

Semi-Rigid Pneumatic Ureteroscopic Removal of Ureteric Stone; Seven Years Experience At Nepalgunj Medical College

Shrestha NM

ABSTRACT

Background: The present study aimed to report the outcomes of ureteroscopy (URS) treatment of ureteric stone with semi-rigid pneumatic ureteroscopic lithotripsy. **Method:** This was a prospective observational study of the patients who underwent ureteroscopic removal of ureteric stone in the department of surgery, urology unit, Nepalgunj Medical college from January 2009 to July 2015. All patients underwent ureteroscopic removal of stones located at different levels of the ureter using semi-rigid 8/9.8 Fr ureteroscope. **Result:** 1251 patients with ureteric stones who underwent URS during the study period. Out of 1251 patients, in 1211 (96.80%) stone was removed in first setting, 10(0.79%) patients needed second setting of URS to remove stones. The overall failure rate was 1.59%. The common complications of URS observed were perforations of the ureteric wall (20%), retropulsion of ureteric stone into kidney (35%) and urosepsis(45%) which necessitated ureterolithotomy, Extra Corporeal Shock Wave Lithotripsy (ESWL) and antibiotic therapy, respectively. Two (0.15%) patients died and the cause was urosepsis with multiorgan failure in both. **Conclusion:** Most of the ureteric stone can be removed in a single setting of URS. However, some complications such as, ureteral trauma, difficulty in fragmentation of a stone, retropulsion of stone into the kidney and a fatal urosepsis may occur in few cases. Therefore, URS is a useful modality to remove the ureteric stones despite its few complications.

Key words: ESWL, lithotripsy, ureteroscopy, ureteric Stone, urosepsis, ureterolithotomy

INTRODUCTION

Ureteroscopy has become routine urological operation to diagnose and treat ureteral disorder like stone formation, stricture, malignancy and bleeding lesion at ureter^{1,2}. In most cases semi-rigid ureteroscopy are safe and effective, however, in certain situations this procedure cannot be easily performed and also failed the procedure. The cause of failure may be due to some pathological ureter like stricture ureter (calculus/neoplastic/congenital/non congenital), tiny ureter, tortuous ureter, a surgeon's experience, type and caliber of ureteroscopic, location of stone as well as previous history of ESWL³⁻⁵.

There are different modalities of treatment for ureteric stone; surgical (Ureterolithotomy, ESWL, Ureteroscopic) and conservative. Ureterolithotomy can be done for the stone located at any part of ureter but it has some drawback of difficulty in removing stones at mid and lower part of ureter, attempting second surgery from the same site, long hospital stay and scar formation⁶. ESWL can be other modality of treatment for upper ureteric stone because of its simplicity, non invasiveness and minimum morbidity. However, some stones are difficult to break due to its hardness and the fragments may remain in the ureter even after successful

fragmentation. Impacted stone (when stone remains at the same site for more than 2 months)⁷ are also more difficult to fragment with ESWL because of lack of natural expansion space for stone in ureter^{8,9}.

Ureteroscopic lithotripsy can be considered as a safe and useful treatment modality¹⁰. There are semi rigid and flexible ureteroscopy. The semi-rigid URS has different types of source of energy to break stone such as, electrohydraulic, ultrasonic and pneumatic where as, the flexible URS has holmium laser with electrohydraulic and ultrasonic, which has more risk of complications like ureteral perforation. The URS with Pneumatic energy is strong enough to fragment all types of stone and is cheaper than laser URS. However semi-rigid URS has also high chance of retropulsion of stone¹¹.

This study presents my seven years experience in treating ureteric stones with semi-rigid pneumatic ureteroscope at Nepalgunj Medical College.

MATERIAL AND METHOD

It is a prospective observational study including all patients above 12 years who underwent Ureteroscopic removal of ureteric stone in the Surgery department, Urology unit, in Nepalgunj Medical College Teaching Hospital during the period from January 2009 to July 2015. All patients who fulfilled the inclusion criteria underwent URS after taking the informed consent. Patient with uncorrected coagulopathy, active untreated urinary tract infection (UTI), pregnancy and age under 12 years were excluded in the study.

Patients were treated with antibiotic prior to operation. Ultrasonography of abdomen and pelvis, kidney-ureter-

Dr. Naresh Man Shrestha

Address for correspondence:

Dr. Naresh Man Shrestha
Department of Urology
Nepalgunj Medical College Teaching Hospital,
Kohalpur, Banke, Nepal
Email: drnms1973@gmail.com

bladder (KUB) X-ray and intravenous urogram (IVU) were performed. Furthermore, the patients were studied for clinical history, clinical examination and routine laboratory investigation. Operative technique: For removal of stone, 8/9.8 Fr wolf semi-rigid pneumatic ureteroscope, flourscope (C-arm), video monitor, stone grasper, lithoclast and irrigating device were used. After inserting a safety guide wire, ureteroscopes was introduced inside the ureter, the visualized stone was fragmented under direct vision by maintaining low pressure normal saline irrigation system.

In very tortuous ureter, Jeromin maneuver and double guide wire technique were used to reach up to stone. Stone fragments were taken out by grasper. In some cases, stone fragment could not be taken out due to its softness and tiny size. At the end of procedure, a double j (DJ) stent was placed for 3 weeks. Before removal of DJ stent, X-ray KUB was done to conform for any residual stone¹².

Data analysis: All the generated data were of qualitative variable, which were presented as frequency and percentage.

RESULTS

1251 patients were eligible for the study and all of them underwent URS. Among them 826(66.02%) were male and 425(33.97%) were female. The male to female ratio was 1:1.94. The age ranged from 12 to 65 years.

There were 325(25.97%) patients with upper ureteric stones, 775(61.95%) with mid ureteric and 151(12.07%) with lower ureteric stones Table I. In 1211(96.80%) patients stone was removed in single setting and in 10 (0.79%) stone was removed in double settings.

	No. of Pts.	%
Male	826	66.02%
Female	425	33.97%
Upper ureteric	325	25.97%
Mid ureteric	775	61.95%
Lower ureteric	151	12.07%

Table I: Demography and level of ureteric stones. (n= 1251)

Settings	No. of Pts.	%
Single setting	1211	96.80%
Double settings	10	0.79%

Table II: Stone clearance (n=1221)

Complications	No. of Pts.	%
Perforation of ureteric wall	4	20%
Retropulsion into stone	7	35%
Uro sepsis	9	45%

Table III: Complications (n=20)

Complications	Management	No. of Pts.	%
Perforation of ureteric wall	Ureterolithotomy	4	20%
Retropulsion of stone	ESWL	7	35%
Urosepsis	Conservative	7	35%
Mortality		2	0.15%

Table IV: Management where URS was failed (n=20)

DISCUSSION

The present study revealed that out of 1251 patients with ureteric stones, stones of 1211(96.80%) patient were being removed successfully in a single setting URS. This finding has been supported by guidelines on urolithiasis¹³ and study of M.El-Qadhi¹⁴. Furthermore, out of 1251 patients, 10(0.79%) patients needed double setting URS due to presence of hard stones and pus efflux after dislodging stone.

Among 10 patients, 6 patients had hard stone and 4 patients had pyonephrosis. To the patients with pyonephrosis, DJ stent was kept in situ till the urine culture report showed negative result for pus but kept not more than three months. To the patient with hard stone, the stones were removed in the next setting. This study showed comparatively higher success rate in first setting of URS (96.80%) than the study of Jermomin L et al. (86.6%). Furthermore, this study showed the lower rate to conduct the second setting of URS (0.79%) than the study of Jermomin L et al. (13.40%)¹⁵.

In the present study five patients (0.39%) with gross ureteral trauma and ureteral stricture were observed in URS and had to be converted to ureterolithotomy. This finding was supported by the study of Jeromin L et al., which mentioned the perforation of the ureteral from URS, which necessitated surgery in 0.29% of patients.

The sixteen patients (1.27%) whose stones were migrated to kidney during fragmentation in URS and needed further treatment with ESWL. This type of complication was observed in the patients with the stone located mainly at the upper ureter. The same complication was also mentioned in the study of Mitre Al et al.¹¹, and the method used for management of this complication was mentioned in Lingeman JE et al. study¹².

Nine patients (45%) suffered from urosepsis and treated with broad spectrum antibiotics which was been also reported in the study of Hossain GM Z et al.¹⁶.

CONCLUSION

The present study showed the high rate of stone clearance in single setting URS, however, there are some complications associated with the method, such as, gross ureteral trauma, retropulsion of the ureteric stone to the kidney, urosepsis and death due to septic shock which should be well managed for successful operative outcome.

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