

# Experience Sharing of Retroperitoneal Laparoscopic Ureterolithotomy from a Teaching Hospital

Joshi R<sup>1</sup>

<sup>1</sup>Department of surgery and urology, Kathmandu Medical College and Teaching Hospital, Kathmandu, Nepal.

## ABSTRACT

**Background:** Retro-peritoneal ureterolithotomy may be first option in impacted large upper and mid ureteric stones in selected cases.

**Methods:** We performed 16 Retroperitoneal Laparoscopic Ureterolithotomy in a teaching hospital. Out of 16 cases, eleven stones were located in the upper ureter and rest in mid ureter. Main indication was impacted large stone (1.5-2cm) (1.72 cm, mean size). Failed extracorporeal shock wave lithotripsy and Uretero-rensoscopy were other two indications. Failed PCNL for renal pelvic stone were resorted to open procedure not RUL.

**Results:** Total 16 RUL were performed. Hospital stay in range was 3-11 days. The mean operative time was 96 minutes and mean blood loss was 30 ml. There were 4 failures. No major complications were encountered. Prolong urinary leakage was seen in one patient. Follow up Intravenous urogram at 3 months revealed normal ureter in all cases.

**Conclusions:** RUL is a good option in lieu of open surgery for selected patient with large hard impacted ureteral stone which are likely to resist any endo-urolgical procedure. Our experience represents a safe and effective treatment option as a first option for large impacted stone or as a salvage second option for failed endo-urolgical procedure or ESWL.

**Keywords:** Double J stent; retroperitoneal ureterolithotomy; Uretero-rensoscopy; Urinary tract Infection.

## INTRODUCTION

As in many of the surgical practices, laparoscopy is becoming common in urological surgery. The need for open procedure has dwindled due to the emergence of ESWL, endo-urolgical procedures like PCNL, URS.<sup>1</sup> Despite the availability these procedure, there are exceptions where stones cannot be removed from the urinary tract.<sup>2</sup>

Laparoscopic ureterolithotomy have been described by retroperitoneal and transperitoneal approach. Jeong and colleagues<sup>3</sup> reported 12 patients who underwent retroperitoneal laparoscopic ureterolithotomy for upper ureteric stone. Abolyor and colleagues<sup>4</sup> reported 11 patients who underwent transperitoneal ureterolithotomy. Our objective is to describe the early experience of RUL in regards to indications, results and

outcome of this technique. Recent advances in flexible ureteroscopes and holmium laser have also demonstrated efficiency but the availability of equipment can dictate the treatment options.<sup>5</sup>

## METHODS

A cross sectional study was conducted in the Department of Kathmandu Medical College and Teaching Hospital from March 2012- September 2012. The written and oral consent were taken for this procedure and also counseled about the conversion to open surgery if required. The approach for the surgery was retroperitoneal. Main indication for RUL was large impacted stone (Range 1.5 - 2.0 cm) and impactation of stone were seen in 14 cases (87.5 %). Other main indication was patients' choice who

**Correspondence:** Dr. Robin Joshi, Department of Surgery, Kathmandu Medical College and Teaching hospital, Sinamangal, Kathmandu, Nepal. Email: robinjoshi@hotmail.com, Phone: 9841203920.

had opted for laparoscopy after counseling and those reluctant to open surgery. Three patients who failed ESWL and 2 patients with failed URS have been other indications. Stones less than 1 cm were excluded. Stones located in PUJ and VUJ which can be managed by PCNL, URS were also excluded from this study.

**Operative Technique:** In our study we have used 3 ports in true lateral position. Two 10mm and one 5 mm port was placed. Camera port was placed 2 cm below tip of 9<sup>th</sup> costal cartilage. Another 5 mm port was placed 2-3 cm above the anterior superior iliac spine and 10 mm port was placed in midway between the previous ports. Combined finger dissection and improvised balloon made of surgical gloves were used for the creation of retroperitoneal space. Ureter was located on psoas fascia. Ureterotomy was done on the stone bearing site and extracted. Interrupted intracorporeal suturing was done with 3/0 Polyglactin and retrograde DJ stenting was done. Proper placement of stent was confirmed by fluoroscope. After gaining initial experience we performed 1 antegrade stenting and drain was placed.

## RESULTS

Sixteen patients were included in this study. Age of the patients was in the range of 25-45 yrs. Mean age was 35.63 years. Ten patients (62.5%) were male and 6 (37.5%) were female (Table 1). Out of 16 stones, eleven were located in the upper ureter and 5 were in the mid ureter. Total 11 (68.75%) of the stones were located in the upper ureter and rest in the mid ureter. Out of 50% right ureteric stones 62.5% were the upper ureteric stones and in the left 75% were in the upper ureter. Mean stone size was 1.72 cm. The mean operative time was 96 minutes and mean blood loss of 30 ml. Drain was placed for 4-11 days in our cases with hospital stay of 3-11 days (Table 2). No major complications were seen in our 16 cases. We had four conversions to open surgery. Conversions were due to difficult anatomy, peritoneal breach which led to difficult pneumo-retroperitoneum, proximal migration of stone and one with anteriorly placed ureter which was detected per-operatively due to poor urogram films. As for the complications, prolong urine leak and wound infection were the commonest. The urine leak stopped in 3-4 days in most of the patients and maximum leak was seen for 11 days in 1 patient which was managed conservatively. This was due to improper DJ placement. Urine stopped leaking after few days of DJ removal. Two patients had urinary tract infection for which stent was removed on third week. No untoward complication was noticed. During the follow up after 3 months, IVU revealed normal ureter in all of the cases. At six months, patients had no specific complains.

**Table 1. Location of stone, size of stone, route of operation, operative time, per operative blood loss, drain placement, hospital stay, stent removal after surgery**

Characteristics	n (%)
<b>Location of stone</b>	
Upper Ureter	11 (68.75)
Mid Ureter	5 (31.25)
<b>Right ureter</b>	
Upper	5 (62.5)
Mid	3 (37.5)
<b>Left Ureter</b>	
Upper	6 (75)
Mid	2 (25)
<b>Size of stone in cm (range)</b>	
Mean in cm	1.5-2 cm 1.72
<b>Route of operation</b>	
	Retroperitoneum
<b>Operative time( Mean in minutes)</b>	
	96 minutes
<b>Per-operative Blood Loss(Mean in ml)</b>	
	30 ml
<b>Drain placement (days in range)</b>	
	4-11 days
<b>Hospital stay (days in range)</b>	
	3-11 days
<b>Stent Removal after surgery</b>	
Median	5 weeks
Range	4-6 weeks

**Table 2. Procedures performed on the patients**

Procedure (n=16)	Complications (n=6)	Conversions (n=4)
Retroperitoneal Ureterolithotomy	Prolong urine leak (1) Wound infection (4) UTI (2) Wound hernia (0)	Anomaly of ureter Proximal (1) migration of stone (1) Peritoneal breach (1) Difficult anatomy (1)

## DISCUSSION

In the era of Endo-urology, primary approach to stone has been PCNL, URS and with the advent of holmium laser lithotripsy impacted ureteral stone has been successfully dealt. Mugiya et al<sup>6</sup> successfully demonstrated 100% stone free rate in 104 patients with impacted ureteral stone using small flexible ureteroscopes (6.5 to 7.5 Fr) combined with holmium laser lithotripsy. But these new expensive technology is not widely available and not all the urological set around the world will be able to afford lithotripters, lithotrites, URS etc.<sup>5</sup> For these reasons, selected cases can be dealt by laparoscopy although routinely not recommended.

An impacted stone is defined as a stone that can not be bypassed by a guide wire or catheter or a stone that remains for more than 2 months at the same site in the ureter.<sup>7</sup> It has also been noticed that impacted stones tend to be more ESWL resistant.<sup>8</sup>

In our present early experience in 16 cases, we were able to identify few of the difficulties during laparoscopy mainly difficult anatomy, few landmarks, and peritoneal breach leading to near impossible pneumo-retroperitoneum. In the hands of good laparoscopy practice, retroperitoneal RUL is safe, effective and is associated with a short learning curve.<sup>9</sup> Our main indication for RUL was large impacted stone (1.5-2.0 ml) and stone resistant to ESWL. Our center does not possess flexible URS and holmium laser. Fan et al<sup>9</sup> reported 40 patients who underwent RUL for the upper ureter for large impacted stone. Similarly Nouria and colleagues<sup>10</sup> shared their experience on six patients who had large impacted stone in the upper ureter. The stone size ranged from 18 to 40 mm (mean 25.7 mm). The retroperitoneal route was used in all cases. As many urologists do not possess expensive instruments like flexible URS and holmium laser, resorting to a reasonably minimum invasive RUL which is an option for selected cases.

With experience, the RUL is safe, effective. Due to its minimal invasive nature as compared to open surgery, RUL has less morbidity like less post-operative pain, few wound scars and lesser hospital stay and above all quicker return to work. Many urologists prefer balloon to create space. We, in our cases, have used improvised surgeon's glove as a modified balloon and finger dissection to create retroperitoneal space. In our early cases there was conversion due to peritoneal tear that led to difficult pneumo-retroperitoneum. Gaur et al<sup>11</sup> reported eight failures mostly in early part of the series of 101 patients. Likewise, Kijvikai K and colleagues<sup>12</sup> performed RUL as primary procedure in 30 patients who had either larger, impacted stone in the upper ureter and resistant to ESWL. They had 1 failure of 30 patients. Most of the urologists have faced some limitation in the early part of learning curve and had conversions to open surgery, viz dense adhesion, difficult anatomy, pneumo-retroperitoneum.<sup>12</sup>

Intra-peritoneal suturing was done in all cases but was not successful in all cases. In first 3 cases ureterotomy was left open with DJ stent, proper placement of which was confirmed by fluoroscope. In the later cases, time for suturing was less and reduced our operation time. Retrograde DJ Stenting was done in all 16 cases and proper position was again confirmed by fluoroscope. Only one patient had antegrade stenting which further reduced the operative time.

El. Moula and colleagues<sup>13</sup> reported a total 74 patients out of which 54 patients had upper ureteral stone. They had four conversions. Mean operative time was 58.7 min, mean blood loss 90.6 ml, prolonged urine leakage in one patient and hospital stay was 64 days. Jeong et al<sup>3</sup> evaluated RUL in 12 patients. Total 6 patients were converted to open surgery. Mean operation time, mean estimated blood loss and mean hospital stay were respectively 109 min (90-120 min), 5 ml (10-100 ml), 4.6 days (2-7 days). RUL was not easy to perform simply due to severe adhesion, difficult anatomy and difficulty in locating ureter. Nevertheless, RUL can be considered a primary procedure before open ureterolithotomy.<sup>3</sup>

In the present study, mean operative time, mean estimated blood loss and mean hospital stay were 96 minutes, 30 ml, 3 days respectively. There was one patient who stayed for 11 days due to prolonged urine leak due to improper DJ placement.

It closed spontaneously after removal of DJ stent. There was no specific major complication apart from urine leaks and minor wound infection in our study. Minimal invasive surgery like PCNL, URS, whenever possible should be performed but RUL can be taken as a primary surgical treatment before open surgery. It is safe, effective with 100% stone clearance rate. Learning curve is not very steep and any urologist trained in laparoscopy can achieve successful results with shorter learning curve time.<sup>9,14-18</sup>

Our short term results are promising and follow up at six months showed no specific complaints.

## CONCLUSIONS

Large impacted stone in the upper/mid ureter can be successfully treated with RUL before open surgery. It is safe and reliably minimally invasive procedure for selected cases. Minimal blood loss and less use of analgesics, good cosmetic result, and shorter hospital stay with shorter leave from work are advantageous parts. Longer follow up is required to see for long term results and morbidity like recurrent stones and strictures.

Competing Interest: None stated

## REFERENCES:

1. Taue R, Izaki H, Fukawa T, Koizumi T, Nakanishi R, Yamaguchi K, et al. Laparoscopic ureterolithotomy for ureteral calculi: three case reports. *Hinyokika kyo*. 2008 Oct;54(10):661-4.
2. Farooq Qadri SJ, Khan N, Khan M. Retroperitoneal laparoscopic ureterolithotomy--a single centre 10 year experience. *Int J surg*. 2011;9(2):160-4.

3. Jeong BC, Park HK, Byeon SS, Kim HH. Retroperitoneal laparoscopic ureterolithotomy for upper ureter stones. *J Korean Med Sci.* 2006 Jun;21(3):441-4.
4. Abolyosr A. Laparoscopic transperitoneal ureterolithotomy for recurrent lower-ureteral stones previously treated with open ureterolithotomy: initial experience in 11 cases. *J Endourol.* 2007 May;21(5):525-9.
5. Lingeman JE, Evan AP et al. Surgical management of urinary lithiasis. In: Walsh PC, Retik AB, Vaughan ED, Wein AJ, editors. *Campbell's urology*. 8th ed. Philadelphia, Pennsylvania: Saunders; 2002. p. 3361-451.
6. Mugiya S, Nagata M, Un-No T, Takayama T, Suzuki K, Fujita K. Endoscopic management of impacted ureteral stones using a small caliber ureteroscope and a laser lithotripter. *J Urol.* 2000 Aug;164(2):329-31.
7. Roberts WW, Cadeddu JA, Micali S, Kavoussi LR, Moore RG. Ureteral stricture formation after removal of impacted calculi. *J Urol.* 1998 Mar;159(3):723-6.
8. Farsi HM, Mosli HA, Alzimaity M, Bahnassay AA, Ibrahim MA. In situ extracorporeal shock wave lithotripsy for primary ureteric calculi. *Urology.* 1994 Jun;43(6):776-81.
9. Fan T, Xian P, Yang L, Liu Y, Wei Q, Li H. Experience and learning curve of retroperitoneal laparoscopic ureterolithotomy for upper ureteral calculi. *J Endourol.* 2009 Nov;23(11):1867-70.
10. Noura Y, Kallel Y, Binous MY, Dahmoul H, Horchani A. Laparoscopic retroperitoneal ureterolithotomy: initial experience and review of literature. *J Endourol.* 2004 Aug;18(6):557-61.
11. Gaur DD, Trivedi S, Prabhudesai MR, Madhusudhana HR, Gopichand M. Laparoscopic ureterolithotomy: technical considerations and long-term follow-up. *BJU Int.* 2002 Mar;89(4):339-43.
12. Kijvikai K, Patcharatrakul S. Laparoscopic ureterolithotomy: its role and some controversial technical considerations. *Int J Urol.* 2006 Mar;13(3):206-10.
13. El-Moula MG, Abdallah A, El-Anany F, Abdelsalam Y, Abolyosr A, Abdelhameed D, et al. Laparoscopic ureterolithotomy: our experience with 74 cases. *Int J Urol.* 2008 Jul;15(7):593-7.
14. Leonardo C, Simone G, Rocco P, Guaglianone S, Di Pierro G, Gallucci M. Laparoscopic ureterolithotomy: minimally invasive second line treatment. *Int Urol Nephrol.* 2011 Sep;43(3):651-4. (Epub ahead of print)
15. Shah TP, Vishana K, Ranka P, Patel M, Chaudhary R. Retroperitoneal laparoscopic ureterolithotomy – our experience. *Indian J Urol* 2004;20:101-5
16. Goel A, Hemal AK. Upper and mid-ureteric stones: a prospective unrandomized comparison of retroperitoneoscopic and open ureterolithotomy. *BJU Int.* 2001 Nov;88(7):679-82.
17. Demirci D, Gulmez I, Ekmekcioglu O, Karacagil M. Retroperitoneoscopic ureterolithotomy for the treatment of ureteral calculi. *Urol Int.* 2004;73(3):234-7.
18. Ryu DS, Park WJ, Oh TH. Retroperitoneal laparoendoscopic single-site surgery in urology: initial experience. *J Endourol.* 2009 Nov;23(11):1857-62.