

The relationship between catheter placement and the incidence of urinary tract infections in Condong Catur Hospital, Yogyakarta

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ABSTRACT

Introduction: Catheter-related urinary tract infections for one-third of all health-care related infections in the United States, and have also been shown to increase morbidity, mortality, and length of stay. Various problems are associated with urinary catheter insertion, namely trauma, complications, and patient discomfort. The purpose of this study was to analyze the relationship between catheter placement and the incidence of urinary tract infections in hospitalized patients in Condong Catur Hospital Yogyakarta.

Methods: The design of this study was an analytic observational study using a cross sectional design. The sample was patients diagnosed with UTI for 12 months from August 2019 to July 2020 and inclusion and exclusion criteria. The sample selection was done by consecutive sampling. There were 98 samples of inpatients at the Condong Catur Hospital. The data were taken from the medical records of patients who had UTIs or those with a catheter installed.

Results: There are 98 patients in the Condong Catur Hospital, 18 of them have had UTIs, ten of which were caused by catheter insertion. In this study, bivariate analysis was used to compare the two groups with partners and found a significant association between catheter use and urethral infection, with a p-value of 0.001.

Conclusion: There is a significant relationship between catheter placement and the incidence of urinary tract infections in hospitalized patients in Condong Catur Hospital.

Keywords: catheter placement, hospital, UTI.

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INTRODUCTION

Hospital infections have been demonstrated to increase morbidity and mortality, duration of hospital stay, and expenditures related to patient care and cause additional suffering to patients, making them an important public health problem around the world. Urinary tract infections are the most prevalent hospital infections in the United States, accounting for 40% of all hospital infections (US). The temporary use of a urinary catheter is the most major risk factor for urinary tract infection in the hospital. CAUTIs (catheter-associated urinary tract infections) are the most frequent urinary tract infections in the United States, accounting for over 13000 deaths per year. Patients admitted to intensive care units had a higher rate of indwelling urinary catheters (83 percent vs. 21 percent) than patients admitted to general wards, putting them at a higher risk of CAUTI usage. From 2010 to 2015, a large investigation

of 703 intensive care units in 50 countries found an average incidence density of 5.07 CAUTI incidents per 1000 catheter-days. In research conducted in two intensive care units in Brazil, the rate of CAUTI was estimated to be seven occurrences per 1000 catheter days.¹

Uncomplicated urinary tract infection (UTI) and complicated urinary tract infection (UTI) are the two types of UTI. Outpatients are more likely to get uncomplicated UTIs, which occur in otherwise healthy people and have no organ or neurologic abnormalities of the urinary system. Uncomplicated UTIs affect mostly women of all ages; however, they can also affect boys or men. Persistence, such as the use of intermittent urinary catheterization, urinary obstruction by stones (retention), immunosuppression, renal illness, kidney transplantation, and pregnancy, are all risk factors for UTI. Urinary catheterization is the most common cause of a complex UTI. CAUTI (catheter-associated urinary

tract infection) accounts for 40% of all nosocomial infections worldwide.^{2,3}

One of the most prevalent nosocomial diseases is urinary tract infection (UTI), which is connected with a urinary catheter in half of the cases. This improper insertion technique includes using superfluous catheters, poor insertion procedures that can introduce bacteria, and leaving the catheter in place for too long, allowing bacteria to climb up the catheter into the bladder, producing a UTI and perhaps into the bloodstream.⁴

Fifteen to twenty-five percent of hospitalized patients had a urinary catheter implanted during therapy. More than a third of in-hospital healthcare-related infections (HAIs) reported by acute care hospitals are caused by CAUTI.⁵

The purpose of this study was to analyze the relationship between catheter placement and the incidence of urinary tract infections in hospitalized patients in Condong Catur Hospital Yogyakarta.

Thus, it is hoped that various efforts will be made to reduce the incidence of CAUTI and UTI from this paper.

METHODS

Study Design

This study used a cross-sectional design and was designed as an analytic observational study. This research was conducted at the Condong Catur Hospital.

Data Collection

The sample was patients diagnosed with UTI for 12 months from August 2019 to July 2020 with inclusion and exclusion criteria. The sample selection was done by consecutive sampling. There were 98 samples of inpatients at the Condong Catur Hospital. The data were taken from the medical records of patients who had UTIs or a catheter installed.

Data Analysis

The data were analyzed using SPSS with univariate analysis to determine the frequency distribution of each variable and bivariate analysis to determine the relationship between catheter use and urethral infection, with $p < 0.05$ was considered significant.

RESULTS

There are 98 patients in the Condong Catur Hospital, 18 of them have had UTIs, ten of which were caused by catheter insertion. In this study, bivariate analysis was used to compare the two groups with partners and found a significant association between

catheter use and urethral infection, with a p -value of 0.001.

From the results of [table 1](#), it was found that most patients experienced UTI in the age range of 20-29 years (40%). Then in the age range of 1-9 years and more than 60 years, each amounted to 2 patients (20%). Meanwhile, there was only one patient in the age range of 30-39 years and 50-59 years (10%).

Based on [table 2](#), the relationship between the use of catheters and the incidence of urinary tract infections has a significance level (p) < 0.05 . In other words, it can be concluded that there is a significant association between the use of catheters and the incidence of nosocomial infections of urinary tract infections in Condong Catur Hospital, Yogyakarta.

DISCUSSION

Many attempts have been made to develop interventions to reduce the incidence of CAUTI. Any evidence that lowering bacterial colonization around the meatus or urethral region can minimize the risk of CAUTI is welcome.⁶

More than 60% of urinary tract infections are associated with catheter insertion. Approximately 15-25% of all inpatients are catheterized during their hospital stay. Bacteriuria increases by 3-8% per day for every day following catheter insertion in a medical facility. Cases were found in almost all patients who developed bacteriuria after 30 days of catheter insertion. Most bacteriuria cases due to catheter insertion are asymptomatic, so

less than 5% of cases cause bacteremia that requires treatment. Catheter-associated bacteremia is responsible for 15% of bloodstream infections and 10% fatalities.⁷

Training of health care staff, vigilant observation of CAUTI episodes, and suitable catheter insertion and management practices are all helpful strategies. In addition, removing the catheter is clinically unnecessary. One of the most significant impediments to making judgments about indwelling urinary catheter removal is the health staff's perceptions of patients with severe illnesses who use the device. Promoting the adoption of procedures in clinical settings with specific criteria for indications of indwelling urinary catheters is one strategy to shift from perception-based to evidence-based judgments.¹

In the United States, introducing a no-payment insurance policy for hospital-acquired complications is an intervention to reduce unnecessary catheters. It was used and controlled infection, in general, has succeeded in reducing catheter use. Another important thing to do is timely removal of the catheter.⁸

Given that catheter removal has resulted in a CAUTI decrease of more than 50 percent, a reduction in catheter days is required. Education to improve catheter insertion and maintain awareness and adequate care of the catheter in place with regular assessments of catheter need, safety, hand cleanliness, and barrier prevention for catheter patients should all be included in CAUTI prevention programs. Interventions aimed at boosting the appropriate use of urine tests and antibiotics to treat UTIs can also significantly impact the pace at which symptomatic CAUTI is reported to be reduced.⁹

UTI is one of the most common hospital infections, and urinary catheter use is linked to 75% of UTIs. Bacteriuria almost always precedes catheter-related urinary tract infections (CAUTI). Bacteriuria can be asymptomatic and

Table 1. Characteristics of Catheter Insertion UTI Subjects Based on the Age.

Age	Frequency	Percentage (%)
1-9	2	20
10-19	0	0
20-29	4	40
30-39	1	10
40-49	0	0
50-59	1	10
> 60	2	20
Total	10	100

Table 2. Incidence of UTI in Catheterized and Non-catheterized Patients.

UTI incident	Yes	%	No	%	Total	%	p
Catheter installed	10	10.2	80	81.6	90	91.8	0.001
No Catheter Installed	8	8.2	0	0	8	8.2	
Total	18		80		98		

have a long incubation period. In many situations, bacteriuria causes urgency, dysuria, stomach discomfort, and fever, which can be local or systemic. Sepsis, septic shock, and multiorgan failure can all be caused by bacteria in the urinary tract. Long-term catheter use can cause neurogenic bladder dysfunction. Damage to the brain, spinal cord, or other nerves can result from this illness. Stroke, spinal cord damage, and multiple sclerosis are some diseases that might occur.¹⁰

In the United Kingdom, urinary tract infection (UTI) is one of the most frequent infections. Catheter use is linked to an estimated 50% of hospital infections, resulting in increased morbidity, mortality, and healthcare costs. CAUTI can be avoided by limiting catheter use that is not essential, reducing catheter length, and improving catheter insertion methods. Health care workers can play a crucial role in reducing CAUTI with interventions to improve optimal patient care.¹¹

CONCLUSION

There is a significant association between catheter placement and the incidence of urinary tract infections in hospitalized patients in Condong Catur Hospital. Also, further research with different study designs and larger samples needs to be done to identify the factors that influence the relationship between catheter placement and the incidence of urinary tract infections.

AUTHOR CONTRIBUTION

All authors contributed to this study's conception and design (Kusbaryanto, Diana), data analysis and interpretation (Kusbaryanto, Agus Wibowo), article drafting, critical revision of the article, final approval of the article, and data collection (Kusbaryanto, Diana).

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CONFLICT OF INTEREST

There is no conflict of interest for this manuscript.

ETHICAL CONSIDERATION

This research was approved by the Health Research Ethics Committee of the Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta. Letter of exemption Ref. No. 511/EC.KEPK/UMY/2020.

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