

Original article:

Study of parameters of urinary tract infection and catheter tip contamination

¹Dr Tejshwini Patil , ²Dr R N Patil , ³Dr Vedprakash

¹Department of OBGY, Gadag Institute of Medical Sciences, Gadag , Karnataka

²Department of Surgery, Gadag Institute of Medical Sciences, Gadag , Karnataka

³Department of Surgery, Rural Medical College, PIMS (DU) , Loni

Corresponding author*

Abstract:

Introduction: Urinary tract catheterization 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.

Materials and Method: All patients admitted to the surgery ward with sample size 120 patients were included. 120 consecutive patients of either sex, admitted to the surgical ward either directly or via emergency with foleys catheter, were included in this study. A baseline urinary culture was obtained for all included patients in order to exclude those with preexisting urinary tract infection. These patients were followed up 48 hours after catheter was removed in order to diagnose a catheter induced urinary tract infection.

Results: Among the patients in the surgical ward, the following was the distribution of patients identified with the below-mentioned organisms in the urine culture report: candida species in 3.17% (2/63) patients, E. coli in 30.16% (19/63) patients, enterococcus and Pseudomonas in 6.35% (4/63) patients, Klebsiella in 15.87% (10/63) patients, while the urine culture report was found to be sterile in 38.10% (24/63) patients. Out of the patients in the emergency ward that underwent urinary catheterization, the duration of catheterization was <3 days in 22.81% (13/57) patients, as compared to the remaining 77.19% (44/57) patients wherein the duration of catheterization was >3 days.

Conclusion: From the results of our study we conclude the necessity for healthcare professionals to be alerted towards the need for careful evaluation of every patient and ensuring a mandate for catheterization prior to initiating the procedure, particularly in females and inpatients in the emergency wards.

Introduction:

Urinary tract catheterization 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 Bacterial colonization on foleys catheter can precede the emergence of bacteriurea and has a significantly higher rate of culture positive as compared to urine culture. This is especially true in the initial two to three days of catheterization. Hence, it is important to consider this parameter instead of urine culture in order to obtain a more precise picture of asymptomatic infections of urinary tract in catheterized patients. In western

countries there are a number of proposed study with the incidence of infection post catheterization in surgical ward and emergency ward.²

Nosocomial UTIs (urinary tract infections) develop in five percent of catheterized patients per day in United States of America, with associated bacteremia in 4%² and as many as 80% are a consequence of urinary catheters³ fever, pyelonephritis, urinary tract stones and chronic renal inflammation are some of the other complications of this procedure⁴ Urinary tract catheterization also prolongs hospital stay and increases the cost of healthcare⁵ Unfortunately, and excessive catheter use still persists.⁶ To remove unnecessary urinary catheters can significantly reduce the duration of urinary catheterization and the catheter associated urinary tract infection rate in a hospital.⁷

Materials and Method:

All patients admitted to the surgery ward with sample size 120 patients were included. 120 consecutive patients of either sex, admitted to the surgical ward either directly or via emergency with foleys catheter, were included in this study. A baseline urinary culture was obtained for all included patients in order to exclude those with preexisting urinary tract infection. These patients were followed up 48 hours after catheter was removed in order to diagnose a catheter induced urinary tract infection.

The catheter tip culture of all these patients was included in this study. A urine culture were sent by the observer in case were patients developed symptoms suggestive of UTI during the course of their follow up till 48 hours after removal of catheters.

Data was recorded for each patient using a proforma which included the following parameters age, sex, diagnosis at admission, indication for catheterization, place for catheterization (surgical ward/ emergency ward), duration of catheterization, development of UTI during hospital stay, analysis of urine culture and catheter tip culture. Patient will be followed after seven days in both the groups.

Results:

Among the patients in the emergency ward, the following was the distribution of patients identified with the below-mentioned organisms in the urine culture report: acinetobacter in 1.75% (1/57) patients, E. coli in 19.30% (11/57) patients, Klebsiella in 17.54% (10/57) patients, Pseudomonas in 14.04% (8/57) patients, while the urine culture report was found to be sterile in 50.0% (27/57) patients.

Among the patients in the surgical ward, the following was the distribution of patients identified with the below-mentioned organisms in the urine culture report: candida species in 3.17% (2/63) patients, E. coli in 30.16% (19/63) patients, enterococcus and Pseudomonas in 6.35% (4/63) patients, Klebsiella in 15.87% (10/63) patients, while the urine culture report was found to be sterile in 38.10% (24/63) patients.

Out of the patients in the emergency ward that underwent urinary catheterization, the duration of catheterization was <3 days in 22.81% (13/57) patients, as compared to the remaining 77.19% (44/57) patients wherein the duration of catheterization was >3 days.

In all the patients in the surgical ward, i.e. 100% (63/63) patients that underwent urinary catheterization, the duration of catheterization was >3 days. The fisher's exact test showed that a statistically significant difference was noted ($p < 0.0001$) was noted. Among the patients in the emergency ward, the following was the distribution of patients identified with the below-mentioned organisms in the urine culture report: acinetobacter in 1.75% (1/57)

patients, E. coli in 19.30% (11/57) patients, Klebsiella in 17.54% (10/57) patients, Pseudomonas in 14.04% (8/57) patients, while the urine culture report was found to be sterile in 50.0% (27/57) patients.

Discussion:

Among the patients in the surgical ward, the following was the distribution of patients identified with the below-mentioned organisms in the urine culture report: candida species in 3.17% (2/63) patients, E. coli in 30.16% (19/63) patients, enterococcus and Pseudomonas in 6.35% (4/63) patients, Klebsiella in 15.87% (10/63) patients, while the urine culture report was found to be sterile in 38.10% (24/63) patients.

Among hospitalized patients, a variation of about 12%-26% in catheter prevalence within patient groups, settings and specialties is known to exist. Even though urethral catheterization is a medical intervention with well-defined risks, nearly 14%-38% are placed without a specific medical indication. To warrant prompt removal, conscientious review of the purpose, importance and efficacy of catheters is requisite in all settings.⁸ This study was conducted to examine the incidence of urinary tract infections due to urinary catheterization in surgical and emergency wards, and to assess various parameters of urinary tract infection and catheter tip contamination.

A total of 120 patients were included in this study. A similar study was conducted by Bhatia N et al to investigate the various indications for urinary tract catheterization in patients and determine the frequency of its inappropriate use.⁹ Tiwari MM et al conducted a study to evaluate the appropriateness of urinary catheter use in a non-ICU setting, examine relevant risk factors related to inappropriate urinary catheter use, and to assess clinical outcomes associated with inappropriate catheter use.¹⁰ Jansen I et al analyzed 14,252 patients from 28 hospitals to study the prevalence of indwelling urethra catheterizations, including their inappropriate use in the Netherlands.¹¹ Shackley DC and associates evaluated the variation in the prevalence of urinary catheters among patient groups, settings, specialties and over time from the National Health Service database.¹²

Conclusion:

From the results of our study we conclude the necessity for healthcare professionals to be alerted towards the need for careful evaluation of every patient and ensuring a mandate for catheterization prior to initiating the procedure, particularly in females and inpatients in the emergency wards.

References:

1. Stamm AM, Coutinho MS. Urinary tract infection associated with indwelling bladder catheter: incidence and risk factors. *Rev Assoc Med Bras.* 1999; 45:2733. [PubMed]
2. Gokula RR, Hickner JA, Smith MA. Inappropriate use of urinary catheters in elderly patients at a midwestern community teaching hospital. *AM J Infect Control.* 2004; 32:196-9. [PubMed]
3. Burke JP, Yeo TW. Nosocomial urinary tract infection. In: Mayhall CG, editor. *Hospital epidemiology and infection control.* 3rd ed. Philadelphia: Lippincott Williams and Wilkins; 2004. pp. 267-86.
4. Sedor J, Mulholland SG. Hospital-acquired urinary tract infections associated with the indwelling catheter. *UrolClin North Am.* 1999; 26:821-8. [PubMed]

5. Saint S. Clinical and economic consequences of nosocomial catheter-related bacteriuria. *Am J Infect Control.* 2000; 28:68-75. [PubMed]
6. Saint S, Wiese J, Amory JK, Bernstein ML, Patel UD, Zemencuk JK, et al. Are physicians aware of which of their patients have indwelling urinary catheters? *Am J Med.* 2000; 109:476-80. [PubMed]
7. Apisarnthanarak A, Thongphubeth K, Sirinvaravong S, Kitkangvan D, Yuekyen C, Warachan B, et al. Effectiveness of multifaceted hospitalwide quality improvement programs featuring an intervention to remove unnecessary urinary catheters at a tertiary care center in Thailand. *Infect Control Hosp Epidemiol.* 2007; 28:791-8. [PubMed]
8. Shackley DC, Whytock C, Parry G, Clarke L, Vincent C, Harrison A, et al. Variation in the prevalence of urinary catheters: a profile of National Health Service patients in England. *BMJ open.* 2017 Jun 1;7(6):e013842.
9. Bhatia N, Daga MK, Garg S, Prakash SK. Urinary catheterization in medical wards. *Journal of global infectious diseases.* 2010 May;2(2):83.
10. Tiwari MM, Charlton ME, Anderson JR, Hermsen ED, Rupp ME. Inappropriate use of urinary catheters: a prospective observational study. *American journal of infection control.* 2012 Feb 1;40(1):51-4.
11. Jansen IA, Hopmans TE, Wille JC, van den Broek PJ, van der Kooi TI, van Benthem BH. Appropriate use of indwelling urethra catheters in hospitalized patients: results of a multicentre prevalence study. *BMC urology.* 2012 Dec;12(1):25.
12. Shackley DC, Whytock C, Parry G, Clarke L, Vincent C, Harrison A, et al. Variation in the prevalence of urinary catheters: a profile of National Health Service patients in England. *BMJ open.* 2017 Jun 1;7(6):e013842.