Original Article

Comparison of the Treatment Outcomes of Different Surgical Procedures in Patients with Large Proximal Ureteral Stone

Asadullah, Muhammad Musa Kakar and Masha Khan

ABSTRACT

Objective: To compare the effectiveness in term of stone clearance between ureterolithotripsy, extracorporeal shock wave lithotripsy and Laparoscopic Ureterolithotomy.

Study Design: Comparative study

Place and Duration of Study: This study was conducted at the Urology Department Sandeman Civil Hospital Quetta, from April 2019 to June 2020**.**

Materials and Methods: In this study, 80 patients of both genders having large stones (>1cm) in proximal ureter were included. After taking informed consent, patient's detailed history including age, sex and BMI were recorded. 24 patients received ureterolithotripsy, 27 patients received extracorporeal shock wave lithotripsy, and 29 patients received laproscopicuretrolithotomy treatment. Effectiveness in term of stone clearance was recorded and compared between treatment procedures. Data was analyzed by SPSS 24.0.

Results: There were 46 (57.50%) males while 34 (42.50%) females patients with mean age 37.26±10.54 years. Mean BMI was 23.43±2.05 kg/m^2. Extracorporeal shock wave ithotripsy had significantly shorter operative time 40.85±4.62 minutes as compared to uretrolithotripsy and laparoscopic uretrolithotomy 68.72±5.22 minutes and 110.06±11.38 minutes (p-value <0.05). Patients received laparoscopic uretrolithotomy had significantly higher stone clearance rate 93.10% as compared to extracorporeal shock wave lithotripsy and uretrolithotripsy 55.56% and 58.33% (p-value <0.05).

Conclusion: Laparoscopic uretrolithotomy was more effective than extracorporeal shock wave lithotripsy and uretrolithotripsy in term of stone clearance.

Key Words: Ureteral, Calculi Stone, Uretrolithotripsy, Laproscopic, uretrolithotomy, Extracoporeal shock wave lithotripsy, Stone Clearance

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INTRODUCTION

Ureteral stones are common in people worldwide, causing extreme pain and can lead to urinary tract infection and hydronephrosis. The primary cause of renal failure may also be ureteral stone. The ureteral stone (< 1 cm) of small dimension is normally transported into the bladder via a ureter, but the stones (> 1 cm) of large size can take more than two to three weeks to pass[1].

For several years, the treatment of patients with ureteral stones was used for medical expulsions using Alpha blockers and calcium channel blockers, resulting in a high expultion rate of stones compared to placebo.[2] The new multiple-center placebo-controlled exam has nevertheless resulted in a range of advantages over medical expulsive treatment.

Surgical treatment is the better solution to remove large proximal ureteral stones. Furthermore, it is controversy about the correct technique or procedure to treat larger proximal stones. Several studies indicate that uretroscopic treatment is successfully exceeded[3]. Uretrolithotripsy and shock wave lithotripsy (SWL) have been the first alternative treatment to the large proximal urinary tract stones[4]. American urological association and European urology association have recommended the success rate by the URS in developing countries is high compared with shock wave lithotripsy[5].

Uretroscopy is widely used in these conditions. Semi rigid and rigid URS for treatment of large proximal stones has been used. Multiple surgical complications may be caused by percutaneous nephrolithotomy. However, the technique of laproscopic lithotomy for treating large stones resulted in fewer complications and high effective ureteral clearance of stones[6].

Several studies have been performed to evaluate the effectiveness of laproscopic lithotomy and

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uretrolithotrypsiesin the treatment and efficacy of large proximal ureteral stones. These studies have shown that laproscopiclithotomy is more successful then URS [7-8]. We conducted this study to compare the effectiveness in term of stone clearance of uretrolithotripsy, extracorporeal wave lithotripsy and laparoscopic uretrolithotomy in patients presented with large ureteral stone.

MATERIALS AND METHODS

This comparative study was conducted at Department of Urology Sandeman Civil Hospital, Quetta from April 2019 to June 2020. Total 80 patients of both genders having large proximal stones >1cm in ureters were included. Patient's age range was from 20 to 60 years. After taking informed consent, patient's detailed history including age, sex and BMI were recorded. Pregnant women, history of open surgery, renal failure patients and those with no consent were excluded from this study.

Among all the patients, 24 patients received ureterolithotripsy, 27 patients received extracorporeal shock wave lithotripsy, and 29 patients received laproscopicuretrolithotomy treatment. Effectiveness in term of stone clearance was recorded and compared between treatment procedures. Data was analyzed by SPSS 24.0. Chi-square test was done to compare the outcomes between surgical procedures with p-value <0.05 was taken as significant.

RESULTS

Out of 80 patients, 46 (57.50%) patients were males while 34 (42.50%) were females with mean age 37.26±10.54 years. Mean BMI was 23.43±2.05 kg/m^2. Mean stone size was 2.05±0.36 cm. (Table 1).

Table No 1: Demographics of all the patients

Characteristics	Frequency no.	%age
Mean age (Yrs)	37.26±10.54	-
Mean BMI (kg/m)	23.43±2.05	-
Gender		
Male	46	57.5
Females	34	42.5
Mean Stone size (cm)	2.05±0.36	-
Techniques		
Uretrolithotripsy	24	30
ESWL	27	33.75
Laparoscopic uretrolithotomy	29	36.25

Extracorporeal shock wave lithotripsy had significantly shorter operative time 40.85±4.62 minutes as compared to uretrolithotripsy and laparoscopic uretrolithotomy 68.72±5.22 minutes and 110.06±11.38 minutes (p-value <0.05). Patients received laparoscopic uretrolithotomy had significantly higher stone clearance rate 93.10% as compared to extracorporeal shock wave lithotripsy and uretrolithotripsy 55.56% and 58.33% (p-value <0.05) (table 2).

Table No 2: Comparison of outcomes between techniques

Variables	Uretroli-thotripsy (n=24)	Extracorporeal shock wave Lithotripsy (n=27)	Laparoscopic uretro-lithotomy (n=29)	P-value
Operative Time (min)	68.72±5.22	40.85±4.62	110.06±11.38	0.001
Stone clearance				
Yes	14 (58.33)	15 (55.56)	27 (93.10)	0.001
No	10 (41.67)	12 (44.44)	2 (6.90)	

DISCUSSION

Uretral stone is one of the most common urological disorders. The technological advances of upper urinary tract stones have gradually changed the treatment. Surgical treatment is the better solution to remove large proximal ureteral stones. However, the best method for treating large proximal stones is controversial; research indicates that uretroscopic treatment is far more effective than extracorporeal shock waves lithotripsy[9]. The main downside of shockwave lithotripsy is long-term treatment time and the auxiliary procedures being needed.

Uretrolithotripsyis an efficient and safe form of treatment for large proximal ureteral stones as shown in various studies[10] and that stone removal procedure has a high degree of root clearance compared to ESWL[11]. The results are close to those observed in our study, which suggests a 58.3 and 55.56% stone removal ratio. Another research by Cout et al showed that ureterolithotripsies have better advantages than shock wave treatments without any significant complications differences[11]. Several ureteral stones studies have shown that stones observed in the upper urinary tract may lead to serious complications[12]. The most common and severe complications found in uretrolithotripsy treatment procedure is uretralevulsion and perforation and studies shows that the incidence rate 0 to 1%[13].

In our study, 46 (57.50%) patients were males while 34 (42.50%) were females with mean age 37.26±10.54 years. Mean stone size was 2.05±0.36 cm. A study conducted by Asif et al in which the male ratio was high as compared to females.[14] Previous studies demonstrated that average age of patients with large proximal stone was 35 years.[15]

In present study we found that Extracorporeal shock wave lithotripsy had significantly shorter operative time 40.85±4.62 minutes as compared to uretrolithotripsy and laparoscopic uretrolithotomy 68.72±5.22 minutes and 110.06±11.38 minutes (p-value <0.05). These results showed similarity to many of previous studies in

which laparoscopic uretrolithotomy had significantly longer operative time as compared to extracorporeal shock wave lithotripsy and uretrolithotripsy [16-17].

In our study we found that patients treated with uretrolithotripsy and laparoscopic uretrolithotomy had higher satisfaction rate as compared to extracorporeal shock wave lithotripsy. Some other studies showed similarity, in which laparoscopic uretrolithotomy had higher patients satisfaction rate as compared to extracorporeal shock wave lithotripsy [18-19].

CONCLUSION

We concluded Laparoscopic uretrolithotomy was more effective than extracorporeal shock wave lithotripsy and uretrolithotripsy in term of stone clearance. Laparoscopic uretrolithotomy has better treatment outcomes than other techniques, but has certain drawbacks that are longer operative time and being costlier than other procedures.

Author's Contribution:

Concept & Design of Study:	Asadullah
Drafting:	Muhammad Musa Kakar
Data Analysis:	Masha Khan
Revisiting Critically:	Asadullah, Muhammad Musa Kakar
Final Approval of version:	Asadullah

Conflict of Interest: The study has no conflict of interest to declare by any author.

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