

Utilizing Evidence-Based Practice to Achieve “Zero Tolerance” for Catheter-Associated Urinary Tract Infections (CAUTIs)

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Abstract—Catheter associated urinary tract infections continue to remain the single most common HAI; with external forces, such as mandated public reporting of HAI and the climate of “zero tolerance” for hospital-acquired infections have led to an increased effort in the reduction and elimination of CAUTIs.

Index Terms—catheter-associated urinary tract infection, evidence-based practice, healthcare associated infection, quality improvement, and zero tolerance.

I. INTRODUCTION

According to the Centers for Disease Control and Prevention (CDC), healthcare-associated infections (HAI) can be caused by a diverse group of organisms such as bacteria, fungi, and viruses throughout the course of receiving medical treatment. The ongoing improvement in medical treatments has brought lifesaving care to patients; however, with those improvements also comes a risk of HAI.² A healthcare associated, or hospital-acquired infection, is defined as an infection that is not present when a patient is admitted to a healthcare facility. If the infection develops in a patient 48 hours or more after admission to the facility, the infection is referred to as a healthcare-acquired infection.⁵ There are four major types of HAIs they include: surgical site infection (SSI), central line-associated bloodstream infection (CLABSI), catheter-associated urinary tract infection (CAUTI), and ventilator-associated pneumonia (VAP). Many factors influence HAIs in a healthcare facility setting. Factors can include but are not limited to decreased immunity, diagnostic and therapeutic procedures, invasive techniques, and medical devices. For example, a urinary catheter device provides a pathway for organisms to enter the bladder and thus increases the risk of infection and other medical complications.¹⁸

An estimated 1.7 million HAIs occur in United States hospitals annually. Healthcare-associated infections among adults and children outside of the intensive care unit (ICU) averaged approximately 1.2 million. Deaths associated with HAIs in United States hospitals were 98, 987 of these 13, 088 were associated with urinary tract infections (UTIs).^{4, 13} Urinary tract infections are the most common HAIs; approximately 80% of UTIs are associated with the use of urinary catheters.¹⁹ Costs of catheter-associated urinary tract infections (CAUTIs) can be estimated at \$1006 per incidence.⁴ In addition to the financial burden CAUTIs place on the healthcare system, there are also issues related to length of stay and quality of life that should be noted.³

In recent years, organizations such as The Joint Commission (TJC) and Centers for Medicare and Medicaid Services (CMS) have targeted efforts to reduce HAIs such as CAUTIs. In 2008, CMS issued an announcement that under a revision of the Prospective Payment System it would no longer reimburse healthcare facilities for costs attributed to CAUTIs.²² The 2012 National Patient Safety Goals includes a goal focused on the use of evidence-based practices to prevent infections of the urinary tract that are caused by catheters.¹⁶ Most recently the CMS released that as part of a national quality improvement effort it plans to require by 2014 the reporting of rates of CAUTIs publicly by healthcare facilities participating in the Hospital Inpatient Quality Reporting Program.³

Urinary tract infections continue to remain the single most common HAI and the vast majority of cases of nosocomial UTIs are associated with an indwelling urinary catheter; with external forces, such as mandated public reporting of HAI and the climate of “zero tolerance” for hospital-acquired infections have led to an increased effort in the reduction/elimination of CAUTIs.²¹

II. PURPOSE

The purpose of this pilot study is to examine the impact that a nurse driven Foley catheter protocol will have on CAUTIs.

III. LITERATURE REVIEW

Appropriate Catheter Usage

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Research supports the use of short-term urinary catheterization (usually less than 30 days) for appropriate indications.¹⁰ These include urinary retention, obstruction to the urinary tract, close monitoring of the urine output of critically ill patients, urinary incontinence that poses a risk to the patient because of Stage 3 or greater ulcer to the sacral area, and comfort care for terminally ill patients.^{9, 10, 11, 15} In spite of recommendations, research, and guidelines urinary catheters continue to be used for unsuitable motives.^{8, 12, 14, 19} In 2009 the CDC released its Guidelines for the prevention of catheter-associated urinary tract infections including that urinary catheter use and duration of use should be minimized in all patients. Guidelines also outlined that the use of urinary catheters in an operative patient should only be used as necessary, rather than routinely.¹⁰ Despite efforts unnecessary urinary catheterization of hospital patients continues to be estimated at a rate of between 21% and 50%.^{7,8, 12, 20} Studies suggest that a majority of these inappropriate catheter uses are inserted in the emergency department.^{9, 14} Additionally urinary catheters are being inserted without the physician's order in an estimated one-third of all catheterized patients with no documented rationale.⁷

Regardless of the reason for urinary catheter insertion, evidence strongly supports the continued assessment for the need of an indwelling catheter.¹² Dingwall and McLafferty⁶ cited that although nurses are trained with the knowledge about correct and incorrect indications for urinary catheters, they continue to use indwelling catheters for reasons outside of evidence based practice.

Proper Catheter Technique and Management

In 2009 the Healthcare Infection Control Practices Advisory Committee (HICPAC) released Guidelines for Prevention of Catheter-Associated Urinary Tract Infections. The multidisciplinary team estimated that between 17% and 69% of hospital-acquired CAUTIs may be preventable by the implementation of an evidence based prevention program.¹⁰ Evidence supports that certain interventions can reduce the incidence of CAUTIs.¹⁷

Interventions recommended in the prevention of CAUTIs include the performance of hand hygiene immediately before and after the insertion or with any manipulation of the catheter device or site; ensuring that only properly trained person who are familiar with proper technique of aseptic catheter insertion perform the skill; use of sterile lubrication in order to reduce trauma and irritation during catheter insertion; proper securement of indwelling catheters to prevent movement and urethral irritation; and use of the smallest bore catheter possible in order to minimize trauma during insertion.

In those patients that require an indwelling urinary catheter the daily maintenance is equally important to preventing CAUTIs. Daily interventions recommended to prevent CAUTIs include a daily assessment of the need for the indwelling catheter; aseptic technique and maintenance of a closed drainage system; ensuring an unobstructed urine flow by preventing any kinks or loops of tubing; keep the urine collection bag below the level of the bladder and avoid contact with the floor; avoid rigorous or frequent cleaning of the

catheter entry site; perform a daily routine cleansing or after bowel contamination of the perineal area using soap and water; empty the drainage bag at least every 4 to 6 hours; insure adequate fluid intake as indicated based on the patient's medical condition; avoid clamping the catheter or drainage tube; and avoid irrigation of the bladder.

Urine Sampling

The routine urinalysis is the most common and convenient screening exam in which to provide the health professional with a patient's valuable health status information.²³ For collection of small volume fresh urine specimens evidence supports the aspiration of urine from the needleless sampling port with a sterile syringe after cleansing of the port with a disinfectant. If a larger volume of urine is need for examination aseptically obtain samples from the drainage bag. For urine culture screening a urine sample should never be extracted from the catheter drainage bag. Evidence supports that routine urine examinations should not be performed in the absence of clinical signs of infection. Chronically catheterized patients have bacteria and organisms that change frequently. Urine cultures should only be obtained if those patients demonstrate clinical symptoms of a UTI. Consider changing the entire catheter if infection occurs before treating CAUTIs with antibiotics.¹⁷ Urine specimens should be immediately transported to the lab for testing.²⁴

IV. STRATEGIES FOR QUALITY IMPROVEMENT

Based on the proposed HICPAC guidelines the implementation of a quality improvement program should enhance the use of indwelling catheters and reduce the risk of CAUTIs. The purpose of a quality improvement program should be to assure the appropriate utilization of catheters, to identify and remove catheters as soon as possible, and to ensure the adherence to hygiene and proper care of catheters. Implementation examples include a system of alerts to identify all patient with urinary catheters, development of protocols for nurse driven removal of unnecessary urinary catheters, education and performance feedback, and peri-operative catheter management guidelines.²⁴

Proposed Solution

Through a thorough review of the literature some very important points were realized, in order to establish an effective urinary catheter protocol their existed a need to involve the cooperation of other departments and staff. Nursing staff played a critical role in the insertion and maintenance of urinary catheters but the need for support and cooperation among other departments would be critical to making a process change of this magnitude. Upon reviewing the literature the following areas were noted as critical processes in establishing a successful hospital wide urinary catheter protocol: establishing a hospital wide uniform process for the collection and handling of urine specimens; standard education process for all nursing staff that includes yearly

reviews; development of a standardized protocol for addressing indwelling urinary catheters; development of an audit and tracking tool; and a method to communicate the successes as well as opportunities with staff.

V. METHODS

Quality Improvement Effort

Evidence-based practice guidelines derived from both current and valid research can improve patient outcomes, as well as quality care. Merely disseminating current evidence-based research is ineffective in changing nursing practice, but learning how to implement findings is crucial to promoting high quality care.²⁵ This project utilized the following framework for development of a CAUTI prevention program:

- (a.) Enlist the support and advice from a multidisciplinary team. The team members included nurses, physicians, infection control, laboratory, revenue, educators, and pharmacy.
- (b.) Based on the review of literature, develop a list of evidence-based guidelines to reduce CAUTIs. The list of guidelines will be utilized to develop a hospital wide policy and protocol.
- (c.) Measure outcomes and develop an audit/feedback tool.
- (d.) Derive a method to educate staff and measure competency on a continuous basis.

Ethical Considerations

Internal Review Board (IRB) approval was requested from both the healthcare facility and through the academic institution. Approval was granted by both organizations.

Setting

A regional acute care medical facility was the site of the protocol intervention. The medical facility is a tri-state medical facility serving a ninety mile radius of the corners of Alabama, Georgia and Florida. The facility is a 420 bed not-for-profit referral center serving 600,000 residents in the geographic area. It is the area's largest healthcare provider. It was decided that a pilot study would be conducted on one unit in order to manage resources and measure outcomes more effectively. The telemetry/medical-surgical unit was chosen. The unit is comprised of 42 patient beds; only adult patients that are 18 years and older are admitted to this unit.

Intervention

Based upon evidence present during the review of literature and the recommendation of the multidisciplinary team, a nurse driven protocol was devised. In addition to the new tool the current policy on urinary catheter insertion and care was evaluated and changes were drafted. The urinary catheter protocol proposed:

- (a.) The patient must meet certain criteria for the insertion of a foley catheter. They include urinary retention, incontinence with pressure sores, urinary tract obstruction, neurogenic bladder patients not performing self-catheterization, surgery involving the genitourinary tract, monitoring accurate urine output in critically ill patients, and palliative care measures.
- (b.) Assess the foley catheter every 24 hours to determine the continued need.
- (c.) Discontinue foley catheter when patient does not meet criteria.
- (d.) All foley catheters inserted in surgery should be removed by post op day 2 unless physician documents an order.
- (e.) An addendum was added per physician request that all catheters placed by urology not be removed without a physician order.

The policy regarding urinary catheter insertion was also evaluated. It was decided to create a new policy based on evidence recommendations. A bundle approach was used in the plan development. Changes in policy included:

- (a.) A new contract was negotiated to utilize a catheter kit that contained all the required items for catheter insertion. Those items are a stat lock securement device, silicone catheter, and chart sticker. Prior to this decision the nurse was required to hand pick the items and risk the chance of not gathering all the appropriate equipment.
- (b.) Prior to performing a catheter insertion procedure the patient must receive perineal care using soap and water. This care must be documented as part of the catheter insertion.
- (c.) Catheter insertion will be performed by a trained staff member who has completed the required competency or be supervised by a staff member who has completed the required competency. Utilize sterile technique for each urinary catheter insertion.
- (d.) For those patients that require a urinary catheter to be in place for greater than 24 hours, then perineal care should be performed with soap and water on daily basis.

In order to promote a culture of safety and ensure that all staff are trained and aware of the changes in procedure, an educational campaign was created. Interventions included the following:

- (a.) Create a computer based learning module on the facilities' online education system. The module will outline the changes of policy and procedures. It will include the rationale for why the changes were made and a brief review of the evidence that was obtained as a result of the literature review.
- (b.) The new urinary catheter company was brought in to demonstrate the new product through revolving in-services on the unit.
- (c.) A competency based exam was created in order to test the knowledge of the staff member on the new changes. Each employee on the unit, both licensed and unlicensed staff, was required to enroll in the module and pass the

exam by a set date. In addition the staff will be required to enroll and pass the exam each year.

- (d.) An educational pamphlet was created to distribute to all patients who required the insertion of a urinary catheter. The pamphlet informed the patient of the purpose of a urinary catheter, the care required on a daily basis, signs and symptoms of an infection, and when to anticipate having the catheter removed.

Based on further evidence it was decided to make adjustments to the policy and procedure for collecting urinary catheter samples. Changes include:

- (a.) A urine culture specimen should be obtained automatically when the patient has been hospitalized for less than 48 hours and when a new urinary catheter is being inserted for the first time.
- (b.) Routine urine culture specimens should not be collected on a patient with a urinary catheter unless the patient becomes symptomatic.
- (c.) The nurse is expected to collect all urine specimens in a timely manner. The specimen should be obtained within 8 hours of the order.
- (d.) A urine specimen is to receive priority in being transported to the lab.

The team decided that it was critical to the project's success that a method be created in order to share audit results with the staff. The communication tool needed to be easily accessible and updated on a daily basis in order to provide staff with frequent updates. The team decided to utilize a visual audit tool. The tool was created as a poster that could be mounted within the nursing station for all staff to see. The tool would measure the daily results of how successful the staff was with meeting the objectives. There would be a simple dot placed each day that would be either green or red in color. Green would represent that all criteria had been met. Red would represent that an opportunity had arose. The unit manager would have the responsibility to approach the individual staff member as to what protocol had failed. It was also decided that a unit champion would be selected for the pilot unit. The champion would be someone who could help promote the new changes, encourage the staff, and be leader in the campaign.

VI. RESULTS

The goal of this project was to establish whether a nurse initiated urinary catheter protocol and staff education could positively impact the hospital CAUTI rate. A goal was set to reduce the hospital wide HAI infection rate to 2% for 2012 year. Data supported that the protocol, staff education, and audit tool was successful in reducing both the CAUTI rate and catheter utilization rate.

Data

A retrospective data collection and analysis was performed. The HAI rate for the 2010 to 2011 period was 3.21%. Of that rate 1.89% of HAIs directly related to CAUTIs. The goal rate for all HAIs for 2011 to 2012 was set at 2%. Prior to initiating this process the telemetry/medical-surgical unit HAI rate was 2.38%. Urine specific HAI rate was 1.56%, this accounted for 62% of total HAIs (refer to Table 1).

Table 1

2010 to 2011 Healthcare Associated Infection (HAI) Rates		
Hospital:		
HAI		3.21%
CAUTI		1.89%
Pilot Unit:		
HAI		2.38%
CAUTI		1.56%

In December 2011 the new urinary catheter protocol was initiated on the designated pilot unit. The education process was also initiated for unit staff. Data collection efforts began in February of 2012. Data results in February revealed that there were no CAUTIs. In order to gain a better perspective of the new urinary catheter protocol and process, it was decided to monitor rates for a 6 month period to determine the impact of the process. Again data was compiled from February of 2012 to July of 2012. Results over the 6 month period revealed a CAUTI rate of 0 for the pilot unit (refer to Table 2). In addition the researcher also examined the catheter utilization rate. This rate is an indicator of utilization of urinary catheters. A decreasing trend can reflect that a program is successful in reducing the usage and length of usage of urinary catheters. Data analyzed from January of 2011 to December of 2011 revealed a total of 2,764 catheter rate; this equates to a monthly average catheter utilization rate of 230. Results from February of 2012 to July 2012 did show a reducing trend as compared to rates of the previous year. The average rate of utilization of urinary catheters for the pilot period was 166. Data did support that the newly initiated process impacted both CAUTIs and the utilization of urinary catheters.

Table 2

Pilot Unit Post CAUTI Data Results	
CAUTI:	
February 2012	0
March 2012	0
April 2012	0
May 2012	0
June 2012	0
July 2012	0

VII. DISCUSSION

Project results were better than anticipated. As a result of efforts and data it was decided to expand this project hospital-wide as of August 2012. Data will continue to be analyzed to understand the impact that this process will have long-term. In order to maintain a long-term sustainability a few processes have been hard wired into the endeavor. In order to ensure that all staff members receive education and safeguard competency, the original education module was required of all hospital staff. This includes licensed and unlicensed staff. Additionally the competency exam is required by all staff and is part of the yearly proficiency. All newly hired employees will also have the expectation of enrolling and completing the new training process. It has also been decided that further training and focus will be placed in the curriculum of both licensed and unlicensed newly hired staff. This will help insure that all new staff members will understand the culture of “zero tolerance” for CAUTIs. The audit communication tool was duplicated for each unit and mounted within the nursing station on each unit. The task of maintaining the daily audit has been placed as a daily responsibility of the unit quality nurse. Each unit will receive an in-service regarding the success of the initial pilot program and the process of the audit tool. Plans involve incorporating this presentation in each unit’s monthly staff meeting. Discussions are also underway to determine how to celebrate this success as an organization. The initial pilot study has translated into positive patient outcomes and a significant financial impact. Hospital leadership has begun to develop a timeline in order to roll out this new process throughout the entire organization.

VIII. FUTURE IMPLICATIONS

Evidence supports that nurse-driven interventions can improve nursing care; it is important to remember that re-education on the significance of basic skills while incorporating current based practices can raise alertness of simple interventions that can impact patient outcomes for the better.²⁵

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