Incidence and Risk Factors of Urinary Tract Infection Associated with Indwelling J Ureteral Stent

Thesis

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LIST OF ABBREVIATIONS

AIDS	Acquired immunodeficiency syndrome ocorticotropic hormone
BEA	Bile Esculin Agar
CDC	Centers for Disease Control and prevention
Cipro	Ciprofloxacin
CLED	Cysteine Lactose Electrolyte Deficient agar
CO	CHRO Magar Orientation
CRI	Chronic renal impairment
DM	Diabetes Mellitus
DN	Diabetic Nephropathy
ESRD	End Stage Renal Disease
ESWL	Extracorporeal Shock Wave Lithotripsy
ELIZA	Enzyme linked immunosorbent assay
EC	Squamous epithelial cells
FDA	Food and Drug Administration
HBD-1	Human Beta Defensin-1

H.S.	Highly significant

MAC	MacConkey agar
NCCLS	National Committee for Clinical Laboratory Standards
NAAT	Nucleic acid amplification test
PCR	Polymerase chain reaction
RBCs	Red blood cells
SGG	Sialosyl Galactoside Globoside
TMP-SMX	Trimethoprim – Sulfamethxazole
UTI	urinary tract infection
WBCs	White blood cells

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Introduction

Urinary tract infection (UTI) is a cause of considerable morbidity in patients with indwelling ureteral stents (**Saltzman , 2008**). The majority of episodes of UTI resolve without antimicrobial treatment, just as do those associated with indwelling urethral catheters **(Bregg et al., 2007)**. Occasionally, antimicrobial treatment is required, especially when the infection is complicated by catheter-associated sepsis. Empirical treatment of these symptomatic patients requires a working knowledge of the local prevailing bacteria associated with the usage of the devices and of their antimicrobial susceptibility pattern. This would avoid the indiscriminate use of antibiotics, with its attendant emergence of multi-resistant organisms **(Ritcher et al ., 2008).**

Moreover, the identification of subjects at high risk of device-associated infections would permit the formulation of an appropriate policy for antimicrobial prophylaxis prior to removal of the stents. It is known that between 5% and 25% of patients with indwelling urethral catheters develop asymptomatic UTI, while only about 3% to 5% develop symptomatic UTI necessitating antimicrobial therapy or removal of the catheters. Very little information is available in

the literature regarding bacteriuria following J stent insertion **(Kehinde et al ., 2007).**

Even when this information is available, very little is known about the different microbial agents associated with UTI following stent insertion **(Tambyah et al ., 2008).**The availability of information on the potential pathogens is important for developing strategies to minimize or prevent stent associated bacteriuria **(Meares , 2005).**

The indwelling J ureteral stent is a useful addition to the urological field. The placement of self-retaining double-J stents has become accepted in a wide range of applications, such as relief of obstruction, prevention of stricture formation, treatment of urinary tract leaks, and facilitation of fragment clearance after extracorporeal shock wave lithotripsy **(Saint et al ., 2004).**

The advent of extracorporeal shock wave lithotripsy (ESWL) and more rapid increase in endourologic techniques have dramatically increased the indications for indwelling J ureteral stents **(Pratt , 2007).**

Aim of the work:

The aim of this study is to detect the incidence of urinary tract infection and bacterial colonization on J ureteral stents, and also to determine the risk factors predisposing to UTI associated with J ureteral stents in patients who inserted it in the National Institute of Urology and Nephrology.

Nosocomial urinary tract infection

Patient care is provided in facilities which range from highly equipped clinics and technologically advanced university hospitals to front-line units with only basic facilities. Despite progress in public health and hospital care, infections continue to develop in hospitalized patients, and may also affect hospital staff **(Ducel , 2006).**

Nosocomial infections, also called “hospital-acquired infections”, are infections acquired during hospital care which are not present or incubating at admission **(Benenson, 2006).** Infections occurring more than 48 hours after admission are usually considered nosocomial.

A nosocomial infection can be defined as: An infection acquired in hospital by a patient who was admitted for a reason other than that infection. An infection occurring in a patient in a hospital or other health care facility in whom the infection was not present at the time of admission. This includes infections acquired in the hospital but appearing after discharge, and also occupational infections among staff of the facility **(Kirkland et al ., 2007).**

Hospital acquired infections are the most common type of adverse event in healthcare. unquestionably a critical

component of patient safety. Nosocomial infections are also classified according to their frequencies, associated mortality rates, costs, or relative changes in frequency over recent years. For instance: **(Burke, 2008).**

- urinary tract infections (UTI) are the most frequent (accounting for about 35 percent of nosocomial infection) but carry the lowest mortality .

The urinary tract, from the kidneys to the urethral meatus, is normally sterile and resistant to bacterial colonization despite frequent contamination of the distal urethra with colonic bacteria. Mechanisms that maintain the tract's sterility include urine acidity, emptying of the bladder at micturition, ureterovesical and urethral sphincters, and various immunologic and mucosal barriers. About 95% of nosocomial UTI occur when bacteria ascend the urethra to the bladder and, in the case of acute uncomplicated pyelonephritis, ascend the ureter to the kidney. The remainder of UTI are hematogenous. Systemic infection can result from UTI, particularly in the elderly. About 6.5% of cases of hospital-acquired bacteremia are attributable to UTI (**Bratzler et al ., 2008).**

Nosocomial urinary tract infection associated with J ureteral stent

Definition :

Definitions to identify nosocomial infections have been developed for specific infection sites as urinary tract. These definitions are derived from the Centers for Diseases Control and Prevention (**CDC)** publications in USA surveillance of nosocomial infections **(Sun et al ., 2008).**

Urinary Tract Infection according to (CDC) must meet at least one of the following criteria:

- ***Criterion 1***: Patient has at least one of the following signs or symptoms with no other recognized cause: fever (>38 ^{o}C), urgency, frequency, dysuria or suprapubic tenderness and patient has a positive urine culture that is >10^{5} microorganisms per cm^{3}.

Criterion 2: Patient has at least two of the following signs or symptoms with no other recognized cause: fever (>38^{o}C),

urgency, frequency, dysuria, or suprapubic tenderness and at least one of the following:

a) Pyuria (urine specimen with >10 WBC /mm^3).
b) Organisms seen on gram stain of unspun urine.
c) Physician diagnosis of a UTI.
d) Physician institutes appropriate therapy for a UTI. **(World Health Organization, 2007)**

Risk factors:

1-***The microbial agent:-***

The patient's indwelling J ureteral stent is exposed to a variety of microorganisms during hospitalization. Contact between the patient and a microorganism does not by itself necessarily result in the development of clinical disease. Other factors influence the nature and frequency of nosocomial infections. The likelihood of exposure to infection depends partly on the characteristics of the microorganisms, including resistance to antimicrobial agents, intrinsic virulence, and amount (inoculum) of infective material **(Savey et al ., 2008).**

Urinary Infections associated with J ureteral stent may be caused by a microorganism acquired from another person in the hospital (cross-infection) or may be caused by the patient's