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Research Article

A COMPARATIVE STUDY ON THE EFFECTIVENESS AND SAFETY OF FLEXIBLE UTEROSCOPY IN COMPARISON WITH LAPAROSCOPY FOR TREATING THE PATIENTS SUFFERING FROM OBSTRUCTIVE PYELONEPHRITIS

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Abstract:

Objective: The aim of this study was to provide the comparison of effectiveness and safety of F-URS (Flexible Ureteroscopy) and TPLU (Trans peritoneal Laparoscopic Ureter lithotomy) in the patients suffering from obstructive pyelonephritis.

Methodology: A group of forty patients appeared with obstructive pyelonephritis because of proximal ureteral stones having larger size than 1.50 centimeters, were included in this research work. The duration of this study was from January 2015 to January 2020. After pyonephrosis' drainage and sepsis's resolution, twenty patients underwent treatment with TPLU (Group-1) and twenty patients underwent treatment with the utilization of F-URS (Group-2). Before surgical intervention, characteristic of stones, parameters related with procedures and clinical outcomes were evaluated in both groups.

Results: The findings of this research work showed that, both procedures are much efficient in treating the proximal ureteral stones of large size. High stone free rate was provided by the TPLU (100.0% vs 80.0%. $P=0.0430$) and TPLU also provided the low rate of retreatment. We found no difference in the patients of both groups for duration of surgery and rate of complication. Patients who got treatment with the procedure of F-URS were present with less pain after surgery ($P=0.0080$), a short stay at hospital ($P<0.0010$) and very fast return to their routine daily activities ($P<0.001$).

Conclusions: Results of this research work concluded that both procedures are much effective and secure for the treatment of the proximal ureteral stones of large size after getting control on obstructive pyelonephritis. There is high stone free rate provided by the TPLU with comparable duration of surgery and rate of complication in comparison with the procedure of F-URS. There are also some advantages of F-URS as less pain after surgical intervention, fast return to normal routine activities and less stay in hospital.

Key Words: Obstructive, Pyelonephritis, Flexible Ureteroscopy, Ureter Lithotomy, Stones.

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INTRODUCTION:

Urosepsis because of the ureteral obstruction caused by impaction of stone is a condition of life threatening which normally need immediate drainage of gathering system [1]. The decompression of the collecting system with use of percutaneous nephrostomy tube or with utilization of double-J stent and suitable treatment with use of antibiotics are the important for treatment before surgical interventions for stones [2,3]. After initial therapy, available methods include SWL (Shock Wave Lithotripsy), URS (Ureteroscopy) using demi-rigid or flexible devices, open surgery and ureter lithotomy with laparoscopy. Most common methods are URS& SWL to treat the upper ureteral calculi having smaller than one centimeter of size, due to low morbidity and acceptable effectiveness of these procedures [4]. However, there are low success rates of SWL in comparison with URS when it is utilized for the ureteral stones having greater than one-centimeter size.

Different research works in this particular field have examined the success rates of URS, SWL and ureter lithotomy with laparoscopy for treating the proximal ureteral stones of large sizes [5]. But it is still a controversial issue to select the best technique. So, we provided the comparison between the efficacy and safety of the F-URS and TPLU in the patients who appeared with pyelonephritis secondary to ureteral stones of larger sizes.

METHODOLOGY:

We carried out this study on forty patients appeared with obstructive pyelonephritis because of proximal ureteral stones having larger size than 1.50 centimeters from January 2015 to January 2020. We gave all the patients parenteral antibiotics and all these patients underwent placement of nephrostomy tube. After completion of pyonephrosis's drainage and sepsis's resolution, twenty patients underwent treatment with TPLU (Group-1) and twenty patients underwent treatment with F-URS (Group-2) for the removal of stone. We measured the size of stone with imaging before surgery. We excluded the patients having

multiple stones or having less than eighteen years of age. The collection of the data carried out prospectively and then analyzed data retrospectively.'

We choose the method of treatment on the patient's preference after describing them the merits and demerits of both procedures. We used the standard procedures for the detection of obstructive pyelonephritis and its drainage. A single experienced surgeon performed all the operations under GA (General Anesthesia). We completed the follow up of the patients until their recovery.

Traits of demography of the patients, characteristics of stones and parameters related with procedures, success rates, duration of surgery, scores on VAS, total stay in hospital and complication rate were noted down and we provided the comparison of each group. We used the modified Clavien Grading System to classify the complications. We used the NCCS (Number Cruncher Statistical System) for the statistical analyses of the collected information. We used the descriptive statistical methods for the analysis of the data. We also provided the normal distribution for the comparison of the data of the patients of both groups. We used the Yates Continuity Correction as well as Fisher's exact test for the comparison of the qualitative data and P value of less than 0.050 was considered as significant.

RESULTS:

In this current research work, there were 61.90% male and 38.10% female patients. There were twenty patients in Group-1 and twenty patients in Group-2. We found no significant difference between the patients of both groups for gender, size of stone, age, density of stones and site of stone; however, we found a significant difference in the BMI (Body Mass Index) between the patients of both groups. Average BMI of the patients of Group-1 was 25.90 ± 2.30 kg/m² and 27.80 ± 1.30 kg/m² was the average BMI for the patients of Group-2 (P=0.0020). The traits of demography of the patients and characteristics of stone of the patients of both groups are present in Table-1.

Table-I: Patient and Stone Characteristics

	TPLU Group (Group I)	F-URS Group (Group II)	p value
No. patients (%)	20	20	
Mean age \pm SD, years	47.3 \pm 10.0	49.0 \pm 8.7	0.556
Mean stone size \pm SD, mm	19.9 \pm 3.2	19.6 \pm 2.6	0.698
Mean BMI, kg/m ²	25.9 \pm 2.3	27.8 \pm 1.3	0.002
Stone side (right/left)	12/10	10/10	1
Mean stone density	1000.0 \pm 293.9	1184.65 \pm 144.2	0.013

Average duration of surgery was 74.10 \pm 12.20 minutes and 78.10 \pm 6.40 minutes in the patients of Group-1 and Group-2, respectively (P=0.1920). There was hundred percent stone free rate in Group-1 and this rate was eighty percent after single procedure in Group-2 (P=0.0430). There was high rate of retreatment in the patients of Group-2 as compared to the patients of

Group-1 (20.0% vs 0.0%, correspondingly). There was no complication of bleeding in any patient of both groups with the requirement of transfusion of blood and average loss of blood was 58.80 mL in the patients of Group-1. Intra-operative findings of all the patients are present in Table-2.

Table-II: Comparison of Intraoperative and Postoperative Data

	TPLU Group (Group I)	F-URS Group (Group II)	p value
Mean operation time, min	74.1 \pm 12.2	78 \pm 6.4	0.192
Stone-free rate	100%	80%	0.043*
Re-treatment rate	0%	20%	
Mean hospital stays, days	4.2 \pm 1.2	2.1 \pm 1.1	<0.001*
Return to normal activity, days	13.3 \pm 1.7	9.0 \pm 1.6	<0.001*
VAS score			
Day 0	6.4 \pm 1.3	5.1 \pm 1.6	<0.008*
Day 1	4.3 \pm 1.0	3.6 \pm 1.2	0.093
Complications Grade I	5 (22.7%)	7 (35%)	0.591
Mucosal injury	-	1	
Stent related discomfort	2	2	
Ileus Grade II	3	1	
Ureteral perforation	-	1	
Fever	-	2	

Average stay at hospital was 4.20 \pm 1.20 days in Group-1 and 2.10 \pm 1.10 days in Group-2 (P<0.0010). Average scores obtained by VAS score after six hours of surgical intervention were 6.40 \pm 1.30 in Group-1 and 5.10 \pm 1.60 in Group-2 (P=0.0080). Total duration to return to daily routine activities was 13.30 \pm 1.70 days in Group-1 and 9.0 \pm 1.60 days for the patients of Group-2 (P<0.0010). The classification of the complications was carried out in accordance with the Clavien classification system and they are also presented in Table-2. There was no report of major complications as death or septic shock in any patient

of both groups. Overall rate of complication was 22.70% in the patients of Group-1 and 35.0% in the patients of Group-2.

DISCUSSION:

Most frequently used modalities for the management of the proximal ureteral stones having larger than 1.50-centimeter size are F-URS & TPLU [6]. In this research work, we stated that there is high stone free rate of TPLU with low retreatment rate in comparison with the method of F-URS. There was less pain after surgical intervention, less stay at hospital and fast

return to daily activities by the patients who underwent treatment with use of F-URS [7]. But there was no difference in both methods about the rate of complications and duration of surgeries. Obstructive pyelonephritis secondary to large size ureteral stones needs emergency drainage of collecting system of kidneys with double-J stent or percutaneous nephrostomy tube [8]. An early identification, immediate drainage from the collecting system and suitable treatment with use of antibiotics are vital steps for the administration such patients.

An infected kidney leads to a life taking condition like septic shock & urosepsis despite immediate drainage and proper treatment with the use of antibiotics, there is still expectations of two percent rate of mortality [9]. After sepsis's resolution and pyonephrosis's drainage, there should be planning for the treatment of ureteral stones. But, the selection of the best option for the treatment of those patients is still an issue of controversies. Selection of the best method for treating the stones should support not only minimally invasive and contented procedure but also the most effectual method [10]. SWL is the first option of treatment for the large ureteral stones having less than one-centimeter size with low rate of and high stone free rates, there is still reluctance to choose this method for the ureteral stones of large size [11]. In a current research work, Lopes Neto prospectively provided the comparison of the efficacy of SWL, URS, & laparoscopic ureter lithotomy for treating the complication of ureteral stones of large sizes and discovered a low rate of success of 37.50% [12].

Kumar in his research work stated a success rate of 86.0% in patients present with impacted ureteral stones [13]. Lee stated the rate of retreatment of 42.0% with procedure of F-URS in the patients present with proximal ureteral stones of large size. In one recent research study one hundred and three patients with stone size of larger than 1.50 centimeters [14], Ko provided the comparison between URS & laparoscopic ureter lithotomy.

CONCLUSION:

The findings of this research work concluded that both procedures are effective and safe for treating the proximal ureteral stones of large size after having control on obstructive pyelonephritis. There was higher free stone rate provided by the TPLU. This was not much difference in duration of surgery and rate of complication as provided by both groups. There are some advantages of F-URS as less pain after surgical intervention, short stay at hospital and fast return to normal routine activities.

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