



STUDY OF INFECTION RATE DUE TO FOLLEYS CATHETER INSERTION IN ED, MEDICAL WARD AND ICU IN A TERTIARY CARE HOSPITAL

Medicine

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ABSTRACT

Introduction: Indwelling urinary tract catheterization (IUTC) is a very common intervention frequently required in hospitalized patients. It is estimated that 10-12% of hospital patients and four per cent of patients in the community have urinary catheters in situ at any given time. Nosocomial UTIs (urinary tract infections) develop in five per cent of catheterized patients per day in the US, with associated bacteremia in four per cent and as many as 80% are a consequence of urinary catheters. Research has shown that just reminding physicians to remove unnecessary urinary catheters can significantly reduce the duration of urinary catheterization and the catheter associated urinary tract infection (CAUTI) rate in a hospital.

Aims: To Study of Infection Rate due to Foleys Catheter Insertion in ED, Medical Ward and ICU.

Methods: This was a single centre observational, retrospective cohort study from tertiary care hospital in Kolkata, India from May 2021 – JANUARY – 2022 were included no Past History of UTI, No Past History of renal Infection and No Previous Indwelling Foleys Catheter.

Result: In Critical Care (ICCU) Group, 166 (21.3%) patients had CAUTI. In Emergency Group, 297 (42.9%) patients had CAUTI. In Medical Ward Group, 332 (30.1%) patients had CAUTI. Association of CAUTI with Group was statistically significant ($p < 0.0001$). In Critical Care (ICCU) Group, 166 (21.3%) patients had Culture. In Emergency Group, 297 (42.9%) patients had Culture. In Medical Ward Group, 332 (30.1%) patients had Culture. Association of Culture with Group was statistically significant ($p < 0.0001$).

Conclusion: The rate of CAUTI in emergency dept is higher than rate of CAUTI in other medical ward of ICCUs. and we also see that rate of CAUTI in ICCU is much lesser than rate of CAUTI in other medical ward or emergency

KEYWORDS

Foleys Catheter, Nosocomial, urinary tract infections, catheter associated urinary tract infection and Indwelling urinary tract catheterization.

INTRODUCTION

The placement of a urinary catheter is a common clinical intervention performed to allow for external urinary drainage. Urinary catheterization may be performed to relieve bladder outlet obstruction, such as benign prostatic hyperplasia or strictures in the bladder neck or urethra, or adequately drain a hypotonic neurogenic bladder. Routine urinary drainage in perioperative periods or intensive care settings allows for bladder drainage and urinary evaluation and monitoring. Other times, urinary catheterization may be performed to obtain sterile urine for culture, irrigate clots or blood from the bladder, instill therapeutic agents into the bladder, and evaluate the bladder fluoroscopic or urodynamic studies. While most patients tolerate urinary catheterization with minimal discomfort or complications, some patients experience difficult or traumatic urinary catheterization. These patients experience unnecessary discomfort and may risk injury to the urethra, prostate, or bladder. Improper techniques for addressing difficult urinary catheterization can lead to serious complications and prolonged hospital stays.

Indwelling urinary tract catheterization (IUTC) is a very common intervention frequently required in hospitalized patients. It is estimated that 10-12% of hospital patients and four per cent of patients in the community have urinary catheters in situ at any given time.¹ Nosocomial UTIs (urinary tract infections) develop in five per cent of catheterized patients per day in the US, with associated bacteremia in four per cent and as many as 80% are a consequence of urinary catheters. Fever, pyelonephritis, urinary tract stones and chronic renal inflammation are some of the other complications of this procedure. IUTC also prolongs hospital stay and increases the cost of healthcare. Unfortunately, inappropriate and excessive catheter use still persists. Research has shown that just reminding physicians to remove unnecessary urinary catheters can significantly reduce the duration of urinary catheterization and the catheter associated urinary tract infection (CAUTI) rate in a hospital.²

One of the important reasons for inappropriate catheterization could be the lack of widely accepted guidelines regarding the indications for IUTC placement in medical patients. This makes the distinction between appropriate and inappropriate catheterization obscure. There are a limited number of studies, which have determined the appropriateness of IUTC use in medical patients admitted to hospitals. The reasons for inappropriate IUTC placement have not been adequately explored in this group. Similarly, the appropriateness of

catheterization in the emergency setting and its association with the development of BCFC and CAUTI has not been investigated in previous studies.

Catheter-associated urinary tract infection (CA-UTI) is the most common nosocomial infection, accounting for up to 10–70% of all nosocomial infections especially in intensive care unit (ICU) setting.³ Approximately 3–7% of catheterized patients acquire a new infectious organism per day, and the prevalence of bacteriuria approaches 100% by 30 days after catheterization. Symptomatic CA-UTI develops in 24% of patients with bacteriuria, and bacteremia from CA-UTI develops in 3.6% of patients.⁴ These complications of indwelling urinary catheters (IUC) are associated with considerable morbidity, prolonged hospitalization, and increased health care expenditure.⁵ In one study, CA-UTI patients incurred a mean of \$589 (median \$356) of extra costs per patient for diagnostic tests and medication. Hence, strategies to prevent CA-UTI have been emphasized in many countries and hospitals.

The current guideline for prevention of CA-UTI recommends to minimize duration for catheterization and maintain sterile technique for insertion and keep closed drainage system.⁵ Accordingly, each physician should insert catheters only for appropriate indications and leave in place only as long as needed. Implement records of indication for insertion, date of catheter insertion, and daily presence of a catheter maintenance also prevent CA-UTI. Furthermore, a systematic review found that the CA-UTI rate was reduced by 52% with use of a reminder or stop order which prompt IUC removal.⁶

AIM AND OBJECTIVES

AIM

To Study of Infection Rate due to Foleys Catheter Insertion in ED, Medical Ward and ICU.

OBJECTIVES

To study the overall Infection Rate due to Foleys Catheter Insertion.
To compare the rate of culture positivity in ED, Medical Ward and ICU.
To compare the rate of infection in ED, Medical Ward and ICU.

METHODS

This was a single centre observational, retrospective cohort study from tertiary care hospital in Kolkata, India.

Duration Of Study: May 2021 – JANUARY – 2022

All Patients were presenting with acute urinary retention or pre-operative patients or drowsy patients or intubated patients and urinary incontinence.

Inclusion Criteria

- No Past History of UTI.
- No Past History of renal Infection
- No Previous Indwelling Foleys Catheter

Exclusion Criteria

- Past History of UTI.
- Past History of renal Infection
- Previous Indwelling Foleys Catheter
- Immunocompromised

RESULT AND DISCUSSION

This was a single centre observational, retrospective cohort study from tertiary care hospital in Kolkata, India from May 2021 – JANUARY – 2022 were all Patients were presenting with acute urinary retention or pre-operative patients or drowsy patients or intubated patients and urinary incontinence. The present study was conclude 260 participants were taken in 2576 patients EM prevalence were included no Past History of UTI, No Past History of renal Infection and No Previous Indwelling Foleys Catheter in this study.

Mullin KM et al ⁷ (2017) found that implement and describe a multifaceted intervention to decrease CAUTIs in our ICUs with an emphasis on indications for obtaining a urine culture. Leaders from all critical care disciplines agreed to align routine culturing practice with American College of Critical Care Medicine (ACCCM) and Infectious Disease Society of America (IDSA) guidelines for evaluating a fever in a critically ill patient.

It was found that, most of the patients had positive fever report in Medical Ward Group, [882 (80.0%)], in Emergency Group, [409 (59.1%)] and in Critical Care (ICCU) group, [451 (57.7%)]. (p<0.0001).

Present study showed that, higher number of patients had Chills in Medical Ward Group [661 (59.9%)], in Critical Care (ICCU) Group, [308 (39.4%)] and in Emergency Group, [252 (36.4%)]. This was also statistically significant (p<.00001).

Sampathkumar P et al ⁸ (2017) showed that patients in the ICU are at higher risk for catheter-associated urinary tract infection (CAUTI) due to more frequent use of catheters and lower threshold for obtaining urine cultures. AUTI reduction is possible in the ICU through a combination of reduced catheter usage, improved catheter care and stewardship of urine cultures.

Mullin KM et al ⁷ (2017) found that implement and describe a multifaceted intervention to decrease CAUTIs in our ICUs with an emphasis on indications for obtaining a urine culture. Device utilization ratios (DURs), rates of CAUTI, HABS, and urine cultures were calculated and compared. The CAUTI rate decreased from 3.0 per 1,000 catheter days in 2013 to 1.9 in 2014. The DUR was 0.7 in 2013 and 0.68 in 2014. The HABS rates per 1,000 patient days decreased from 2.8 in 2013 to 2.4 in 2014.

It was found that, lower number of patients had positive Cloudy Urine report in Emergency Group, [409 (59.1%)], in Medical Ward Group, [661 (59.9%)] and in Critical Care (ICCU) Group, [473 (60.6%)] but this was not statistically significant (p=0.8496).

Our study showed that, majority of patients had positive Blood in Urine report in Emergency Group, [283 (40.9%)], in Medical Ward Group, [442 (40.1%)] and in Critical Care (ICCU) Group, [165 (21.1%)]. (p<0.0001).

Chia HM et al ⁹ (2020) observed that induction of labor (IoL) is an increasingly common obstetric procedure. Primary outcomes were insertion duration, pain score [11-point Visual Numerical Rating Scale (VNRS)], and failure. All primary outcomes were recorded after the first insertion. Data from 86 participants were analysed. Insertion duration (with standard deviation) was 2.72±1.85 vs. 2.25±0.55min p=0.12, pain score (VNRS) median [interquartile range] 3.5 [2–5] vs. 3

[2–5] p=0.72 and failure 2/42 (5%) vs. 0/44 (0%) p=0.24 for digital vs speculum respectively.

In our study, lowest number of patients had positive report in ABD Pain in Medical Ward Group, [221 (20.0%)], In Emergency Group, 252 (36.4%) and In Critical Care (ICCU) Group, 330 (42.3%). which was statistically significant (p<0.0001).

Data of our study showed that, most of the patients had Pus cells > 8 in Emergency Group, [566 (81.8%)], in Medical Ward Group, [440 (39.9%)] and in Critical Care (ICCU) Group, [165 (21.1%)]. (p<0.0001).

Leuck AM et al ¹⁰ (2012) showed that foley catheters cause a variety of harms, including infection, pain and trauma. Although symptomatic urinary tract infection and asymptomatic bacteriuria are frequently discussed, genitourinary trauma receives comparatively little attention. Data were analyzed as the number of event days per 100 Foley catheter days. During 6,513 surveyed Foley catheter days, urinalysis/urine culture was done on 407 (6.3%) days.

Sampathkumar P et al ⁸ (2017) showed that patients in the ICU are at higher risk for catheter-associated urinary tract infection (CAUTI) due to more frequent use of catheters and lower threshold for obtaining urine cultures. AUTI reduction is possible in the ICU through a combination of reduced catheter usage, improved catheter care and stewardship of urine cultures.

In Their study only 12.7% of urine samples remained sterile, while in all other samples one or more etiological agents were isolated. Similarly, **Betran et al, and Ramić ¹¹** in their studies on urine samples from patients with spinal cord injury found high percentages of positive urine culture (86.5% and 94 % respectively). Polymicrobial bacteriuria is the rule in patients with indwelling catheters, and occurred in 44% of culture-positive urine specimens.

In our study Culture was significantly more observed high in patients with Emergency Group [297 (42.9%)] compared to Medical Ward Group [332 (30.1%)] and Critical Care (ICCU) Group [166 (21.3%)]. (p<0.0001).

Sultan I et al ¹² (2018) aimed of this study was to evaluate the impact of medical student placement of Foley catheters on rates of postoperative catheter-associated urinary tract infection (CAUTI). A multivariable model risk-adjusting for patient and operative variables associated with CAUTI in univariate analysis (exploratory p < 0.20) evaluated the independent effect of medical student placement of Foley catheters on the odds of CAUTI. After risk-adjustment, patients with Foleys placed by medical students were at a more than 4-fold increased risk of CAUTI (odds ratio [OR] 4.09, p = 0.02) compared with patients with catheters placed by nurses. Patients with catheters placed by residents did not have an increased risk-adjusted odds of CAUTI (OR 2.16, p = 0.15). Other significant predictors of postoperative CAUTI included female sex (OR 2.61, p = 0.01), partial/total functional dependence (OR 4.81, p = 0.008), blood transfusion (OR 34.7, p = 0.02), and increased length of Foley stay (OR 1.06, p < 0.001). More intense supervision of medical students during urinary catheter insertion in the operating room and improved education regarding sterile technique may be important factors in reducing rates of postoperative CAUTI in academic institutions.

Sampathkumar P et al ⁸ (2017) showed that patients in the ICU are at higher risk for catheter-associated urinary tract infection (CAUTI) due to more frequent use of catheters and lower threshold for obtaining urine cultures. This review provides a summary of CAUTI reduction strategies that are specific to the intensive care setting. The surveillance definition for CAUTI is imprecise and measures catheter-associated bacteriuria rather than true infection. Alternatives have been proposed, but CAUTI rates measured by this definition are currently required to be reported to the Centers for Medicare and Medicaid Services and high CAUTI rates can result in financial penalties. Although CAUTI may not directly result in significant patient harm, it has several indirect patient safety implications and CAUTI reduction has several benefits. Various bundles have been successful at reducing CAUTI both in individual institutions and on larger scales such as healthcare networks and entire states.

Mullin KM et al ⁷ (2017) found that implement and describe a

multifaceted intervention to decrease CAUTIs in their ICUs with an emphasis on indications for obtaining a urine culture. Surveillance data for CAUTI and hospital-acquired bloodstream infection (HABSI) were recorded prospectively according to National Healthcare Safety Network (NHSN) protocols. Device utilization ratios (DURs), rates of CAUTI, HABSI, and urine cultures were calculated and compared. The CAUTI rate decreased from 3.0 per 1,000 catheter days in 2013 to 1.9 in 2014. The DUR was 0.7 in 2013 and 0.68 in 2014. Effectively reducing ICU CAUTI rates requires a multifaceted and collaborative approach; stewardship of culturing was a key and safe component of their successful reduction efforts.

CA-UTI is the most common adverse event associated with indwelling urinary catheter use, although only a small proportion of acute care facility residents with CA-ASB develop symptomatic infection by **Tambyah PA (2000)**¹³. The presence of any health care acquired infection was independently associated with the number of invasive devices, including indwelling urethral catheters, but the proportion of patients with urinary infections and a catheter was not reported. The recent US point prevalence survey reported urinary tract infection was the fourth most common infection, accounting for 12.9% of health care infections; 67.7% of these patients had a urinary catheter. A comparative British trial evaluating different types of catheters reported rates of CA-UTI of 10.6%-12.6% of catheterized patients, although only 3.2%-5.0% of infections were microbiologically confirmed by **Pickard R (2012)**¹⁴. Some of this decrease is attributable to more intense prevention efforts, but modification of definitions to exclude asymptomatic bacteriuria has also contributed.

We observed that higher number of patients had CAUTI in Emergency Group [297 (42.9%)] compared to others in Medical Ward Group [332 (30.1%)] and Critical Care (ICCU) Group [166 (21.3%)] but this was statistically significant ($p < 0.0001$).

Gibson KS et al¹⁵ (2013) found that to assess the effectiveness of inner thigh "Taping" compared with "Traction" using a weighted bag when an intracervical Foley catheter is used for cervical ripening. Similar regarding maternal race, age, parity, gestational age, and induction indication. Time to delivery was not significantly different (mean $\pm$ standard deviation: 19.8 ± 8.5 vs 18.8 ± 8.0 hours; $P = .39$). Time to catheter expulsion was shorter in the Traction Group (median, 2.6; range, 0.2–10.8 vs median, 1.5; range, 0.1–6.3 hours; $P < .001$).

We found that, higher number of patients were age in Critical Care (ICCU) Group compared to others in Medical Ward Group [49.6537 ± 15.9161] and in Emergency Group [38.5462 ± 14.5060]. This was statistically significant with Three Group of patients ($p < 0.0001$).

CONCLUSION

In our study Culture was significantly more observed in patients with Emergency Group compared to Medical Ward Group and Critical Care (ICCU) Group.

We observed that higher number of patients had CAUTI in Emergency Group compared to Medical Ward Group and Critical Care (ICCU) Group but this was statistically significant.

Thus from this study we can conclude that the rate of CAUTI in emergency dept is higher than rate of CAUTI in other medical ward of ICCUs. and we also see that rate of CAUTI in ICCU is much lesser than rate of CAUTI in other medical ward or emergency.

Table: Association Between CAUTI : Group

		Group				Chi-square	p-value
		In Critical Care (ICCU)	In Emergency	In Medical Ward	TOTAL		
CAUTI	Negative	615	395	771	1781	81.2306	<0.0001
	Row %	34.5	22.2	43.3	100.0		
	Col %	78.7	57.1	69.9	69.1		
	Positive	166	297	332	795		
	Row %	20.9	37.4	41.8	100.0		
	Col %	21.3	42.9	30.1	30.9		
	TOTAL	781	692	1103	2576		
	Row %	30.3	26.9	42.8	100.0		
	Col %	100.0	100.0	100.0	100.0		

Culture	Negative	615	395	771	1781	81.2306	<0.0001
Row %	34.5	22.2	43.3	100.0			
Col %	78.7	57.1	69.9	69.1			
Positive	166	297	332	795			
Row %	20.9	37.4	41.8	100.0			
Col %	21.3	42.9	30.1	30.9			
TOTAL	781	692	1103	2576			
Row %	30.3	26.9	42.8	100.0			
Col %	100.0	100.0	100.0	100.0			

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