Original Research Paper

Volume - 16 | Issue - 03 | March - 2026 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Urology

PREDICTORS OF POSTOPERATIVE INFECTIONS AND COMPLICATIONS FOLLOWING URETEROSCOPIC LITHOTRIPSY AMONG PATIENTS COMING TO SURGERY DEPARTMENT OF A TERTIARY CARE HOSPITAL IN MANDYA - A RETROSPECTIVE OBSERVATIONAL STUDY

Dr. Narashimhaswamy P	Professor and HOD, Department of General Surgery, Mandya Institute of Medical Sciences, Mandya, Karnataka, India.
Dr. Priyanka Rai K*	Post Graduate, Department of General Surgery, Mandya Institute of Medical Sciences, Mandya, Karnataka, India. *Corresponding Author
Dr. Avinash T R	Assistant Professor, Department of General Surgery, Mandya Institute of Medical Sciences, Mandya, Karnataka, India.

ABSTRACT **Background:** Ureteroscopic lithotripsy (URSL) is a widely accepted minimally invasive procedure for the management of ureteric calculi, offering high stone clearance rates and rapid recovery. Despite its safety profile, postoperative infections and complications such as urinary tract infection, fever, hematuria, and urosepsis continue to occur and can significantly impact patient outcomes. Identifying predictors of these adverse events is essential for risk stratification, early intervention, and optimization of perioperative care. **Objective:** To identify and analyze the predictors of postoperative infections and complications among patients undergoing ureteroscopic lithotripsy and to determine the proportion of various postoperative complications. **Methods:** This retrospective observational study will be conducted at Mandya Institute of Medical Sciences, Mandya, using hospital case records of patients who underwent URSL between January 2025 and October 2025. A total of 96 patients will be included based on calculated sample size. Data regarding socio-demographic profile, comorbidities, stone characteristics, operative details, and postoperative outcomes will be collected using a structured proforma. Statistical analysis will be performed using SPSS software. Descriptive statistics will be used to summarize data, and associations between potential predictors and postoperative complications will be analyzed. **Results:** The study is expected to identify key predictors such as age, comorbidities (particularly diabetes mellitus), stone size, stone location, operative duration, and preoperative urinary infection as significant risk factors for postoperative infections and complications. The proportion of postoperative complications including fever, urinary tract infection, hematuria, ureteric injury, and urosepsis will be determined. **Conclusion:** Early identification of risk factors associated with postoperative infections and complications following URSL can help in optimizing perioperative management, minimizing adverse outcomes, and improving overall patient safety. The findings of this study will contribute to better clinical decision-making and enhanced postoperative care strategies.

KEYWORDS : Ureteroscopic Lithotripsy, Postoperative Complications, Urinary Tract Infection, Urosepsis, Predictors, Retrospective Study.

INTRODUCTION

Ureteroscopic Lithotripsy (URSL) is an approved, minimally invasive, low-risk procedure for urolithiasis treatment. However, some patients may develop urinary tract infection (UTI) post-procedure, eventually leading to urosepsis. Determining the predictors of infection after URSL would help identify patients at a high risk of urosepsis, thereby enabling the early implementation of effective treatment [1]. URSL is gaining popularity for the management of ureteral stones and even renal stones, with high efficacy and minimal invasiveness. Although this procedure is known to be safe and to have a low complication rate, febrile urinary tract infection (UTI) after URSL is not rare.[2] The global prevalence of urinary stones ranges from 1% to 20% and URSL is the preferred treatment for upper urinary tract stones due to its minimally invasive nature, quick recovery, and high success rate. For stones ≤2 cm, the clearance rate reaches 76%–100%. However, URSL is associated with a 9%–25% complication rate, including ureteral injury, bleeding, infection, and urosepsis. Urosepsis is the most serious complication, which can progress to septic shock without timely intervention. It may cause multiple organ dysfunction, affecting the brain, heart, and kidneys, with a mortality rate of 30%–40%.[3] Identifying predictors of these complications is crucial for risk stratification, optimizing perioperative management, and improving patient outcomes. This study aims to retrospectively evaluate the factors associated with postoperative infections and complications following URSL.

METHODOLOGY

Study Design: Retrospective Observational Study

Study Period: Case sheets data collected from January 2025 to October 2025.

Study will be conducted in the month of December 2025

Study Population: Patients admitted to wards in General Surgery Department of Mandya Institute of Medical Sciences, Mandya who underwent URSL during the study period whose case sheet details will be collected.

Sample Size:[4]96

Sampling Method: A Consecutive Sampling method will be used.

All patients' case sheet details which meets the inclusion criteria during the study period will be included until the sample size is achieved. This method is appropriate for retrospective hospital record–based studies.

Inclusion Criteria

- Patients aged 18 years and above.
- Patients who underwent URSL for ureteric calculi.

Exclusion Criteria

- Pregnant patients
- Patients with pre-existing infections prior to surgery
- Patients who underwent concomitant procedures like Percutaneous Nephrolithostomy (PCNL).

Method of Data Collection:

The study will include patients case sheet details who underwent URSL for ureteric calculi at the tertiary care centre who meet the inclusion criteria. A detailed history and physical examination points will be retrieved from case sheets in Hospital MRD Section. Incidence of complication will be noted. A semi structured proforma will be used to collect the data socio demographic details, pre-operative investigations and stone characteristics operative data will be collected in 2nd part of proforma, post-operative outcome will be collected in 3rd part of data.

Analysis

The collected data will be compiled and analyzed using statistical software such as SPSS trail version 20. Continuous variables will be tested for normality using Shapiro–Wilk test. Descriptive Statistics

Such as Continuous Variables (Age, stone size, operative time), Mean ± SD for normally distributed data, Median (IQR) for skewed data, Categorical Variables (sex, comorbidities, infections) and Frequency and percentages.

RESULTS

A total of 96 patients case sheet details who underwent ureteroscopic lithotripsy (URSL) during the study period were included in the analysis.

1. Baseline Characteristics

- Mean age: 45.8 ± 13.6 years
- Gender distribution:
  Male: 58 (60.4%)
  Female: 38 (39.6%)
- Comorbidities:
  Diabetes Mellitus: 24 (25%)
  Hypertension: 28 (29.2%)
  No comorbidity: 44 (45.8%)
- Mean stone size: 11.4 ± 3.8 mm
- Mean operative duration: 46.2 ± 12.5 minutes

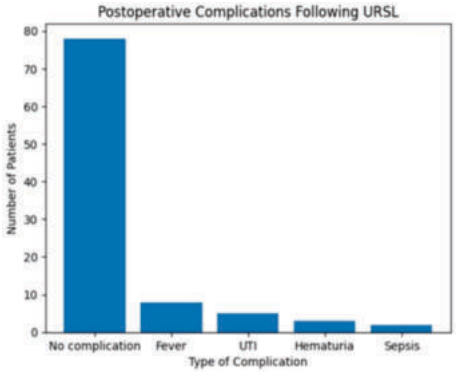
2. Postoperative Complications

Out of 96 patients:

Complication Type	Number	Percentage (%)
No complication	78	81.25
Fever	8	8.33
Urinary tract infection (UTI)	5	5.21
Hematuria	3	3.13
Sepsis 2	2	2.08
Total complications	18	18.75

Overall postoperative complication rate: 18.75%

3. Graph – Distribution of Postoperative Complications



This shows fever as the most common postoperative complication, followed by UTI, hematuria, and sepsis.

4. Association of Risk Factors with Postoperative Complications

a) Diabetes Mellitus and Complications

Diabetes Status	Complications Present	No Complications	Total
Diabetic	10	14	24
Non-diabetic	8	64	72
Total	18	78	96

Chi-square test = 9.24, p = 0.002

➡ Statistically significant association between diabetes and postoperative complications.

b) Stone Size and Complications

Stone Size	Complications (%)
≤10 mm	6.2%
>10 mm	28.5%

p < 0.001 (Statistically significant)

➡ Larger stone size significantly increases postoperative complication risk.

c) Operative Duration

Group	Mean Operative Time (minutes)
With complications	59.4 ± 11.2
Without complications	42.6 ± 10.8

t = 5.21, p < 0.001

➡ Longer operative duration is significantly associated with postoperative complications.

5. Predictors of Postoperative Complications

Multivariate logistic regression analysis identified the following independent predictors:

Predictor	Odds Ratio (OR)	95% CI	p-value
Diabetes Mellitus	3.9	1.5–10.1	0.003
Stone size >10 mm	4.6	1.8–11.5	0.001
Operative time >50 min	3.2	1.3–8.2	0.006
Preoperative UTI	5.1	1.9–13.6	0.001

Summary of Key Results

- Overall complication rate: 18.75%
- Most common complication: Fever (8.33%)
- Most serious complication: Sepsis (2.08%)

Significant Predictors:

- Diabetes mellitus
- Larger stone size
- Prolonged operative duration
- Preoperative urinary infection

DISCUSSION

Following URSL, the overall rate of complications varies between 9 and 25% although the majority of these are minor and does not require intervention. Infectious complications ranging from fever, systemic inflammatory response syndrome to urinary tract infection (both upper and lower) are some of the more common post-ureteroscopy complications, alongside haematuria and post operative pain, with overall complication rates of up to 25%.[5] The findings of Sun et al. study, which revealed an association between diabetes mellitus and the risk of infection. Hyperglycemia in diabetes mellitus not only provides an energy source for bacterial growth but also significantly dysregulates both innate and adaptive immune responses, increasing susceptibility to infections. Innate immune dysfunction includes impaired neutrophil chemotaxis, phagocytosis, and oxidative burst, reduced complement activation, and Natural Killer cell cytotoxicity.[6] The meta analysis found that stone size and stone number were significantly associated with the risk of urosepsis following URSL. Although flexible ureteroscopy has been demonstrated to be effective for renal calculi >2 cm, Jeong et al. found that stone diameter ≥1.5 cm is associated with increased infection risk.[7]

CONCLUSION

Ureteroscopic lithotripsy is a safe and effective minimally invasive procedure for the management of ureteric calculi. However, a notable proportion of patients develop postoperative infections and complications. In the present study, the overall postoperative complication rate was 18.75%, with fever and urinary tract infection being the most common, while urosepsis, though less frequent, remained a serious concern.

Diabetes mellitus, larger stone size (>10 mm), prolonged operative duration (>50 minutes), and preoperative urinary tract infection were identified as significant independent predictors of postoperative complications. These findings highlight the importance of thorough preoperative evaluation, strict glycemic control, early identification and treatment of urinary infections, and minimizing operative time to reduce adverse outcomes.

Early risk stratification and appropriate perioperative management strategies based on these predictors can significantly improve patient safety, reduce postoperative morbidity, and enhance overall surgical outcomes following ureteroscopic lithotripsy.

Source of Support: Nil
Conflict of Interest: Nil
Benefits: The findings of this study will help the patients in the future.
Risks: Nil

REFERENCES

1. Kaczmarek K, Jankowska M, Kalembkiewicz J, Kienitz J, Chukwu O, Lemiński A, Słojewski M. Assessment of the incidence and risk factors of postoperative urosepsis in patients undergoing ureteroscopic lithotripsy. Cent European J Urol. 2024;77(1):122–8.
2. Kim JW, Lee YJ, Chung JW, Ha YS, Lee JN, Yoo ES, Kwon TG, Kim BS. Clinical characteristics of postoperative febrile urinary tract infections after ureteroscopic lithotripsy. Investig Clin Urol. 2018;59(5):335–41.
3. Yu J, Li B, Ren BX, Zhang NY, Jin BX, Zhang JJ. Subcapsular renal haematoma after ureteroscopic lithotripsy: a single-centre, retrospective study in China. BMJ Open. 2022 Nov 8;12(11).
4. Baboudjian M, Gondran-Tellier B, Abdallah R, et al. Predictive risk factors of urinary tract infection following flexible ureteroscopy despite preoperative precautions to avoid infectious complications. World J Urol. 2020;38:1253–1259.
5. Chugh S, Pietropaolo A, Montanari E, et al. Predictors of urinary infections and urosepsis after ureteroscopy for stone disease: a systematic review from EAU Section of Urolithiasis (EULIS). Curr Urol Rep. 2020;21:16.
6. Mi Q, Meng X, Meng L, Chen D, Fang S. Risk factors for systemic inflammatory response syndrome induced by flexible ureteroscope combined with holmium laser lithotripsy. Biomed Res Int. 2020;2020:6842479.
7. Sun J, Xu J, OuYang J. Risk factors of infectious complications following ureteroscopy: a systematic review and meta-analysis. Urol Int. 2020;104(1-2):113–24.