

The Outcome of Open Ureterolithotomy in the Management of Large Upper Ureteric Stone: A Case Series Of 35 Patients in A Tertiary Care Hospital in Bangladesh

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ABSTRACT

Background with Objective: Ureteric stones pose a global health concern, impacting millions and prompting ongoing exploration for effective management. This study focuses on the outcomes of open ureterolithotomy, addressing large upper ureteric stones, a subset of upper urinary tract stones. Ureterolithiasis can lead to severe complications like urosepsis and renal failure if untreated, emphasizing the urgency for optimized therapeutic approaches. This quasi-experimental study aimed to observe and assess the outcomes of open ureterolithotomy in managing large upper ureteric stones.

Methods: This prospective observational study was carried out among 35 patients attending at the department of Urology at Sir Salimullah Medical College Mitford Hospital, Dhaka for the treatment of upper ureteric stone within the defined period from January 2019 to December 2020. All the data were compiled and sorted properly and the quantitative data was analyzed statistically by using Statistical Package for Social Science.

Results: The study encompassed 35 patients, predominantly female (54.30%) with a mean age of 45.88±14.47 years. Mean stone size was 19.57 mm, and operative time averaged 19.57 minutes. Postoperative parameters revealed a 5.0-day hospital stay and a 3.85-week recovery time. Stone distribution indicated 42.70% in the right ureter and 54.30% in the left, with a stone clearance rate of 94.3%. Complications, both perioperative and postoperative, affected 34.3% and 40% of cases, respectively encompassing bleeding, pleural injury, fever, urinary leakage, blood transfusion, and wound infection.

Conclusion: Open ureterolithotomy proves effective and safe for managing large upper ureteric stones, boasting a high stone clearance rate. However, its invasive nature correlates with significant perioperative and postoperative complications, underscoring the need for careful patient selection and monitoring. Consideration of minimally invasive alternatives is encouraged, necessitating further research for a comprehensive understanding of ureteral stone management.

KEYWORDS: Ureterolithotomy, large upper ureteric stones, surgical outcomes, complications

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INTRODUCTION

Stones in the ureters are a condition that is still a hot topic to discuss in various health studies because the incidence rate is quite high. Based on world epidemiology, ureteral stones have affected millions of people. The incidence and prevalence rates have continued to increase. The condition of ureteral stones causes sufferers to experience complaints in the form of severe pain that arises suddenly¹. Ureterolithiasis is part of the upper urinary tract stones. Urolithiasis is the most common urologic benign disease with 10-15% prevalence². It is a significant cause of morbidity in developing countries as patients present with complications like urosepsis, renal failure etc³. Complications from upper urinary tract stones, if not treated promptly, are obstructive pyelonephritis and become a urological emergency with an increased risk of death from septic shock. Treating ureterolithiasis can use tamsulosin (an alpha-adrenergic blocker), but several studies state that tamsulosin is significantly less effective in overcoming stone passage. Active intervention is needed to assist in removing stones, especially stones that have caused obstruction or are large in size. Two active interventions can be shockwave lithotripsy (SWL) or ureteroscopy (URS)^{4,1}. In the last three decades, various new technique including percutaneous nephrolithotomy (PCNL), shockwave lithotripsy (SWL), ureteroscopic lithotripsy (URSL), retrograde intrarenal surgery (RIRS) and multiple endoscopic methods of stone fragmentation has changed the management of urolithiasis dramatically. But the complete clearance of stone depends upon the mode of surgical treatment. Proximal ureteric stones are challenging for operative management⁵. In ureteroscopic lithotripsy, chances of inadvertent push back are high due to significant proximal dilation⁶. Therefore, the use of open ureterolithotomy can be an option in dealing with complaints of stones with these characteristics and is an effective and safe procedure with a high stone-free rate and a low incidence of complications. This study was done to

observe the outcome of open ureterolithotomy in the management of large upper ureteric stone.

METHODS AND MATERIALS

This prospective observational study was carried out among 35 patients attending at the department of Urology at Sir Salimullah Medical College Mitford Hospital, Dhaka for the treatment of upper ureteric stone within the defined period from January 2019 to December 2020. All patients admitted with ureteric stones were screened and those meeting the inclusion criteria were enrolled using a purposive sampling method. All the data were compiled and sorted properly and the quantitative data was analyzed statistically by using Statistical Package for Social Science. This study investigated the outcomes of open ureterolithotomy in the management of large upper ureteric stone by comparing independent variables such as patient age, sex, and stone size with dependent variables including operative time, stone clearance rate, complications (per-operative and post-operative), hospital stay duration, and recovery time.

Inclusion criteria:

- Age 15-70 years
- Single, upper ureteric stone
- Stone size > 1.5 cm

Exclusion criteria:

- Uncorrectable coagulopathy
- End-stage renal disease (serum creatinine > 8 mg/dL)
- Pregnancy
- Distal obstruction
- Radiolucent stone

RESULTS

Table 1: Age distribution of the respondents (n=35)

Most of the respondents (n=11, 31.43%) were aged between 45 - 54 years. Mean age of the patients were 45.88±14.47 (SD) years.

(Table 1)

Age (in years)	n=35 (%)
15-24	03 (08.57)
25-34	05 (14.29)
35-44	07 (20.00)
45-54	11 (31.43)
55-64	06 (17.14)
65-70	03 (08.57)
Total	35 (100)
mean ± SD	45.88 ± 14.47

Most of the respondents (n=19, 54.30%) were female. **(Figure 1)**

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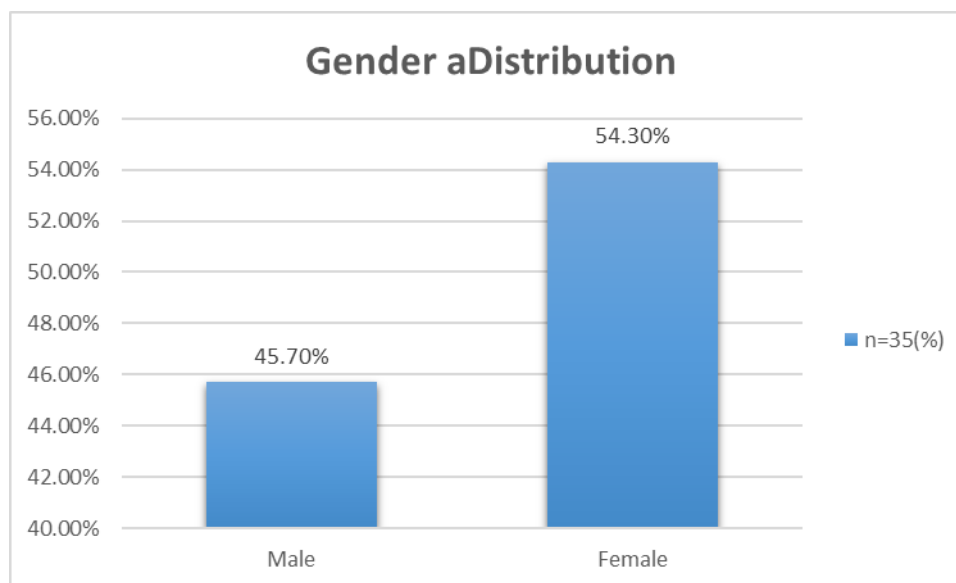


Figure 1: Gender distribution of the respondents (n = 35)

The mean stone size was found to be approximately 19.57 mm with a standard deviation of 1.54, indicating the typical dimension of stones removed during the procedure. The operative time averaged around 110.14 ± 14.37 minutes with a similar standard deviation, reflecting the duration of the surgical intervention. Postoperative hospital stay was reported at an average of 5.0 days, demonstrating the period patients spent in the hospital recovering from the procedure, with a standard deviation of 1.43. The time required for

patients to return to normal activity post-surgery was approximately 3.85 weeks, and this had a standard deviation of 0.97. Stone distribution revealed that 42.70% of cases involved stones in the right ureter, while 54.30% were in the left ureter. The stone clearance rate was notably high at 94.3%, indicating successful removal of stones in the majority of cases. However, 5.7% of patients exhibited residual stones after the open ureterolithotomy. (**Table 2**)

Table 2: Distribution of clinical features of patients underwent open ureterolithotomy (OU)

Characterestics	Mean $\pm$ SD
Stone Size (mm)	19.57 $\pm$ 1.54
Operative Time (min)	110.14 $\pm$ 14.37
Postoperative hospital stay (days)	5.0 $\pm$ 1.43
Time required to return normal activity (weeks)	3.85 $\pm$ 0.97
Stone Side	Frequency ,n(%)
Right Ureter	16 (42.70)
Left Ureter	19 (54.30)
Stone Clearance rate	33 (94.3)
Residual Stone	2 (5.7)

Per operative complications were observed in 34.3% of cases (12 out of 35), encompassed instances of bleeding (20%) and pleural injury (14.3%). Remarkably, no occurrences of renal pelvis injury were reported during this phase. Postoperative complications, affecting 40% of cases (14 out of 35), were diverse in nature. Fever emerged as the most prevalent postoperative issue, affecting 17.1% of patients.

Additionally, urinary leakage was observed in 2.9% of cases, while 14.3% required blood transfusions. Wound infections were documented in 5.7% of postoperative cases. The collective findings underscore the need for vigilant perioperative monitoring, with a focus on addressing bleeding and pleural injury concerns. (**Table 3**)

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Table 3: Distribution of patients according to per and post-operative complications (n=35).

Types of complications	Per operative complications
With Complication	12 (34.3)
Bleeding	7 (20)
Pleural injury	5 (14.3)
Renal pelvis injury	0
	Post operative complications
With Complication	14 (40)
Fever	6 (17.1)
Urinary leakage	1 (2.9)
Blood transfusion	5 (14.3)
Wound infection	2 (5.7)

DISCUSSION

The management of ureteral stones has been a topic of interest in health studies due to its high incidence rate, affecting millions of people worldwide ¹. Ureterolithiasis, the presence of stones in the ureters, is a part of upper urinary tract stones, which has a prevalence of 10-15% ². This condition can cause significant morbidity, particularly in developing countries where patients often present with complications such as urosepsis and renal failure ³. Delayed treatment can lead to obstructive pyelonephritis, increasing the risk of death from septic shock. In our study the stone clearance rate was notably high at 94.3%, indicating successful removal of stones in the majority of cases. However, 5.7% of patients exhibited residual stones after the open ureterolithotomy. Results of this study are consistent with previous studies that have reported high stone clearance rates with open ureterolithotomy. In a study by Nawar et al. (2016), the stone-free rate was 95.8% in patients who underwent open ureterolithotomy ⁷. Similarly, in a study by Yang et al. (2017), the stone-free rate was 96.7% in patients who underwent open ureterolithotomy ⁴. However, open ureterolithotomy is an invasive procedure associated with significant morbidity, including prolonged hospital stay and high rates of perioperative and postoperative complications. Minimally invasive techniques, such as shockwave lithotripsy (SWL) and ureteroscopy (URS), have emerged as alternative treatments for ureteral stones. SWL uses shockwaves to fragment the stones, while URS involves the use of a ureteroscope to access and remove the stones. These techniques have been shown to have similar stone-free rates as open ureterolithotomy but are associated with fewer complications and shorter hospital stays (Preminger et al., 2007; Knox et al., 2010) ^{8,9}.

CONCLUSION

In conclusion, the management of ureteral stones requires a careful evaluation of the patient's clinical characteristics,

stone size, and location. The mean operative time, post operative hospital stay and time required to return normal activity was high in open ureterolithotomy but it is an effective and safe procedure with a high stone-free rate and a low incidence of complications.

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CONFLICT OF INTEREST

Authors declare no conflict of interest.

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