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# Bacteriuria following Foley catheterization after gynecological and obstetrical surgery

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Abstract

**Objective:** To find out the frequency of bacteriuria associated with Foley catheterization after gynecological and Obstetric (cesarean section) surgery and to analyze the factors associated with bacteriuria.

**Methods:** This is a retrospective study conducted in the Department of Obstetrics and Gynecology of TUTH. Hospital chart records of one of the four functional units for a period of one year (1st January 2007 to 31st December 2007) were collected in all postoperative women who had undergone major gynecological surgery (like abdominal hysterectomy, laparatomy, vaginal hysterectomy etc) and cesarean sections in obstetrics. Charts were reviewed and relevant clinical findings and bacteriological studies of catheter tip culture and sensitivity were noted.

**Results:** There were total 390 major operations (both Gyne & Obs) during the study period. In obstetrics there were a total of 211 cesarean section. Files obtained were 186. Urine and catheter tip culture were obtained in 165 out of 186 cases. Positive culture was found in 76 out of 165 (46%). In gynecology, there were 179 major operations, out of which 130 files were obtained. Urine and catheter tip culture reports were available in 121 cases and 56 (46%) were found to be positive. In cesarean section, duration of catheterization was not associated with increased bacteriuria (p=0.926), while in gynecological surgery there was significant impact of catheterization duration on bacteriuria (p=0.042). In gynecological surgery, increasing patients' age had important impact on bacteriuria (p=0.0004). Overall 46% had positive catheter tip culture. The most common organisms isolated were E coli, Enterococcus fecalis and Staph aureus.

**Conclusion:** This study establishes that Foley catheter was associated with increased risk of bacteriuria in postoperative women following obstetrical and gynecological surgery.

**Key words:** Bacteriuria, Foley catheterization, Catheter tip culture and sensitivity

## Introduction

The use of indwelling urethral catheterization to drain bladder after gynecological and obstetrical surgery is customary. It provides rest to the bladder and avoids urinary retention in the post operative period. Urinary tract infection (UTI) is one of the most common nosocomial infections accounting for up to 40% of all hospital acquired infections.[1] Eighty percent of these are associated with the use of urinary catheters.[2] Risk of infection is about 3-10% for each day of catheterization.

Infection occurs when bacteria reach the bladder by one of the two routes. They gain access intraluminally by entering the catheter system at the catheter-collecting tube junction. Patients' own bowel flora may colonize the periurethral area and reach bladder via the external surface of the catheter, especially in females due to anatomical proximity.[3] Experts have suggested the following criteria for diagnosing bacteriuria from catheterized patients: $10^2$ CFU/ml or greater from patients undergoing intermittent catheterization and any detectable growth from those with an indwelling catheter.[4] When these are associated with pyuria and clinical symptoms it represents UTI.

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The objective of the study was to find the frequency of bacteriuria associated with Foley catheterization after gynecological and obstetrical (cesarean section) surgery and to analyze the factors associated with bacteriuria.

## Methods

This was a retrospective study conducted in the Department of Obstetrics and Gynecology of TUTH. Hospital chart records of one of the four functional units, for a period of one year (1st January 2007 to 31st December 2007) were collected. Chart records of all postoperative women who had undergone major gynecological surgery (abdominal hysterectomy, vaginal hysterectomy, laparatomy etc) and cesarean sections in obstetrics were reviewed. Relevant clinical findings and bacteriological studies of the catheter tip culture and sensitivity were noted. **U**rine catheter tip culture has been a routine procedure at the time of catheter removal after major gynecological and obstetrical surgery.

After the data collection, analysis was done with the help of computer. Nominal results were tested using Chi square analysis. A p value of <0.05 was regarded as statistically significant. The computer program SPSS version 11.5 was used.

## Results

There were total 390 major operations during the study period. In obstetrics there were a total of 211 cesarean section. File obtained were 186. Catheter tip culture was obtained in 165 out of 186 cases. In gynecology, there were 179 major operations, out of which 130 files were obtained. Catheter tip culture reports were available in 121 cases.

Of the total operations performed, in cesarean section 74% were emergency cases while in gynecological surgery 93% of the cases were elective. Among the total gynecological surgery 71% were performed by abdominal route and rest by vaginal approach. In both obstetrics (76 out of 165) and gynecological cases (56 out of 121), altogether 46% of the patients had catheter tip culture positive report.

The majority of the cesarean section cases were in age group 21-30 years while in gynecological cases there was more uniform age distribution.

Duration of catheterization shows that 75% of cesarean sections and 83% of the gynecological cases had catheterization for 13-24 hours (figure 1).

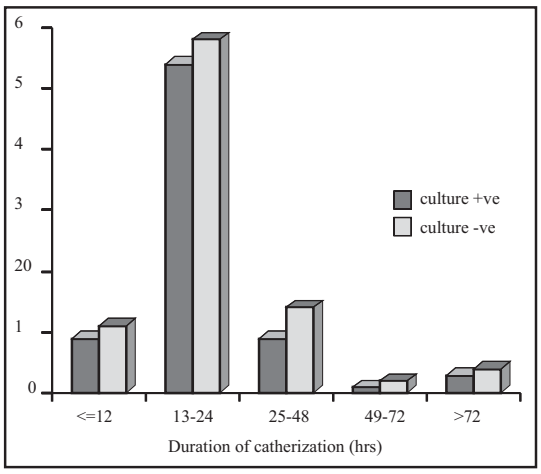


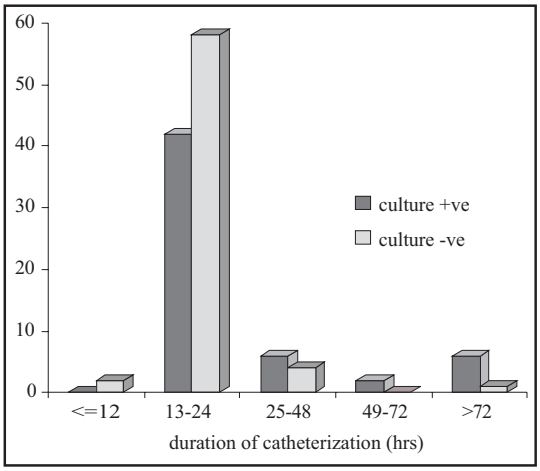

Fig 1. Duration of catheterization

The mean duration of catheterization was 29.6 hours in cesarean section and 31.3 hours in gynecological cases with an overall mean of 30.3 hours. Table 1 shows that the most common organisms isolated were E. coli, Ent fecalis, and Staph aureus.

Table 1. Types of organisms isolated

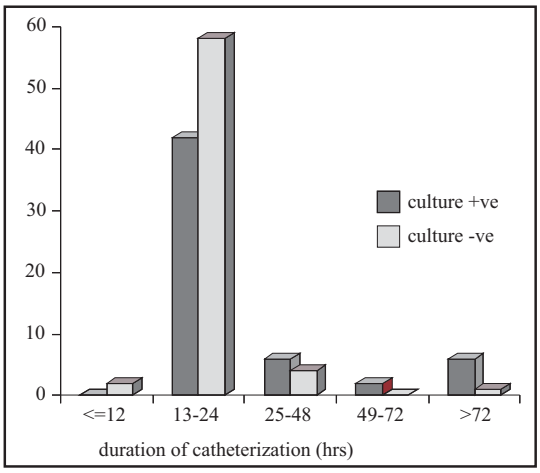
| Organisms | Cesarean n=76 (%) | Gyne surgery n=56 (%) |
|---|---|---|
| E. Coli | 23 (30.3) | 35 (62.5) |
| Ent fecalis | 15 (19.7) | 7 (12.5) |
| Staph aureus | 13 (17.1) | 6 (10.7) |
| Klebsella | 8 (10.5) | 1 (1.8) |
| Enterobactor sp | 5 (6.6) | 2 (3.6) |
| Mixed growth | 8 (10.5) | 4 (7.0) |
| Pseudomonas | 1 (1.3) | 0 |
| Proteus mirabilis | 1 (1.3) | 0 |
| Others | 2 (2.6) | 1 (1.8) |

In cesarean section, duration of catheterization was not associated with increased bacteriuria (p=0.926) (figure 2), while in gynecological surgery there was significant impact of catheterization duration on bacteriuria. As the catheter duration increased there were more culture positive cases (p=0.042) (figure 3). In gynecological surgery, increasing patients' age had important impact on bacteriuria (p=0.0004) (figure 4). Type of cesarean section (emergency or elective) in obstetric and route of surgery in gynecological operations had no impact on bacteriuria.



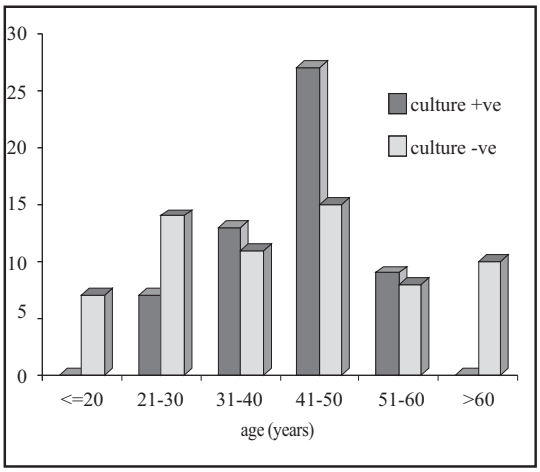

p= 0.926

Fig 2. Duration of catheterization with bacteriuria in cesarean section




P= 0.042

Fig 3. Duration of catheterization with bacteriuria in gyne surgery




P= 0.0004

Fig 4. Patients age with bacteriuria in Gynaecological surgery

## Discussion

The problem of bacteriuria associated with indwelling urethral catheterization in the postoperative period has been found to be an important cause of hospital acquired urinary tract infection. In this study the overall frequency of bacteriruia was found to be 46%.

Various studies have shown similar incidence of bacteriuria associated with catheterization in post operative period ranging from 30% to 53%.[5,6,7,] In the prospective study by Schiotz[6] et al (1996), catheter related bacteriuria in 454 gynecological surgery was 53.5% (mean catheter duration 1.4 days). When left untreated, 21% of these patients developed UTI. Bacteriuria at catheter removal is associated with 2.4 times risk of urinary tract symptoms and 3.2 times risk of UTI.[5] In a study by Okorocha [8]et al (2002), asymptomatic bacteriuria developed in 20% (19 out of 97 patients) following urodynamic studies that had negative bacteriology before cystometry.

In gynecological surgery there was significant impact of age on development of bacteriuria, as majority of the patient were in age group of 41-50 years and above (0.0004). Garibaldi [9]et al (1974) prospectively followed 405 patients with an indwelling catheter from the time of hospital admission. Bacteriuria defined as a growth of$10^3$ CFU or more of predominant bacterial species developed in 23.5%. Significant risk factor on univariate analysis was age older than 50 years (RR=2.0).[9] This could be due to the association of other systemic disease and postmenopausal status in older women.

In the present study duration of catheterization has significant impact on bacteriuria, which was found in gynecological cases. Similarly in a randomized controlled trial by Hakvoort [10]et al (2004) positive urine cultures were found in 40% of cases with 96 hours catheterization group compared with 4% in <24hours catheterization group (OR 15, 95% CI 3.2-68.6). In a prospective study, done at TU Teaching Hospital, Kathmandu, comparing short term (1 day) versus long term (3 days) catheterization in 100 vaginal surgeries, positive urine cultures were seen in 4% versus 22% respectively (p<0.001). [11] This supports the fact that risk of infection is 3-10% for each day of catheterization. In the present study, the most common organisms isolated were E. coli, Staph aureus and Enterococcus fecalis. In a retrospective study conducted in five hospitals from Kathmandu from 500 samples of urine. Culture positive was found in 244 samples. The main organism isolated were E. coli (49%), Staph aureus (23%) and Klebsella (10%).[12] Similarly, Das et al (2006) studied the frequency and susceptibility of pathogens causing UTI at a tertiary care hospital in western Nepal. The

common organisms isolated were E. coli (59.4%), Klebsella sp (15.7%) and Ent feckless (8.1%).[13] These studies show the similar types of pathogens as seen in this study.

## Conclusion

In this study the frequency of bacteriuria was same in cesarean section and gynecological surgery. Duration of catheterization was related to bacteriuria in gynecological surgery but it was not so in CS. In gynecological surgery route of operation was not related with bacteriuria. The most common organisms isolated were E coli, Ent fecalis and Staph aureus.

## Recommendation

Aseptic catheter insertion technique, maintenance of closed drainage system, use of prophylactic antibiotics and avoidance of prolonged catheterization has been suggested to decrease the risk of bacteriuria. The staff caring for the patients should be aware about the proper catheter care.

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## References

1. Haley RW, Culver DH, White JW, Morgan WM, Emory TG. The nationwide nosocomial infection rate: a new need for vital statistics. *Am J Epidemiol* 1985; 121:159-67.

2. Krieger JN, Kaiser DL, Wenzel RP. Urinary tract etiology of blood stream infections in hospitalized patients. *J Infect Dis* 1983; 148:57-62.

3. Stamm WE. Urinary Tract Infections and Pyelonephritis. In: Kasper DL, Fauci AS, Longo DL, Braunwald E et al (Ed) Harrison's Principles of Internal Medicine. 16th edn vol II. New York. McGraw Hill, 2005; 1715-21.

4. The prevention and management of urinary tract infections among people with spinal cord injuries: National Institute on Disability and Rehabilitation Research Consensus Statement. *J Am Paraplegia Soc* 1992; 15:194-204.

5. Chan YM, Ngai SW, Hon E, So WK. Could the incidence of postoperative urinary tract infection be reduced by reversing the sequence of vaginal cleansing and urethral catheterization ? *J Hosp Infect* 2000; 46:67-72.

6. Schiotz HA. Postoperative bacteriuria and urinary tract infections in gynecological patients. *Tidsskr Nor Laegeforen* 1996; 116:246-8.

7. Shapiro M, Simchen E, Izraeli S, Sacks TO. A multivariate analysis of risk factors for acquiring bacteriuria in patients with indwelling urinary catheters for longer than 24 hours. *Infect Control* 1984; 5:525-32.

8. Okorocha I, Cumming G, Gould I. Female urodynamics and lower urinary tract infection. *BJU Int* 2002; 89:863-7.

9. Garibaldi RA, Burke JP, Dickman ML, Smith CB. Factors predisposing to bacteriuria during indwelling urethral catheterization. *N Engl J Med* 1974; 291:215-9.

10. Hakvoort RA, Elberink R, Vollebregt A, Ploeg T, Emanuel MH. How long urinary bladder cathererisation should be continued after vaginal prolapse surgery? A randomized controlled trial comparing short term versus long term catheterization after vaginal prolapse surgery. *BJOG* 2004; 111:828-30.

11. Thakur N, Gurung G, Rana A. A randomized controlled trial comparing short-term versus long-term catheterization after vaginal prolapse surgery. *NJ Obstet Gynaecol* 2007; 2:29-34.

12. Jha N, Bapat SK. A study of sensitivity and resistance of pathogenic micro organism causing UTI in Kathmandu Valley. *Kathmandu Univ Med* J 2005; 3:123-9.

13. Das RN, Chandrashekhar TS, Joshi HS, Gurung M, Shrestha N, Shivananda PG. Frequency and susceptibility profile of pathogens causing urinary tract infections at a tertiary care hospital in western Nepal. *Singapore Med J* 2006; 47: 281-5.