

Characteristic of Urinary Tract Infection with Catheterized in Medan, Indonesia

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Abstract: Urinary tract infection is an infection characterized by bacterial colonization in the urine. Urinary tract infections by various types of bacteria. The purpose of this study has not been found to be related to urinary tract infections in patients who are attached to a catheter. Descriptive research design. The study was conducted from July to November 2018. The sample of this study was 36 patients with urinary tract infections in patients with catheters in the Medan city hospital. The study used an observation sheet. The results of the study involving microscopic habitats were gram-negative bacillus 66.67%, the microorganism found was *Escherichia coli* at 36.11%. Causes of urinary tract infections Rather than gram-negative bacilli, *Escherichia coli*. Need monitoring and protection assistance from health care professionals.

Keywords: Urinary Tract Infection, Etiology, Catheterized

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I. Introduction

Urinary Tract Infection (UTI) is an infection of the urinary tract microorganisms accompanied by bacterial colonization in the urine (bacteriuria). Urinary tract infection is a disease caused by the presence of pathogenic microorganisms in transient urine with or without signs and symptoms^[1]. Bacteria are the main indicator of urinary tract infections. If bacteria are found, there are 100,000 colony forming units (CFU / ml) or more than urine culture. Patients experiencing UTIs are sometimes accompanied by clinical signs and symptoms (asymptomatic) or can be accompanied by clinical signs and symptoms (symptomatic)^[2]. Types of microorganisms that often cause urinary tract infections are *Candida* species 30,8 %, *Escherichia coli* 19,2%, *Enterococcus faecalis* 19,2%, *Klebsiella pneumonia* 11,5%, *Pseudomonas aeruginosa* 7,7%, *Acinetobacter baumannii* 7,7%, dan *Citrobacter freundii* 3,8%^[3].

Asymptomatic and symptomatic symptoms can spread bacteriuria to the urinary tract in the hematogenous and lymphatic bladder. Bacteriuria can develop into bacteremia, sepsis, and death^[4]. Bacteriuria due to UTI significantly increased mortality 1.99 times^[1]. As many as 19% of deaths from 1458 patients due to bacteriuria were treated with a urine catheter^[5]. UTI can occur asymptomatic and symptomatic. The results of research conducted by^[6] that UTIs are symptomatic as much as 70% but in pregnant women. The results of another study that as many as 39% of 29 patients were obtained from urine positive culture with symptomatic bacteriuria^[7]. To determine symptomatic UTI, a urine culture test is needed^[8].

II. Method

This research is an observation with a descriptive approach. The sample consisted of 36 patients who had a urinary tract infection in one of the Medan city hospitals. The study was conducted from July to November 2018. Determination of criteria for urinary tract infections based on the provisions of the Center Disease Control. On the first day, the patient was fitted with a catheter in accordance with the indications and then an observation was made for signs of urinary tract infection. Observations are made for a maximum of 7 days. Patients with signs of fever > 38 ° C, costovertebral pain, suprapubic pain. Taking urine samples is done by microbiology officers and urine culture is carried out. Urinary tract infections with culture results are bacteria 5105 CFU / ml or there are more than two bacteria identified. The researcher asked the respondent's approval with informed consent. This study was approved by the Ethics Committee of Nursing Faculty, Universitas Sumatera Utara with 1503 / VI / SP / 2018.

III. Result And Discussions

The causes of urinary tract infections in patients with catheters vary. The types of bacteria that cause infection are *Enterobacter aerogenes* 1 (2.28%), *Pseudomonas aeruginosa* 5 (13.88%), *epidermal Staphylococcus* 3 (8.33%), *Klebsiella pneumonia* 1 (2.78%), *Enterococcus* (2, 78%), *Enterococcus faecalis* 2

(5.56%), *Escherichia coli* 13 (36.11), *Staphylococcus aureus* 19.44%, *Proteus mirabilis* 1 (2.78%), *Acinetobacter baumannii* 2 (5.56%). The most common bacterium is *Escherichia coli*. The types of organisms that cause urinary tract infections can be seen in the graph below.

Chart 1. Frequency Distribution of Organism

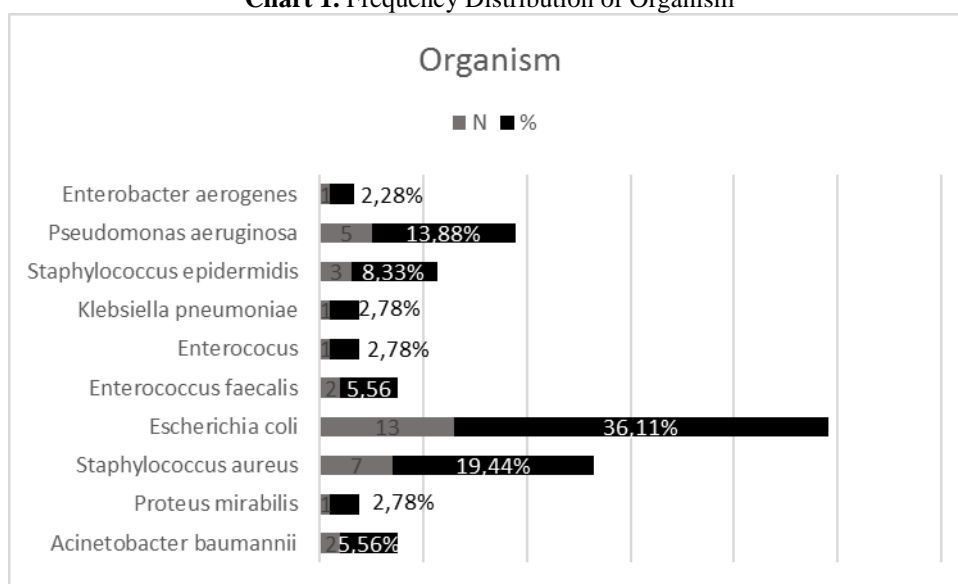
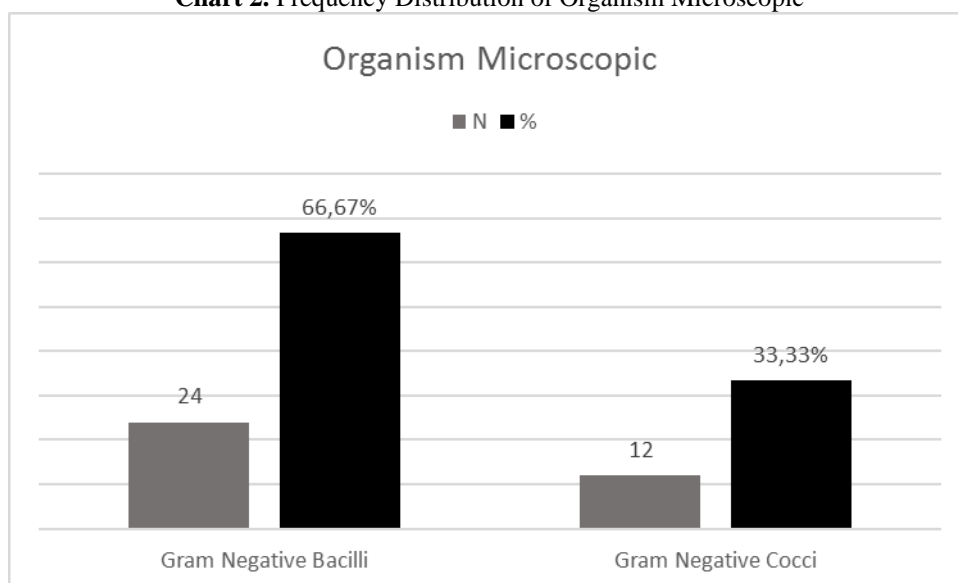


Chart 2. Frequency Distribution of Organism Microscopic



The most microscopic bacterial causes of urinary tract infections were gram-negative bacilli 24 (66.67%) and 12 gram-positive coccus (33.33%).

Characteristics of patients with urinary tract infections in patients who have catheters attached. It can be seen in the table below.

Table 1. Characteristic of Urinary Tract Infection Patients

Characteristic	n (%)
Gender	
Male	24 (66.7)
Female	12 (33.3)
Age	
<60 Years	18 (50.00)
>60 Years	18 (50.00)
Diabetes mellitus (DM)	
Type II DM	32 (88.9)
No DM	4 (11.1)
Immobilization	
Yes	35 (97.2)
No	1 (2.8)
Duration of catheterization	
<5 days, ±Mean	1 (2.8) ±3.42
>5 days, ±Mean	35 (97.2) ±6.42
Drainage System	
Opened	1 (1.28)
Closed	35 (97.2)
Indication catheter used	
Medical	28 (77.8)
Surgical	8 (22.2)
Catheter care	
Yes	5 (13.9)
No	31 (86.1)

Based on table 1. Characteristics of patients with urinary tract infections in patients who are attached to a catheter that the majority of patients are male as many as 24 people (66.7%), the proportion of age has the same number. The majority of patients suffered from diabetes mellitus as many as 32 people (88.9%), patients had immobilization as many as 35 people (97.2%), the duration of catheter placement > 5 days as many as 35 people (97.2), closed drainage system 35 (97.2%), catheter use for indications of 28 people (77.8%), catheter care was not carried out 31 (86.1%).

The results of the study found that the bacterial morphology of the majority of gram-negative bacilli germs was 24 (66.67%). The most common cause of urinary tract infections is bacteria with gram-negative bacilli^[9]. Bacteria is one of the causes of urinary tract infections. The presence of urine bacteria in the bladder indicates bacterial colonization. Urine bacteria were found 44% after the first 72 hours of indwelling urine catheter placement^[10]. Different results from the study^[11] that bacteria occur after 7 days of indwelling urine catheter placement in patients in the hospital.

Installation of a urine catheter is done by sterile technique. A urinary catheter is a device used to excrete urine in the form of a pipe that is inserted into the bladder through the ureter. A urine catheter is used if urine cannot come out spontaneously. Urine catheter installation can save lives. Conversely, a urine catheter is a foreign object and produces a reaction in the urethral mucosa and secretion of urethral secretions. These secretions can block the periurethral duct and can irritate the bladder mucosa. Irritated mucosa will become an artificial channel for the entry of bacteria into the bladder through the urethra^[2].

Under normal conditions, the bladder carries out a sterilization defense mechanism against incoming bacteria. Defense mechanisms through the urine flow, patency of the urotropical joints, urethral barrier, antibody enzymes and bacteria and antibacterial characteristics of urine. This causes sterile bladder from bacteria for 2 days of catheter installation. The decreased natural resistance of the inferior urinary tract due to catheter placement can cause bacterial adhesions to the mucous bladder^[1].

The results of the study found that the most common microorganisms causing urinary tract infections are *Escherichia coli*. *Escherichia coli* is a Gram-negative bacterium in the form of a short stem that has a length of about 2 µm, a diameter of 0.7 µm, a width of 0.4-0.7 µm and a facultative anaerobe. *E. coli* forms colonies that are round, convex, and smooth with real edges^[12]. In general, the cause of urinary tract infection is *Escherichia coli* then followed by *Proteus spp.*, *Staphylococcus*, *Klebsiella spp.* and *Enterobacteriaceae*. About 80% is *Escherichia coli* and the remaining 20% is another type of gram negative^[9].

Normal kidneys usually have resistance to *Escherichia coli* infection because it is rarely a hematogenous infection of *Escherichia coli*. The route of entry of bacteria into the urinary tract through fecal contamination in the urethral meatus. Microorganisms in the feces that rise from the perineum to the urethra reach the bladder and attach to the mucous surface^[12]. The next process, microorganisms colonize the bladder epithelium. This

mechanism is carried out by microorganisms to avoid flushing through voiding, host defense mechanisms and inflammatory triggers^[1]. Other routes enter through the bloodstream and lymphatic system^[2].

Patients with catheters, microorganisms can enter the urinary tract through three main pathways, namely from the urethra into the bladder during catheterization, through a pathway in the thin urethral fluid that is outside the catheter when the catheter and mucous membrane come into contact. The trajectory can also be through migration into the bladder along the internal lumen of the contaminated catheter^[13]. Migration of microorganisms from catheters to the urinary veins can occur within 1-3 days^[11].

Catheter installation can reduce most of the natural resistance of the inferior urinary tract by blocking the periurethral duct, irritating the bladder mucosa and creating an artificial pathway for the entry of germs into the bladder^[1]. There are three main places for the entry of bacteria through a catheter, namely the urethral meatus, the connection to the catheter holding hose and the drainage site of the reservoir bag. These three places must be maintained by health workers^[9].

IV. Conclusion

The most common causes of urinary tract infections are from bacteria type with gram-negative bacilli, such as *Escherichia coli* and *Pseudomonas aeruginosa*. Gram-positive bacteria have also become the second-highest cause, *Staphylococcus aureus*. The need for prevention of the spread of germs through the prevention of infection control by maintaining self-hygiene through hand hygiene.

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