

Original Article

Ureterorenoscopic Lithotripsy; Efficacy and Complications. Is Ureteric Stenting Necessary in Every Patient?

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Objectives: To observe efficacy and complications of ureterorenoscopic lithotripsy in the treatment of mid and lower ureteric stones. The placement of DJ Stent was also compared for their beneficial role or otherwise.

Design of study: Comparative Observational study.

Place and Duration of Study: Department of Urology and Renal Transplantation, Quaid-I-Azam Medical College /Bahawal Victoria Hospital, Bahawalpur, from July 2008 to December 2010.

Materials and Methods: All adult patients of mid and lower ureteric stones (10-22mm) were included in this study. Initially 107 patients were selected but during procedure 07 patients had proximal stone migration and required extracorporeal shockwave lithotripsy. These patients were excluded along with patients with history of previous ureteric surgery, pyonephrosis and pregnancy. Uretroscopy with Pneumatic Lithotripsy was used. The patients were randomly assigned to two groups, i.e. Group I patients had no DG stent while Group II patients had DJ stent

Results: The stone clearance at 24 hours post-operative was 67% in mid ureteric and 73% in lower ureteric stones, at one week 79% and 83%, at one month 87% and 92% and at 3 months 100% stone clearance was seen in both groups. The stented group had more complications and 18% patients of this group had irritative bladder symptoms. Two of these stented patients had severe bladder spasm, steinstrasse and required immediate stent removal at 7th day follow up visit.

Conclusion: Ureteroscopic Pneumatic Lithotripsy is best choice treatment for ureteric calculi when patient demands single session removal of stone and alleviation of symptoms. Routine placement of DJ Stent should be discouraged which has more complications as compared to Non-Stented patients. The DJ Stent also requires second procedure for its removal.

Keywords: Ureteric calculi, Ureteroscopic Lithotripsy (URSL), Double J Stent (DJ Stent).

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Introduction

Minimally invasive endoscopic procedures are replacing open surgical methods. Similarly open ureterolithotomy has almost been replaced by transurethral ureteroscopic lithotripsy.¹ Ureteroscopes and different lithotripsy methods have greatly improved the urologist's ability to treat ureteral stones, regardless of their location in the ureter.² The availability of gadgetry and experience gained by urologists in endoscopic procedures has made ureteroscopic lithotripsy safe and effective in treatment of ureteric stones at any level.³ The clinical availability of smaller caliber ureteroscopes has allowed the indication of ureteroscopy to expand greatly. Transurethral ureteroscopy for treatment of lower ureteric stones continues to be common option.¹ The

success rate for ureteroscopic stone removal depends on stone size, site of stone, experience of urologist, availability of all related gadgetry for ureteroscopy, lithotripsy and stone extraction. It is clear that urologist should be versed with all forms of stone therapy to manage patients effectively.⁴ Ureteric stenting following fragmentation of stone is routine in most of the centers, however their overuse has been questioned.⁵ Byrne RR et al² negates the routine use of stents following uncomplicated ureteroscopic lithotripsy.

The present study was designed as part of our internal surgical audit to observe complications and efficacy of endoscopic procedures. Previously, we used to insert DJ Stent as a routine in every ureteroscopic lithotripsy. In this study we also compared stented and non-stented

Table I: Age, Site and Size of Stone of both Groups.

Variable	Age (in years)			Site of Stone		Size of Stone (in mm)	
	18-30	31-50	>50	Mid	Lower	10-15	16-22
No. Of Male Pts. n=74	26	35	13	30	44	46	28
No. of Female Pts. n=26	08	12	06	09	17	20	06
Total Pts. n=100	34	47	19	39	61	66	34

ureteroscopic lithotripsies for their outcome and patient satisfaction.

Materials and Methods

This study was conducted at the Department of Urology and Renal Transplantation, Bahawal Victoria Hospital / Quaid-e-Azam Medical College, Bahawalpur from July 2008 to December 2010. Patients presenting with mid or lower ureteric stones of 10mm to 22mm size, above 14 years of age and of either gender were included in this study. Patients with previous open ureterolithotomy, pyonephrosis, sepsis and pregnancy were excluded. Total of 107 patients were enrolled in this study. Seven patients had proximal stone migration and were not included in analyzing results of ureteroscopic lithotripsy. In these patients DJ Stent was inserted and stone clearance was achieved by ESWL.

In patients who had successful Ureteroscopic lithotripsy; whether stented or non-stented were analyzed and results compiled over 100 patients including 74 males and 26 females with ratio of 2.8: 1.

The investigations done before the procedure were blood complete examination, urine routine examination, urine culture, USG abdomen, serum creatinine level, uric acid levels and IVU. The procedure was performed under general anesthesia with skeletal muscle paralyzing agents.

The patients randomly assigned to two groups. Both groups had equal number of patients (50 each) with almost comparable stone size so that requirement for stenting can be assessed at the end of ureteroscopic lithotripsy. Group I comprised of Non-Stented patients and Group II comprised of Stented patients.

Preoperative preparation included thorough history, physical examination, informed consent and pre-operative antibiotics. Patient consent included possibility of open surgery if complication occurs and possibility of second endoscopic procedure. Pre-operative antibiotics were given to make urine sterile before ureteroscopy. General anesthesia was used in all ureteroscopic lithotripsy procedures in this study.

Patients were placed in semi-lithotomy position under general anesthesia with head side tilted a little upward. Ureterorenoscope of 9 Fr was inserted over a guide wire in all patients. Stone localized and pneumatic lithotripsy

was done with probe of 1 mm tip under focused vision. Multiple transmitted shocks were given and stone disintegration was done into small particles until whole stone was fragmented. According to group allocation of patients, DJ Stent was inserted in Group II patients. Intra-operative difficulties and complications were noted. DJ Stent was kept for 2-3 weeks in stented group patient and removed endoscopically.

Patients were discharged within 24-48 hours in both groups after assessing the immediate post-operative status. Follow up was after 1 week, 1 month and then at 3 months. Assessment with USG abdomen and plain X-ray for KUB was done and stone clearance was recorded.

Results

Out of 100 patients, 74% were males (n=74) while 26 were females (n=26). Age range was 18-59 years with mean age of 38 ± 13 years. Table-I shows the number of patients according to site and size of stone of both groups.

The stone clearance at 24 hours post-operative was 67% in mid ureteric and 73% in lower ureteric stones respectively, at one week 79% and 83%, at one month

87% and 92% and at 3 months 100% stone clearance was seen in both groups, checked with ultrasonography and x-ray KUB. There was no gross difference in stone clearance in two groups.

The complications are shown in Table-2. The one patient of group II, who required open repair due to perforation, had hospital stay of 76 hours, otherwise, 99% patients of this study were discharged from hospital within 24-48 hours.

Our assessment about role of DJ Stent insertion does not support the idea of routine DJ Stent placement in every patient. DJ Stenting although provides unobstructed urine flow of that particular renal unit but 12% of stented group had colic, 6% hemorrhage, 18% bladder spasm and irritative voiding symptoms and even double chances of developing stricture as compared to non-stented group as shown in Table II.

Table II: Complications (n=36)

Complications	Group I	Group II	Total No. of patients Percentage
	URSL + no DJ Stent	URSL + DJ Stent	
Hemorrhage	02	03	5(5%)
Mucosal Injury	02	02	4(4%)
Extravasation	03	02	5(5%)
Ureteric	00	02	2(2%)
Perforation			
Post-Op Colic	02	06	8(8%)
Post-Op	00	09	9(9%)
Bladder Spasm			
Post-Op	01	02	3(3%)
Steinstrasse			

Discussion

The management of ureteric stones has been changing from conservative to open surgery, minimal invasive surgery, extracorporeal shock wave lithotripsy, endoscopic removal and laparoscopic surgery. Intracorporeal lithotripsy devices and Ureteroscope invention has made treatment of ureteric stones much

convenient. This study was designed to observe intraoperative and post-operative complications of ureterorenoscopic lithotripsy. Routine ureteral stenting has been questioned in many studies.⁶⁻¹² One of the main purposes of our study was also to assess whether double J stent is necessary in every URSL patient or can be avoided.

In this study we included patients with stone size of 10mm to 22mm only so that results can be compared for intraoperative complications and role of DJ stent insertion. There is small margin of safety for endoscopic surgery in the ureter. Operator error however, whether in judgment or in technique can lead to disastrous complications. Therefore, it is necessary for Urologist to be familiar with type of injury, diagnosis and treatment.^{1,2,4} Literature review shows 9% incidence of injury during endoscopic procedures and 1.6% requires surgical treatment. These injuries can be perforation,

false passage, avulsion and stricture formation as delayed complication. Avulsion of ureter is the most serious complication of ureteroscopic procedure if ever occurs.¹³⁻¹⁶ Most of these complications can be managed conservatively except avulsion. Fortunately, we have not come across ureteric avulsion with URSL at our department. Internal stenting or proximal diversion for 6 weeks can manage endoscopic ureteric injury successfully.^{14,16} Prevention of ureteric injury can be done by careful patient selection, complete urological work up, availability of essential instruments, availability of fluoroscopy and sound urological judgment.^{1,4}

Different studies have observed proximal stone migration from 2-7.2%^{2,13,14,17} and we had 07 patients with proximal stone migration, but we excluded them from this study.

Reported incidence of Ureteric perforation is 1-5%^{2,3,13,14,17} and we have come across 2% of ureteric perforation who fortunately belonged to stented group. Conversion to open surgery^{4,13} for endoscopic complications range from 1-2% and we had 1% conversion to open surgery for ureteric perforation. The extravasation of irrigant fluid was seen in 5 (05%) patients in our study (3 in group I and 2 in group II) and all managed conservatively. Subhani et al reported 9.2% rate of extravasation in his study.¹⁸ Mucosal injury observed in different studies range from 3.5-5%^{14,19} and mucosal injury in our study was seen in 4 patients. Some studies declared procedural failure or repeat procedure in range of 3-13%.^{4,7,18,20} In our study we have not come across procedural failure as it has been reported in literature. Interestingly, Jeromin⁴ reported "Jeromin maneuver" which involves pressing abdominal wall by assistant hand facilitating URS in difficult cases. He also reports 16.7%

Conclusion

Ureteroscopic lithotripsy is an ideal single session treatment for ureteric stones Pneumatic Lithotripsy being safest, cheapest has almost 100% stone clearance rates. Routine placement of stents after URSL should be avoided except in complicated cases and high stone burden.

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