250.
8. Gould CV, Umscheid CA, Agarwal RK, Kuntz G, Pegues DA. Guideline for prevention of catheter-associated urinary tract infections 2009. Infect Control Hosp Epidemiol. 2010;31(4):319-326.
9. Hooton TM, Bradley SF, Cardenas DD, et al. Diagnosis, prevention, and treatment of catheter-associated urinary tract infection in adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America. Clin Infect Dis. 2010;50(5):625-663.
10. Tenke P, Kovacs B, Bjerklund Johansen TE, Matsumoto T, Tambyah PA, Naber KG. European and Asian guidelines on management and prevention of catheter-associated urinary tract infections. Int J Antimicrob Agents. 2008; 31 (Suppl 1): S68-578.
11. Conway LJ, Larson EL. Guidelines to prevent catheter-associated urinary tract infection: 1980 to 2010. Heart Lung J Crit Care. 2012;41(3): 271-283.

ECD utilized.

Nothing to Disclose