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Original Article

# Effect of Antibiotic Stewardship Prior to Outpatient Cystoscopy; Prospective longitudinal study

**Ubaid Ullah Khan, Mishal Imran, Azmat Ullah, Muhammad Nawaz, Jibran Jabbar Khan, Syed Yazdan Haider**

Department of Urology, Armed Forces Institute of Urology/National University of Medical Sciences (NUMS), Rawalpindi Pakistan

## ABSTRACT

***Objective***: To determine the effect of antibiotic stewardship prior to outpatient cystoscopy.
***Study Design***: Prospective longitudinal study.
***Place and Duration of Study***: Armed Forces Institute of Urology, Rawalpindi Pakistan, from Aug 2022 to Feb 2023.
***Methodology***: 240 consecutive patients from OPD who had a cystoscopy indication were enrolled. After submitting a voided urine sample for culture, every patient underwent cystoscopy. Bacteriuria was considered significant when the number of colony-forming units per millilitre was greater than 104 for a single organism. Known risk factors for UTIs were used to stratify the patients. Patients did not take any antibiotics in the hours leading up to or following the flexible cystoscopy procedure. For thirty days, they were monitored for the development of a febrile UTI. Having a temperature greater than 38 degrees Celsius along with dysuria or having antibiotics prescribed by a doctor for urinary tract infections were criteria for a febrile UTI.
***Results***: Out of 240 patients 36(18.95%) had nitrate, 29(15.26%) patients had Esterase, 55(28.9%) patients had WBC's on urine microscopy and 33(17.37%) patients had Positive urine culture. At the *p*-value of 0.049, the only significant factors in the development of a febrile UTI were older age (40–60 years) and bacteriuria. The odds ratio was 0.99 and the confidence interval was 0.98–1.20. After cystoscopy, there was no significant correlation between BMI, gender, or risk factors for febrile urinary tract infection (*p*-value >0.05).
***Conclusion***: There appears to be no need for antibiotic medication prior to outpatient flexible cystoscopy in patients who do not exhibit any clinical symptoms of acute UTI, including silent bacteriuria. Antibiotic stewardship is an important responsibility for all urologists.

**Keywords**: Antibacterial Therapy, Flexible Cystoscopy, Urinary Tract Infection.

***How to Cite This Article:*** *Khan UU, Imran M, Ullah A, Nawaz M, Khan JJ, Haider SY. Effect of Antibiotic Stewardship Prior to Outpatient Cystoscopy; Prospective longitudinal study. Pak Armed Forces Med J 2025; 75(6): 1136-1140. DOI: https://doi.org/10.51253/pafmj.v75i6.11625*



## INTRODUCTION

One of the most important ways to detect and monitor patients with bladder tumours and lower urinary tract symptoms (LUTS) is using an outpatient flexible cystoscopy.Even though cystoscopy isn't very intrusive, 10% of people still end up with a UTI after the procedure.[1] Antibacterial prophylaxis should be administered to individuals at risk prior to cystoscopy, according to practice recommendations. Smoking, advanced age, urethral catheters, steroid usage, abnormal anatomy, impaired immune function, and decreased immunity are all risk factors for urinary tract infections (UTIs).[2,3]

Antibiotics are typically administered prior to each outpatient cystoscopy because the majority of patients possess one or more of these risk factors.[4] Unfortunately, most cases of asymptomatic bacteriuria in adults do not necessitate therapy, which is a major drawback of this practice4. A possible factor in the global increase of multidrug-resistant bacteria is the over use of antibiotics in the days leading up to cystoscopy. Asymptomatic bacteriuria affects 25% of ambulatory people, according to one study.[5] Contrary to popular belief, not all studies support the use of antibiotics for routine UTI prevention due to the low risk of serious infections.[6,7] Some find that antibiotics reduce UTI frequency compared to placebo, while others find no benefit. Asymptomatic patients undergoing outpatient flexible cystoscopy are not given prophylactic[8,9] antibiotics or urine cultures taken at our facility. To assess the policy's validity, we compared the incidence of symptomatic UTIs following cystoscopy in individuals who had never

**Correspondence: Dr Ubaid Ullah Khan,** Department of Urology, Armed Forces Institute of Urology, Rawalpindi Pakistan
*Received: 12 Feb 2024; revision received: 12 Aug 2024; accepted: 13 Aug 2024*

used antibiotics previously, including those who were infected and those who were not.

## METHODOLOGY

The Prospective longitudinal study was conducted at Armed Forces Institute of Urology, Rawalpindi Pakistan, from August 2022 to February 2023,after taking permission from Ethical Review Committee vide Certificate no. Uro-Adm-Trg-1/IRB/2022/001 Dated 19 May 2022. Sample size was calculated using WHO sample size calculator, taking the incidence of urinary tract infection was 7.5%, taking 5% Alpha level and 95% Confidence limit.[10]

**Inclusion Criteria**: Patients with indication for cystoscopy of age 18-60 years, of both genders were included.

**Exclusion Criteria**: Patients with diabetes mellitus, UTI, dysuria and antibiotics use in the past one month were excluded.

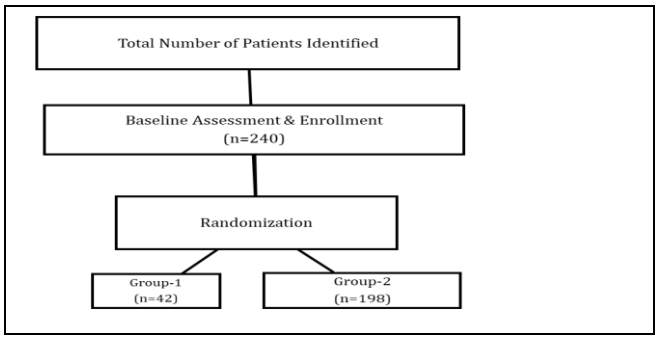


**Figure-1: Flow Diagram (n=240)**

After submitting a voided urine sample for culture, every patient underwent cystoscopy. Bacteriuria was considered significant when the number of colony-forming units per millilitre was greater than 104 for a single organism. Stratification of patients was done based on recognised risk factors for UTIs. Patients did not take any antibiotics in the hours leading up to or following the flexible cystoscopy procedure. We monitored them for 30 days to see when febrile UTIs started. A febrile UTI was determined by a temperature more than 38 degrees Celsius, dysuria, or the use of antibiotics prescribed by a doctor for the treatment of urinary tract infections.

The decision to rely on subjective symptoms in defining febrile UTI was based on the recommendation of European association of urology guidelines 2022, which advise not to investigate or treat asymptomatic bacteriuria unlessclinically significant patient-reported symptoms are present, which often guide healthcare-seeking behaviour and clinical decision-making. These symptoms, such as fever, dysuria, and urgency, are commonly reported by patients seeking medical attention for suspected UTI and are considered crucial in the diagnostic process.Hence, urinalysis and culture/sensitivity was not performed and we relied on subjective symptoms provide a practical and commonly used approach in clinical practice for initial identification and assessment of febrile UTI.A voided urine specimen was submitted by each patient for bacteriologic tests just before cystoscopy. Significant bacteriuria was defined as more than 104 colony-forming units (CFU) per millilitre of a single organism, or no growth at all, according to the urine culture results. Pre- or post-cystoscopy antibiotic administration was delayed. The patient had cystoscopy while in the dorsolithotomy position. Using a povidone-iodine solution, the genitalia were rinsed. The urethra of males was injected with 10ml of 2% Lidocaine jelly, which was devoid of any antimicrobial ingredient. However, the bacteriostatic Chlorhexidine was in the instrument-lubricating gel. The patient underwent an atraumatic insertion of fiber optic cystoscope into the bladder. We used Tergal 800 detergent to manually scrub and ultrasonic wash the cystoscopes, then we exposed them to Cidex and rinsed them. Following the treatment, we gave each patient a fact card that said to phone in the event of dysuria or a temperature of 38.8 degrees Celsius. Patients who experienced dysuria were contacted more frequently by the nurse, but at least once per week following the operations. Thirty days following cystoscopy, the end point was the development of a febrile UTI. Although a urine culture was not collected to confirm infection, patients with dysuria who were given antibiotics by a family practitioner were nevertheless diagnosed with a febrile UTI. After collecting patient data prospectively, we made weekly updates to it. While flexible cystoscopy is being performed, a febrile UTI can develop in 3-6% of individuals with sterile urine. Data was analyzed by using Statistical Package for Social Sciences (SPSS) 22.00. Quantitative data was represented using mean ± standard deviation and qualitative data was represented by using percentage and frequency. Chi square test was applied and regression analysis was used fot factors associated with febrile urinary tract infection after cystoscopy. The $p$-value of $\leq 0.05$ was considered as statistically significant.

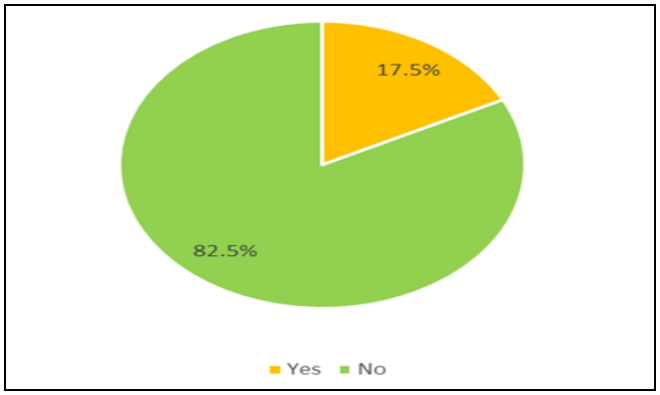


**Figure-2: Frequency of urinary tract infections following flexible cystoscopy (n=240)**

## RESULTS

A total of two hundred and forty (n=240) patients were included, Mean age was 43.31±8.56 years range from 18 to 60 years. Majority of the patients 151(62.9%) were between 41 to 60 years. Mean BMI was 28.69±3.27 kg/m$^2$. Out of total, 154(64.2%) patients were males and 86(35.8%) females. A total of 80 patients had 1 cystoscopy, and 160 patients underwent 2 cystoscopies. Of the 240 patients, 108(45.0%) had hematuria, 53(22.1%) had Lower urinary tract symptoms (LUTS) and 79(32.9%) patients had Surveillance for bladder cancer. The frequency of urinary tract infections following flexible cystoscopy was found in 42(17.5%) patients (Figure-1). Comparison of urinary tract infections with respect Demographic and clinical characteristics of patients shown in Table-I. Table-II showed that a febrile UTI was substantially more likely to develop in patients who were 40–60 years old and who had bacteriuria (odds ratio= 0.99 and CI: 0.98–1.20) with a *p*-value of 0.049. After cystoscopy, there was no statistically significant association between BMI, Gender, or Risk Factors for febrile urinary tract infection ($p$ >0.05).

Out of 240 patients 36(18.95%) had nitrate, 29(15.26%) patients had Esterase, 55(28.9%) patients had WBC's on urine microscopy and 33(17.37%) patients had Positive urine culture shown in Table-III.

## DISCUSSION

This study found that 17% of all patients following cystoscopy and 5% of colonised patients experienced a serious UTI, even though they did not get antibacterial treatment. Few patients in this huge group, whether they tested positive for bacteria or not, actually had a serious UTI, despite the fact that the difference is statistically significant. In situations when risk factors for UTI or bacteriuria are present, this finding contradicts the conventional wisdom regarding antibiotics prior to cystoscopy.[11,12] On the other hand, it conforms to the findings of a few randomised trials that demonstrate that less than 5% of patients treated or given a placebo had UTI following cystoscopy. In the biggest randomised experiment with 2481 patients, only 29 people (1.2%) actually had a symptomatic UTI. However, compared to 3% with placebo, Ciprofloxacin did reduce the incidence of bacteriuria from 9% after cystoscopy.[13] This trial is not randomised, although it is prospective. These kind of studies recruit only patients whose urine is sterile prior to cystoscopy, and their focus is on the frequency of bacteriuria after the procedure rather than on symptomatic UTIs or urosepsis.[14,15] We cannot comment on potential advantages since antibiotics were not given and urine was not checked for bacterial presence before cystoscopy. Despite the vast number of patients included, it is highly improbable that prophylactic antibiotics would have been beneficial in a single controlled trial due to the unexpectedly low infection rate of only 0.85% in untreated individuals. We think it is impractical to conduct another randomised experiment that would put most patients at needless risk of developing multidrug-resistant bacteria because very few individuals experience a febrile UTI, even when their urine is infected. Repetitive use of antibacterial drugs during cystoscopy increases the risk of major UTIs in patients who develop resistant organisms during the procedure.[16]

**Table-I: Comparison of Urinary Tract Infections with Respect Demographic and Clinical Characteristics of Patients (n=240)**

| Variables | | Urinary Tract Infections | | *p*-value |
|---|---|---|---|---|
| | | Yes (n=42) | No (n=198) | |
| Age (years) | 18-40 | 13(30.9%) | 76(38.4%) | 0.016 |
| | 41-60 | 29(69.1%) | 122(61.6%) | |
| Gender | Male | 11(26.2%) | 143(72.2%) | <0.001 |
| | Female | 31(73.8%) | 55(27.8%) | |
| BMI (kg/m2) | ≤27 | 6(14.3%) | 78(39.4%) | 0.002 |
| | >27 | 36(85.7%) | 120(60.6%) | |
| Indications | Hematuria | 8(19.0%) | 100(50.5%) | <0.001 |
| | Lower urinary tract symptoms | 11(26.2%) | 42(21.2%) | |
| | Surveillance for bladder cancer | 23(54.8%) | 56(28.3%) | |

Treatment of asymptomatic bacteriuria is not recommended by infectious disease specialists or recommendations, with the exception of pregnant women or patients undergoing certain invasive genitourinary procedures. The second category includes invasive procedures that rip the bladder

mucosa and make it bleed. No treatment will be beneficial for patients with neurologic impairment of bladder emptying, who are elderly, diabetic, require a short-term urethral catheter, use intermittent catheterization, or have a long-term indwelling urethral catheter. This suggests that the recommendations made by urologists do not align with infectious disease guidelines.[17] It appears that insertion of a urethral catheter is more painful than flexible cystoscopy. Based on these findings, antibiotic prophylaxis prior to cystoscopy is not advised in most circumstances, according to European recommendations on urologic infections.[18] Antibiotics should not be given to individuals with bacteriuria because this condition increases the likelihood of a UTI, according to the study.

**Table-II:Factors associated with Febrile Urinary Tract Infection after Cystoscopy (n=240)**

| Variables | Odds Ratio (95% CI) | *p*-value |
|---|---|---|
| Age | 0.99 (0.98–1.20) | 0.049 |
| Gender | 0.69 (0.29-1.31) | 0.190 |
| BMI | 1.2 (0.85–2.32) | 0.180 |
| Risk factors for UTI | 1.4 (0.39–4.6) | 0.450 |

**Table-III: Distribution of Patients according to Urine Culture (240)**

| | Frequency (%) | |
|---|---|---|
| | Yes | No |
| Nitrate | 36(18.95%) | 154(81.05%) |
| Esterase | 29(15.26%) | 161(84.74%) |
| WBC's on Urine Microscopy | 55(28.95%) | 135(71.05%) |
| Positive Urine Culture | 33(17.37%) | 157(82.63%) |

## LIMITATION OF STUDY

Patients were only asked to self-report if they got a UTI, went to the hospital, or got antibiotics from another doctor beyond the first week following cystoscopy, which is a limitation of the study. Therefore, it's possible that the number of UTIs was underreported.

## CONCLUSION

It is usual for people having cystoscopy to experience asymptomatic bacteriuria. Since recurrent UTIs are uncommon and readily treatable, routine antibiotic prophylaxis is superfluous, even in asymptomatic individuals. To avoid the abuse of antibiotics and the possible rise of germs resistant to them, it is best to avoid frequent antibiotic therapy. Every doctor has a duty to their patients to exercise antibiotic stewardship and not overuse antibiotics unless absolutely required. Urologists should be convinced to play their role by the existing robust facts.

## ACKNOWLEDGEMENT

Authors would like to thank all the study participants for their valuable corporation.

**Conflict of Interest:** None.

**Funding Source:** None.

**Authors' Contribution**

Following authors have made substantial contributions to the manuscript as under:

UUK & MI: Data acquisition, data analysis, critical review, approval of the final version to be published.

AU & MN: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

JJK & SYH: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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