

To Compare the Outcome of Ureterorenoscopy (URS)/ Lithoclast with (PCN) Percutaneous Nephrostomy and Ureterorenoscopy (URS)/ Lithoclast alone in obstructed kidney due to ureteric calculus

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ABSTRACT

Aim: To compare the stone clearance rate in ureteric stones after ureterorenoscopy / lithoclast between patients with and without percutaneous nephrostomy.

Methods: After the approval from Ethical committee KEMU this randomized clinical trial was conducted at department of Urology (unit I and unit II), Mayo Hospital Lahore. Sample size of one hundred fifty patients (seventy-five patients in each group) was estimated. Group-A contained patients with upper ureteric stones and having percutaneous nephrostomy due to presence of lumbar pain resistant to medical treatment, varying degree of hydronephrosis due to obstructed uropathy and acceptance of procedure and underwent ureterorenoscopy with pneumatic lithoclast. Group-B contained patients with upper ureteric stones with presence of lumbar pain and varying degree of hydronephrosis without percutaneous nephrostomy and nephrostomy was not performed and underwent ureterorenoscopy.

Results: In current study the mean age of all patients was 35.79±13.14 whereas the mean age in group-A as well as Group-B was 33.77±12.57 years and 37.81±13.47 years respectively, the mean age was statistically same in both groups, p-value> 0.05. In current study there were 102(68%) male and 48(32%) female cases, the male to female ratio was 2.15:1. In current study the mean operative time in group-A was 61.72±12.14 minutes and in group-B was 28.87±9.04 minutes with statistically lesser mean operative time in group-B, p-value <0.05.

Conclusion: Results of this study showed that stone clearance rate was significantly higher in URS/Lithoclast without PCN when compared with URS/Lithoclast with PCN patients. i.e., 94.7% vs. 80%, p-value=0.007 because hydrostatic pressure and, mucosal edema of the ureter wall are the most important factors in higher stone clearance rate in group B. In our study drainage of collecting system with PCN has reduced the redundancy of ureter proximal to the obstruction and reduced the mucosal edema within the ureter in case of impacted stone and relatively large stone. The operative time was also less for Group-B when compared it with Group-A. Hence, in future URS/Lithoclast alone can be effectively used to treat patients presenting with upper ureteric stones.

Keywords: Percutaneous nephrolithotomy, nephrolithotripsy, SWL, Tubeless, hospital stay.

INTRODUCTION

Ureteric stones were managed by open ureterolithotomy for a long time. Bardenheuer performed calculus removal from upper part of ureter by open surgical procedure in 1882 and this represents one of the earliest record cases of ureterolithomy¹. Passively deflectable ureteroscopy was first developed in 1964 and advances in distal-tip deflection and scope durability continued till the development of ureterorenoscope (URS)². Recent advancement in URS has enabled us to manage the intrarenal stones especially for ureteral access sheath, tipless stone basket and holmium laser. URS has made its place as a minimally invasive modality to treat intrarenal calculi³. Pneumatic lithotripsy is regarded as a simple safe and effective and shows higher stone free rates and lesser complications³. A number of different endoscopic lithotrites such as ultrasonic, electrohydraulic and pneumatic lithotripsy. Pneumatic lithotripsy is cost effective and show higher stone free rates and lesser residual stone in the management of ureteric stones of different localization and different metabolic types or hardness^{4,5}. Many studies have

been done in the past that proved that ureterorenoscopy is the first line technique for the upper urinary tract stone. Previously the study comparing the results of ureterorenoscopy with and without percutaneous nephrostomy in retrospective study with smaller sample and unequal number in the group^{6,7,8}. Rationale of our study is to compare the results of ureterorenoscopy/ lithoclast between patients with and without percutaneous nephrostomy. There is no local study available that compared these two modalities for this specific stone size. Although both these modalities are based on stone size we designed this study so that it can be concluded which modality is better in terms of stone clearance and later on these results can be used to update the local guidelines and opted the modality with higher stone size clearance⁷.

MATERIAL AND METHODS

All Patients with obstructed kidney secondary to the ureteric calculi were selected. Sample size of one hundred and fifty patients (75 patients in each group) is estimated by using 95% confidence level 10% absolute precision with expected % with PCN as 95.1% and without PCN as 82% [9]. Patients selection was done with the help of non-probability convenience sampling technique while

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treatment allocation was done with the help of simple random sampling. Patients of either Sex, age 15 years and above Postrenal obstruction secondary to the upper ureteric calculi, creatinine level of patients should be less than 1.2 mg/dl, and patients having upper ureteric stone of 1-2 cm were selected. A total of 150 patients of ureteric stone were selected from outpatient department of Urology Mayo Hospital Lahore. Approval from Hospital Ethical Committee was obtained. The demographic data like age and address were recorded. Two types of patients were selected from an OPD and ward with flank pain due to upper ureteric calculi and had hydronephrosis of moderate and severe grades. Group-A consist of patient with ureteric stones and having percutaneous nephrostomy and underwent ureterorenoscopy with pneumatic lithoclast . PCN was performed with radiologist consultation. URS was performed after the patient’s medical condition has improved. The duration between nephrostomy tube placement and URS was about 2 to 4 weeks. Group-B consist of patients with upper ureteric stones without percutaneous nephrostomy and underwent ureterorenoscopy. Routine investigations were carried out including complete blood count, estimated GFR, blood urea and serum creatinine,U/S -KUB,BSL ,PT APTT,INR HBsAg and anti-HCV. The outcome was assessed after 2 weeks after the operation. The outcome like success rate, operative time and complication rate were assessed by ultrasound KUB, and x-rays KUB. Patients were requested to come for removal of DJ stent after 4 weeks. Nephrostomy tube was left in place for 24hr after internal stent placement..External drainage was continued for 12hrs ,after which time the nephrostomy tube was clamped to ensure the good internal drainagecould be accomplished through the stent. Data was entered spcc-20. Quantitative variables like age was presented as mean ±S.D. Qualitative variable like gender was presented as frequency and percentages. Comparison of two groups with PCN and without PCN was applied chi-square, p-value ≤0.05 was taken as significant.

RESULTS

In this study 75 cases were taken in Group-A (consisted of patient with ureteric stone and having percutaneous nephrostomy and underwent ureterorenoscopy with pneumatic lithoclast) and 75 cases were also taken in Group-B (consisted of patients with ureteric stone and without percutaneous nephrostomy and nephrostomy was not indicated and underwent ureterorenoscopy) Table 1.

Group-A: Patient with ureteric stone and having percutaneous nephrostomy and underwent ureterorenoscopy with pneumatic lithoclast.

Group-B: Patients with ureteric stone and without percutaneous nephrostomy and nephrostomy was not indicated and underwent ureterorenoscopy.

The mean age of all patients was 35.79±13.14 whereas the mean age in group-A and Group-B was 33.77±12.57 years and 37.81±13.47 years respectively, the mean age was statistically same in both group, p-value > 0.05 in Table 1.

In group-A there were 49(65.3%) male and 26(34.7%) female case while in group-B there were 54(72%) male and 21(28%) female cases. The male to female ratio in both groups was statistically same, p-value > 0.05 in Table 2.

The mean operative time in group-A was 61.72 ± 12.14 minutes and in group-B was 28.87 ± 9.04 minutes with statistically lesser mean operative time in group-B, p-value < 0.05 the reason of less operative time in group-B was as there was hydronephrosis and hydroureter in group-B as compare to group A in Table 3. Chi-square test = 7.30 p-value = 0.007

In group-A 60(80%) cases had success and in 15(20%) cases success was not achieved while in group-B there were 71(94.7%) cases who had successful stone clearance and in 4(5.3%) stone was not clear (not had success), the success was statistically higher in group-B as compared to group-A, p-value < 0.05 (i.e., 0.077) (Table 4).

In group-A perforation of ureter was occurred in 3(4%) and in group-B it was occurred in 1(1.3%) patient, stone pushed back was seen in 3(4%) of group-A and 2(2.7%) of group-B while failure to enter into ureter was observed in 9(12%) cases of group-A and 1(1.3%) of group-B. The complications rate was statistically higher in group-A as compared to group-B, p-value < 0.05 Table 5.

There were 102(68%) male and 48(32%) female cases, the male to female ratio was 2.15:1.

Fig.1: Gender distribution of the cases

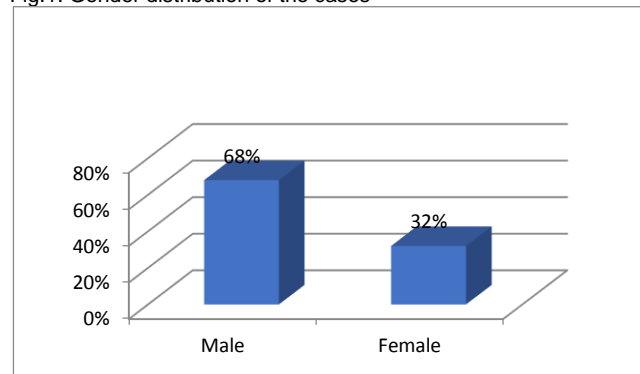


Table 1: Comparison of age (years) in both groups

Study groups	Mean	S.D	Min.	Max.
Age (years)				
Group-A (n=75)	33.77	12.57	7	70
Group-B (n=75)	37.81	13.47	10	67
Total (n=150)	35.79	13.14	7	70

Table 2: Comparison of gender in both groups

Gender	Group A	Group B	Total
Male	49(65.3%)	54(72.0%)	103(68.7%)
Female	26(34.7%)	21(28.0%)	47(31.3%)
Total	75(100.0%)	75(100.0%)	150(100.0%)

Table 3: Comparison of operative time (minutes) in both groups

Study groups	Mean	S.D	Min.	Max.
Operative Time (minutes)				
Group-A (n=75)	61.72	12.14	10.0	90.0
Group-B (n=75)	28.87	9.04	15.0	65.0
Total (n=150)	45.29	19.63	10.0	90.0

Table 4: Comparison of success in both groups

Success	Group A	Group B	Total
Yes	60(80%)	71(94.7%)	131(87.3%)
No	15(20%)	4(5.3%)	19(12.7%)
Total	75(100.0%)	75(100.0%)	150(100.0%)

Table 5: Comparison of complications in Treatment Groups

	Group A	Group B	P value
No complication	60(80%)	71(94.7%)	0.036
Perforation of ureter	3(4%)	1(1.3%)	
Stone pushed back	3(4%)	2(2.7%)	
Failure to enter into ureter	9(12%)	1(1.3%)	

DISCUSSION

Ureterorenoscopy (URS) is an insignificantly intrusive strategy for the treatment of ureteral stones. Momentum urological ways to deal with stone sickness have moved from getting suggestive stones looking for approaches to render patients without stone while limiting intercession related grimness¹⁰. URS has been endorsed for rewarding lower ureteral stones, however critical advances in ureterorenoscope configuration joined with the presentation of new lithotripsy methods for intracorporeal stone discontinuity have prompted the treatment of proximal stones in a way that has comparative viability and security levels as procedures performed for distal calculi¹¹. Ureteroscopy and extracorporeal shock wave lithotripsy (SWL) are the most usually performed careful intercessions in the administration of ureteral stones. Generally, unbending ureteroscopic expulsion of stone (URS) has been a supported methodology in the careful treatment of distal ureteral stones, while SWL has been favored for less available proximal ureteral stones. However, recently developed miniaturized ureteroscopes and improved lithotripters have facilitated effective and safe retrograde treatments for urinary tract calculi, regardless of stone sizes and locations¹². In current study the mean age of all patients was 35.79±13.14 whereas the mean age in group-A and Group-B was 33.77±12.57 years and 37.81± 3.47 years respectively, the mean age was statistically same in both group, p-value > 0.05. Another study reported that mean age of patient was 48±16 (with age range of 13–88) years^{13,14}, in current study the mean age was lesser. In current study there were 102(68%) male and 48(32%) female cases, the male to female ratio was 2.15:1. In current study the mean operative time in group-A was 61.72±12.14 minutes and in group-B was 28.87 ± 9.04 minutes with statistically lesser mean operative time in group-B, p-value < 0.05 i.e., the reason of less operative time in group-B was as there was hydronephrosis and hydroureter in group-B. Another study reported that PCN group showed significantly better outcomes in terms of the operative time (57.4 minute vs. 68.1 minute)⁹. In current study it was found that in group-A 60(80%) cases had success and in 15(20%) cases success was not achieved while in group-B there were 71(94.7%) cases who had successful stone clearance and in 4(5.3%) stone was not cleared, the success was statistically higher in group-B as compared to group-A, p-value < 0.05 (i.e., 0.077). Another retrospective review was performed to investigate the results of crisis ureteroscopy (URS) cases acted in Auckland City Hospital. They announced that altogether, 83% of crisis URS cases had an American Society of Anesthesiologists (ASA) status of 1 or 2, 25% of stones were >9 mm, with a mean (SD) size of 8 (4) mm, and 285 methodology (72%) were fruitful. These patients were more

youthful (47 versus 51 years), were bound to have an ASA score of 1 (103 patients in the fruitful treatment bunch versus 26 in the bombed treatment gathering), had littler stones (7 versus 9mm) and were bound to have distal stones (P<0.05). A sum of 20 complexities (5%) were recorded including six bogus entries and three mucosal wounds, one of which required radiological mediation, and 50 patients (13%) re-introduced, for torment (76%), dying (10%) or contamination (14%)¹⁵. In current study we also found lesser complications when treated without PCN.

CONCLUSION

Results of this study showed that stone clearance rate was significantly higher in URS/Lithoclast without PCN when compared with URS/Lithoclast with PCN patients. i.e. 94.7% vs. 80%, p-value=0.007. The operative time was also less for Group-B when compared it with Group-A. Hence, in future URS/Lithoclast alone can be effectively used to treat patients presenting with ureteric stone.

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