Catheter Associated Urinary Tract Infections

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Catheter-acquired urinary tract infections are the most reported healthcare-associated infection (Centers for Disease Control and Prevention, 2015). Patients with an indwelling catheter for a prolonged period are at high risk for this infection, increasing costs for both the patient and the hospital. CAUTIs also put the patient at risk for further health complications such as sepsis and death (Hinkle & Cheever, 2018). Nurses caring for a patient with an indwelling catheter should remember The Quality and Safety Education for Nurses (QSEN) and their seven core competencies: patient-centered care, evidence-based practice, teamwork and collaboration, safety, quality improvement, and informatics. Nurses can directly affect patients and their families by demonstrating these competencies, especially patient-centered care and quality improvement (QSEN Institute, 2020). Healthcare professionals can decrease the occurrence of CAUTIs by using evidence-based research to prevent infections and further complications.

Literature Review

Effectiveness of meatal cleaning in the prevention of catheter-associated urinary tract infections and bacteriuria: An updated systematic review and metaanalysis

Mitchell et al. (2021) conducted a meta-analysis of 18 studies preventing catheter-associated urinary tract infections (CAUTIs). CAUTIs account for 70-80% of nosocomial infections and prolong the stay of patients, costing hospitals and patients more money. In the United Kingdom, the analysis estimated that CAUTI caused over 45,000 excess beds, 1467 deaths, and a loss of 10,471 quality life years (Mitchell et al., 2021). The meta-analysis of 927 articles showed that using chlorhexidine for meatal cleaning instead of other agents such as soap, saline and antimicrobial cloths before catheterization led to a significant reduction of CAUTIs (Mitchell et al., 2021). This article is related to the QSEN competency of quality improvement because the study aimed to look at different methods of meatal cleaning and how they affect

incidences of CAUTIs. The meta-analysis shows that quality improvement for preventing CAUTIs would be switching protocol from soap, saline, or provocative iodine 10% to chlorhexidine (Mitchell et al., 2021).

Effect of a Female External Urinary Catheter on Incidence of Catheter-Associated Urinary Tract Infection

Female-external urinary catheters (FEUCs) are marketed but are not taken advantage of in many hospitals for CAUTI reduction (Zavodnick et al., 2020). FEUCs do not insert into the urethral meatus. The device has a urine collection segment between the labia attached to suction on the wall. Using FEUCs decrease CAUTI rates from 3.14 in every 1000 to 1.42 every 1000 days catheterized. However, intensive care patient days increased (Zavodnick et al., 2020). This article showed that using FEUCs instead of indwelling urinary catheters significantly reduced the number of CAUTIs (Zavodnick et al., 2020). The piece falls under the QSEN competencies of quality improvement and patient-centered care. Using FEUCs instead of indwelling catheters on non-intensive care patients that still indicate catheterization has reduced CAUTIs and, in turn, increased positive patient outcomes.

Don't have a doubt, get the catheter out: A nurse-driven CAUTI prevention protocol

In 2017, the pediatric critical care center (PICU) was the cause of 87% of the CAUTIs and 65% of total indwelling urinary catheter device days (Schiessler et al., 2019). A multidisciplinary team came up with the plan, do, check, act method as a urinary catheter hospital protocol. The protocol includes consulting with urology and pediatric surgery before removing catheters. The nurse was then to chart indications for use given by the provider (Schiessler et al., 2019). Protocol quality measure was in full device days and the number of CAUTIs within those days. A month after the protocol implementation, the unit decreased device days by 60%. As the number of device days decreased, CAUTIs also was reduced (Schiessler et

al., 2019). This protocol can be related to the QSEN competency of quality improvement. Providing nurses with an evidence-based hospital protocol of prompt removal of unneeded catheters reduces device days and CAUTIs in the hospital.

Long-term use of noble metal alloy coated urinary catheters reduces recurrent CAUTI and decreases proinflammatory markers

Magnusson et al. (2019) used several control catheters, including metal alloy catheters (NMA-coated catheters). All catheters led to CAUTI and the need for antibiotic therapy besides the NMA-coated catheters. NMA-coated catheters reduced CAUTIs, and the catheter was considered comfortable with reduced inflammatory markers (Magnusson et al., 2019). The lab processed urine to look for amounts of metal in the urine that might indicate instability of the coating. However, the processing did not show any significant metal releases, proving safe for patient use (Magnusson et al., 2019). The study relates to quality improvement in reducing CAUTIs in long-term catheter use and patient-centered care regarding how comfortable and safe new NMA-coated catheters are.

Optimizing interventions for catheter-associated urinary tract infections (CAUTI) in primary, secondary and care home settings

In the United Kingdom, over 50% percent of hospital-related infections are due to CAUTIs (Wanat et al., 2020). Key behavioral indicators of hospital workers to prevent CAUTI includes; knowledge, memory, social influences, environmental context, resources, attention, decision making, social, professional role, and identity. The highest number of national and research interventions to reduce CAUTI include education, enablement, training, modeling, and incentives (Wanat et al., 2020). Most interventions included behavioral change techniques to develop evidence-based protocols in education and training on urinary catheters (Wanat et al., 2020). Good teaching and training, along with evidence-based protocols, are shown to reduce the

incidence of CAUTIs. This article falls under quality improvement because the goal is to improve the quality of training, protocols, and collaboration between medical personnel and stakeholders to reduce CAUTIs (Wanat et al., 2020).

Case Study

Catheter-associated urinary tract infections are high in long-term care facilities. This study examined the effectiveness of a 3-year targeted infection prevention program. The elderly population makes up most of the residents in nursing homes. Within the nursing home, staffing problems are an issue. Some elderly need help with bathing, especially cleaning their perineum when an indwelling catheter is in place. The staffing problem affects elderly care resulting in catheter-associated urinary tract infections (Hutton et al., 2018). Indwelling catheters put the resident at twice the risk for infection. The catheter infection also puts the resident at risk for sepsis and even death. Catheter treatment causes around $2,000 for each infection in the nursing home (Hutton et al., 2018). Since the majority of the residents in the nursing home have an indwelling catheter, this has prompted a change to help prevent urinary tract infections.

The change in the nursing home is called the Targeted Infection Prevention Program (TIP Program). The program helps the facility save money and reduces infections, which helps health outcomes. Not all nursing home facilities have this program (Hutton et al., 2018). The facilities that utilize the program have a lower urinary tract infection rate. The overall health outcome of the nursing home population has improved. The nursing staff trained on hand hygiene, applying a barrier cream after performing perineum care on the resident, and infection prevention (Hutton et al., 2018). Reducing the infection rate of residents helps improve their quality of life and proves to the nursing staff how well their hard work is paying off.

Synthesis

Practice

Best practice to prevent catheter-associated urinary tract infections includes only placing an indwelling catheter if indicated by urology with specific parameters, using female external urinary catheters, using metal alloy catheters, and cleaning the meatus with chlorhexidine instead of other antiseptic agents if indicated (Schiessler et al., 2019). Using urinary catheters far too often and an increased number of days that the catheter is in both significantly increase CAUTIs (Schiessler et al., 2019).

Education

The most significant reduction in CAUTI was due to the removal of indwelling catheters promptly (Schiessler et al., 2019). The longer an indwelling urinary catheter is in, and the more likely a CAUTI will occur. Using other methods, such as female-external urinary catheters, can also significantly reduce CAUTI since the contraption does not enter the urethral meatus (Zavodnick et al., 2020). NMA-catheter is used in indicated patients for long-term indwelling urinary catheters. These catheters have the least amount of CAUTI among indwelling catheters on the market (Magnusson et al., 2019). If CAUTIs occur, treatment includes using broad-spectrum antibiotics until a urinary analysis shows what kind of infection it is. Once the infection is determined, more focused antibiotics are the primary form of treatment (Wanat et al., 2020).

Research

Further research should focus on quality improvements to CAUTI protocols and more studies focusing on preventative measures and interventions (Schiessler et al., 2019). Studies on new catheter devices should evaluate the reduction of CAUTIs and the safety of inpatient use (Magnusson et al., 2019).

Conclusion

Different proposed changes to reduce the occurrence of catheter-associated urinary tract infections include using a biofilm or noble metal alloy catheter to prevent bacteria formation and colonization, proper urethral meatus cleaning, and nurse-driven protocols to remove indwelling catheters soon as clinically indicated. Catheter-associated urinary tract infections are the most reported healthcare-associated infection (Centers for Disease Control and Prevention, 2015) and are costly for the patient and facility. Nurses and other healthcare professionals must recognize the risk and how detrimental a CAUTI could be to a patient's overall health. It is crucial to use evidenced-based practice and other QSEN competencies such as patient-centered care, quality improvement, teamwork, and collaboration (QSEN Institute, 2020) to lower the incidence of CAUTIs.

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