

ORIGINAL PAPER

Prospective observational comparative study on antibiotic prophylaxis in cystoscopy: Towards a rational use of antimicrobials

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Summary

Introduction: Antibiotic resistance represents a major public health problem driven by inappropriate antimicrobial use. Cystoscopy is a common urological procedure associated with a low risk of urinary tract infection (UTI), and the role of routine antibiotic prophylaxis remains controversial.

Objective: To evaluate the effectiveness of antibiotic prophylaxis in preventing post-cystoscopy UTI.

Materials and methods: A prospective observational comparative study including 297 patients undergoing outpatient cystoscopy.

Patients were assigned to Group A (no prophylaxis, n = 161) and Group B (cefuroxime 500 mg prophylaxis, n = 136). Urine cultures were obtained one hour before and one week after cystoscopy. Significant bacteriuria was defined as $> 10^4$ CFU/ml. Risk factors were analyzed according to current literature.

Fisher's exact test and multivariate logistic regression were performed. Statistical analysis was performed using SPSS/R.

Results: UTI occurred in 5.59% of patients without prophylaxis and 5.88% with prophylaxis (p = 1.00). Antibiotic prophylaxis did not reduce infection risk (OR 0.95; 95% CI 0.36-2.53).

Baseline characteristics and risk factors were similar between groups. No independent predictor reached statistical significance.

Conclusions: Routine antibiotic prophylaxis does not reduce post-cystoscopy UTI incidence in low-risk patients, supporting restrictive and rational antimicrobial use.

KEY WORDS: Cystoscopy; Antibiotic prophylaxis; Urinary tract infection; Antimicrobial resistance.

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INTRODUCTION

Antimicrobial resistance has become one of the most pressing global health challenges, largely attributable to unnecessary antibiotic exposure. In urological practice, cystoscopy is routinely performed for diagnostic and surveillance purposes and is generally considered safe; however, it carries a small but measurable risk of urinary tract infection (UTI).

Historically, antibiotic prophylaxis has been widely prescribed to prevent infectious complications following cystoscopy. Recent evidence and international guidelines increasingly discourage systematic prophylaxis in low-risk patients, advocating instead for selective use based

on individual risk profiles. Despite these recommendations, clinical practice remains heterogeneous, and antibiotics continue to be administered routinely in many centers.

This prospective observational comparative study aimed to evaluate whether antibiotic prophylaxis with cefuroxime effectively reduces UTI incidence following outpatient cystoscopy.

MATERIALS AND METHODS

Study design and population

A prospective observational comparative study was conducted in patients undergoing outpatient cystoscopy at an urology department.

Patients were allocated to the prophylaxis or no-prophylaxis group according to routine clinical practice during the study period. The decision to administer antibiotic prophylaxis was based on operator preference and institutional practice at the time of the procedure.

A total of 297 patients were included and classified into two groups according to routine clinical practice:

- Group A: No antibiotic prophylaxis (n = 161)
- Group B: Cefuroxime 500 mg orally before cystoscopy (n = 136).

Inclusion and exclusion criteria

Inclusion:

Adult patients undergoing diagnostic or follow-up cystoscopy.

Exclusion:

- Positive urine culture before procedure
- Symptoms of UTI
- Antibiotic use within 30 days
- Indwelling urinary catheter.

Microbiological evaluation

Urine cultures were collected:

- One hour before cystoscopy
- One week after the procedure.

Significant bacteriuria was defined as $> 10^4$ CFU/ml of a single organism.

Clinical variables

Based on contemporary literature, the following potential risk factors were assessed:

- Advanced age
- Previous cystoscopy
- History of bladder tumor
- New bladder tumor diagnosis
- Urethral stricture
- Prostatic enlargement
- Immunosuppression (defined as the presence of conditions or treatments associated with impaired immune response, including diabetes mellitus, chronic corticosteroid therapy, chemotherapy, solid organ transplantation, and hematologic malignancies).

Statistical analysis

Categorical variables were compared using Fisher's exact test. Multivariate logistic regression was performed, given the number of events, to identify independent predictors of UTI. Odds ratios (OR) with 95% confidence intervals (CI) were calculated. Statistical significance was set at $p < 0.05$. Statistical analysis was performed using SPSS/R.

RESULTS

Baseline characteristics

Both groups were comparable regarding demographic and clinical variables (Table 1).

In our series, causes of immunosuppression included diabetes mellitus, chronic corticosteroid therapy, and oncologic treatments.

Incidence of post-cystoscopy UTI

UTI occurred in 9 patients in Group A and 8 patients in Group B, with no significant difference between groups ($p = 1.00$).

Overall post-cystoscopy infection rate was 5.72%.

Antibiotic prophylaxis was not associated with reduced infection risk (OR 0.95; 95% CI 0.36-2.53).

Multivariate analysis

No independent predictor reached statistical significance (Table 2).

DISCUSSION

This prospective observational comparative study demonstrates that routine antibiotic prophylaxis with cefuroxime does not significantly reduce the incidence of urinary tract infection following outpatient cystoscopy.

The observed infection rates are consistent with previously published series reporting low UTI incidence in low-risk populations. Our results reinforce recent evidence and international guideline recommendations discouraging systematic antibiotic use for uncomplicated cystoscopic procedures.

Although certain clinical conditions such as immunosuppression and urethral abnormalities showed a trend toward increased risk, none reached statistical significance in multivariate analysis.

Table 1.
Baseline characteristics and outcomes.

Variable	No prophylaxis (n = 161)	Prophylaxis (n = 136)	p-value
Age, mean \pm SD (years)	67.4 \pm 11.2	66.9 \pm 10.8	0.72
Previous cystoscopy, n (%)	92 (57.1)	75 (55.1)	0.74
History of bladder tumor, n (%)	68 (42.2)	59 (43.4)	0.85
New bladder tumor, n (%)	21 (13.0)	19 (14.0)	0.81
Urethral stricture, n (%)	14 (8.7)	12 (8.8)	0.98
Prostatic enlargement, n (%)	83 (51.6)	72 (52.9)	0.83
Immunosuppression, n (%)	11 (6.8)	9 (6.6)	0.95
Post-cystoscopy UTI, n (%)	9 (5.59)	8 (5.88)	1.00

Table 2.
Logistic regression for predictors of UTI.

Factor	OR	95% CI	p-value
Antibiotic prophylaxis	0.95	0.36-2.53	0.92
Age > 65 years	1.48	0.62-3.51	0.37
Previous cystoscopy	1.21	0.51-2.86	0.65
History of bladder tumor	1.34	0.58-3.09	0.49
Urethral stricture	2.10	0.72-6.15	0.17
Immunosuppression	3.02	0.88-10.30	0.07

Routine prophylaxis exposes patients to unnecessary antibiotic exposure, potential adverse events, increased healthcare costs, and contributes directly to antimicrobial resistance.

Limitations

The study was conducted at a single center and focused on short-term post-procedural infection. Nevertheless, the prospective observational comparative study design and objective microbiological endpoint strengthen the robustness of the findings.

DECLARATIONS

Ethical approval and consent for participate: All procedures were performed in accordance with the ethical standards of the institutional and national research committee and with the Helsinki declaration.

Availability of data and material: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Competing interests: The authors declare no conflicts of interest.

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CONCLUSIONS

Routine antibiotic prophylaxis with cefuroxime does not reduce the incidence of urinary tract infection following outpatient cystoscopy in low-risk patients.

These findings support selective rather than systematic antibiotic administration and reinforce the importance of rational antimicrobial use in urological practice.

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