

Original Article**Effectiveness of Single-Dose Postoperative Antibiotics in Patients Undergoing Uteroscopy in a Tertiary Care Center****Amit Kumar Shah*, Shrijan Kharel, Sumit Verma, Deepak Pun, Bashu Dev Baskota**

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Article Received: 18th March, 2026; Accepted: 8th June, 2026; Published: 30th June, 2026**DOI: <https://doi.org/10.3126/jonmc.v15i1.96248>****Abstract****Background**

Uteroscopy is a commonly performed procedure in the management of ureteric calculi; however, post-operative infectious complications are a cause for clinical concern. Antibiotic prophylaxis is routinely used for mitigating such risks. Current guidelines advise a single dose of preoperative antibiotic but many centers continue postoperative antibiotics administration despite a lack of solid evidence. This study was designed to compare the effectiveness of single-dose of preoperative antibiotic prophylaxis versus combination pre and postoperative antibiotics in the prevention of infectious complications after ureteroscopy.

Materials and Methods

A comparative study was conducted in the Department of Surgery (Urology Unit), B and C Medical college & Teaching Hospital, Birtamod, Jhapa, Nepal. A total of 112 patients with ureteric calculi were randomly assigned into 2 groups; Group A (n = 54) received a single dose of antibiotic preoperatively; and Group B (n = 58) received pre- and postoperatively. All patients underwent ureteroscopy under spinal anaesthesia. Postoperative infectious results, such as cystitis, pyelonephritis and urosepsis, were assessed for 6 weeks post-operatively. Data were analyzed using IBM SPSS statistics version 27.

Results

The two groups were comparable in baseline characteristics. Postoperative cystitis occurred in 5.6% of Group A and 13.8% of Group B ($p = 0.206$). Pyelonephritis was seen in 1.9% vs. 3.4% ($p = 1.000$), and urosepsis in 1.9% vs. 0% ($p = 0.482$), respectively. No statistically significant differences were found between groups.

Conclusion

A single preoperative dose of antibiotics is no less effective than combined pre- and postoperative antibiotic prophylaxis in the prevention of infectious complications after ureteroscopy.

Keywords: *Antibiotic prophylaxis, Postoperative complications, Uteroscopy, Urinary tract infection, Urolithiasis*

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Introduction

The global burden of urolithiasis has risen markedly over recent decades, making ureteroscopy (URS) a cornerstone of minimal invasive stone management [1, 2]. Despite its high efficacy and safety, URS is associated with postoperative infectious complications- including localized and systemic urinary tract infection (UTI), fever, and systemic inflammatory response syndrome (SIRS) with prevalence of 9 to 25% [3, 4]. These complications contribute significantly to patient morbidity, readmission, and increase in health-care burden [5, 6].

Appropriate antimicrobial prophylaxis is essential to mitigate such risks. However, practices vary widely and despite current guidelines recommending only a single dose of antibiotics for ureteroscopy, many centers prescribe postoperative antibiotics without robust evidence of additional benefit [7].

Given the increasing frequency of ureteroscopic interventions and concerns over antibiotic overuse, optimizing perioperative prophylaxis is imperative. This study compares the effectiveness of a single preoperative antibiotic dose versus combined pre- and postoperative antibiotics in preventing infectious complications after ureteroscopy. The findings aim to support evidence-based antibiotic stewardship in urological surgical procedures.

Materials and Methods

A prospective randomized comparative study was conducted in the Department of Surgery (Urology Unit) at B and C Medical College & Teaching Hospital, Birtamod among patients diagnosed with ureteric calculus who presented either to the emergency department or outpatient department from October 2024 to October 2025. Ethical approval for the study obtained from the Institutional Review Committee of B and C Medical College and Teaching Hospital, Birtamod (Reference No.00322025). A total of 112 patients were enrolled in the study after obtaining informed written consent. The study population consisted of both male and female patients aged between 18 and 70 years.

Patients with urogenital malignancy, other causes of sepsis, severe immunocompromised states such as diabetes mellitus or HIV infection, those already on broad-spectrum antibiotics prior to urine culture, patients on corticosteroid therapy, individuals with congenital urological anatomical

anomalies, and those with prolonged catheterization or indwelling ureteral stents were excluded from the study. All eligible patients received a detailed clinical evaluation including a detailed medical history and physical examination, relevant blood chemistry investigations, urinalysis, and midstream urine culture and sensitivity testing. Patients were then randomly assigned into two groups by a simple randomization method. Sample size was calculated based on an expected reduction in infectious complications from 15% to 5%, with 80% power and $\alpha = 0.05$, requiring at least 52 patients per group. The final sample size included 112 patients. Group A (n= 54) had received a single pre-operative dose of prophylactic antibiotics; Group B (n= 58) had received both pre and postoperative antibiotic treatment. The patients underwent intravenous infusion of either ceftriaxone (1gm) or ciprofloxacin (200 mg) once and before induction of anaesthesia. In addition, patients of Group B received postoperative antibiotics (either oral levofloxacin or cefixime) prescribed as the antibiotic policy of the hospital. All the ureteroscopic interventions were done by a single urologist using a Richard Wolf semirigid ureteroscope (6/7.5 Fr). Pneumatic lithotripsy was done with a Lithoclast for intracorporeal stone fragmentation, and stone fragments were removed with either biprong or triprong forceps. A double-J stent was placed at the end of the procedure if felt necessary by the operating surgeon. The same preoperative and post operative protocols were kept for both groups, including strict observance of aseptic precautions, including sterilization of surgical instruments.

Following surgery, all patients were observed and followed up for 6 weeks. The end point of follow up was symptomatic urinary tract infection (UTI) within six weeks of the ureteroscopic procedure. Any patient with symptoms suggestive of UTI including fever with or without chills and rigors, suprapubic pain, urethral pain, or flank pain, dysuria, urgency, frequency, and hematuria underwent repeat urine analysis and urine culture to confirm UTI. All procedures were carried out in compliance with the ethical standards of the institution and the 2013 revision of the Declaration of Helsinki. The study variables were the demographic parameters (age, gender, body mass index (BMI)) and the perioperative and clinical variables of preoperative stent placement, postoperative stent placement,



post-operative Foley catheter, diabetes mellitus, operative side (right or left), and stone location (upper, middle or lower ureter). Postoperative infectious outcomes such as cystitis, pyelonephritis and urosepsis were also noted as dependent outcome variables.

Demographic data, clinical features, intraoperative findings and postoperative findings were documented in a predesigned proforma. Data were processed using IBM SPSS V27. (IBM Corp., Armonk, NY, USA). Continuous variables including age, BMI were expressed as a mean $\pm$ SD and compared for the two groups using independent samples t-test. Categorical variables, such as gender, status of diabetes, presence of stent and catheter, side of operative procedure, position of stone in the kidney and outcome for infection (cystitis, pyelonephritis, urosepsis) were reported as frequencies and percentages and compared with the Chi-square test or Fisher's exact test where applicable. A p -value ≤ 0.05 was considered statistically significant.

Results

A total of 112 patients who underwent ureteroscopy for ureteric calculi were included in the study, with 54 patients in Group A (preoperative antibiotic only) and 58 patients in Group B (pre- and postoperative antibiotics). The mean age of patients in Group A was 31.85 ± 9.58 years, while that of Group B was 31.67 ± 9.29 years, with no statistically significant difference between the groups ($p = 0.920$). The gender distribution was comparable, with males comprising 68.5% of Group A and 63.8% of Group B ($p = 0.598$). No patients in either group had a pre-operative stent. Postoperative stenting was performed in 83.3% of patients in Group A and 89.7% in Group B, with no significant difference ($p = 0.326$). The distribution of stone location was also similar between groups, with the majority of stones located in the lower ureter (81.5% vs. 82.8%, $p = 0.882$).

Postoperative infectious outcomes within six weeks of ureteroscopy were compared between the two groups (Table 2). The incidence of postoperative cystitis was higher in Group B (pre- and postoperative antibiotics) at 13.8%, compared to 5.6% in Group A (preoperative only), although this difference did not reach statistical significance ($p = 0.206$). Postoperative pyelonephritis occurred in 1.9% of patients in Group A and 3.4% in Group B ($p = 1.000$), while urosep-

sis was observed in 1.9% of Group A and none in Group B ($p = 0.482$). The overall rate of infectious complications was low in both groups, and no statistically significant differences were found in any of the postoperative infection outcomes between the two antibiotic regimens. These results suggest that the addition of postoperative antibiotics did not significantly reduce the incidence of post-ureteroscopic infectious complications compared to the single-dose pre-operative prophylaxis regimen.

Table 1: Baseline Characteristics of the Study Population (n = 112)

Variables	Groups		p-value
	Group A (Pre-operative only, n = 54)	Group B (Pre + Post-operative, n = 58)	
Age (years)	31.859.58 $\pm$	31.679.29 $\pm$	0.920
Gender			
- Male	37(68.5%)	37(63.8%)	0.598
- Female	17(31.5%)	21(36.2%)	
BMI (kg/m ²)	22.81 $\pm$ 2.98	22.79 $\pm$ 2.98	0.968
Diabetes mellitus	6(11.1%)	5(8.6%)	0.658
Preoperative stent	0(0.0%)	0(0.0%)	N/A
Postoperative stent	45(83.3%)	52(89.7%)	0.326
Postoperative Foley catheter	9(16.7%)	9(15.5%)	0.869
Operative side			
- Right	34(63.0%)	28(48.3%)	0.118
- Left	20(37.0%)	30(51.7%)	
Stone location			
- Upper ureter	4(7.4%)	3(5.2%)	0.882
- Middle ureter	6(11.1%)	7(12.1%)	
- Lower ureter	44(81.5%)	48(82.8%)	

Table 2: Comparison of Postoperative Infectious Outcomes between Groups

Postoperative Infectious Outcomes	Groups		p-value
	Group A (Pre-operative only, n = 54)	Group B (Pre + Post-operative, n = 58)	
Postoperative cystitis	3(5.6%)	8(13.8%)	0.206
Postoperative pyelonephritis	1(1.9%)	2(3.4%)	1.000
Postoperative urosepsis	1(1.9%)	0(0.0%)	0.482

Discussion

In this comparative study, the effectiveness of single-dose preoperative antibiotic prophylaxis was evaluated against combined pre- and postoperative antibiotic administration in preventing postoperative infectious complications among patients undergoing ureteroscopy for ureteric calculi. The results showed no statistically significant difference between the two groups in terms of postoperative cystitis, pyelonephritis, or urosepsis, showing that the use of a single dose of preoperative antibiotics is effective in protecting



the patient as were the extended antibiotic regimens.

Our results are consistent with some prior studies in favour of the single preoperative prophylactic antibiotic dose and ureteroscopy. Knopf et al. reported no diminution of postoperative infections with the increased use of antibiotics after surgery, and beyond a single dose preoperatively [8]. Similarly, Darenkov et al. found the prolonged use of antibiotics after URS was not associated with a significant decrease in infection rates, stressing the importance of limiting antibiotic exposure to decrease resistance [9]. Mariappan and Loong also found that the use of preoperative prophylaxis alone was adequate to minimise the infectious complications of endoscopic urological procedures [10].

In the current study, the incidence of postoperative cystitis was 5.6% and 13.8% in the group given preoperative antibiotics alone and preoperative and postoperative antibiotics, respectively, but the difference was not statistically significant. These rates are comparable to those reported by Netsch et al. who reported an overall 6% incidence of UTI after ureteroscopy despite prophylaxis [11]. Similarly, infection rates of 2-9% have been reported by Blackmur et al. following URS, mostly in high-risk individuals such as diabetics or persons with indwelling stents [12]. Our slightly higher incidence may be attributed to regional variations in microbial resistance patterns and antibiotic use.

Postoperative pyelonephritis and urosepsis were infrequent in both groups, consistent with the low rates (<3%) reported in other studies [13]. Deng et al. demonstrated that shown that patients with sterile urine undergoing ureteroscopy had a similar risk of a post-operative febrile UTI whether or not pre- and post-operative antibiotics were given. This implies the need for specific high-risk groups to be targeted for antibiotic prophylaxis, and suggests that a more selective approach is needed for pre-operative urine analysis in low-risk patients [9]. Similarly, like our setting in healthcare a study from India emphasized that adherence to guideline-based single-dose prophylaxis was not inferior to prolonged courses in preventing severe infections after ureteroscopic lithotripsy [14].

The implications of these findings are important. Un-needed use of antibiotics after surgery poses increased risks of antimicrobial resistance, adverse drug reactions and increased costs to

healthcare services without added benefits to the patient. This study speaks in favour of the guidelines by American Urological Association (AUA) and European Association of Urology (EAU) both of which recommend a single dose of routine preoperative antibiotic regimen for ureteroscopy [15]. Advocating evidence-based antibiotic stewardship is important to curb the resistance trends especially in resource limited settings where inappropriate antibiotic use is prevalent.

But there are some limitations that need to be recognized. The research was performed in one tertiary care centre, so findings may not be generalizable. Culture-specific antibiotic resistance patterns were not analysed which could influence the rate of infection. Additionally, the sample size might not have been large to find differences in rare complications such as urosepsis. Despite these limitations, the results add to the body of evidence in favour of rational use of antibiotics in urological surgery.

Conclusion

A single preoperative dose of antibiotics is no less effective than pre- and postoperative antibiotic prophylaxis in the prevention of infectious complications after ureteroscopy. Rational use of antibiotics should be promoted, to avoid resistance and unnecessary drug exposure.

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Conflict of interest: None

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