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ESWL;

EXTRA CORPOREAL SHOCK WAVES LITHOTRIPSY WITH AND WITHOUT DOUBLE-J-URETERIC STENT

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ABSTRACT… Objectives: Objectives of the study are to evaluate extracorporeal shock waves lithotripsy (ESWL) with and without double-J-ureteric stent in 2-3 cm renal stone. **Study Design:** Comparative study. **Place and Duration of Study:** This study was out conducted at Lithotripsy Center, Department of Urology & Renal Transplantation, KEMU/ Mayo Hospital, Lahore, from June 2015to May 2016."**Methodology:** This study consisted of 60 patients admitted. All patients were divided into two equal groups. Thirty patients of kidney stones were included in group A, who were treated by ESWL without double-j-ureteric stent. Group B, who were treated by ESWL with prior double-j-ureteric stent insertion. Detailed History was taken from all the patients with special regard to the renal stone pain. Detailed Clinical examination of the patient was done and recorded in proforma. Systemic review was also done to see any co-morbidity. All patients underwent for base line and specific investigations" like Urinalysis Pre-ESWL and at monthly intervals post ESWL, mid-stream urine examination for Gram's staining; culture and sensitivity were performed in selected patients, renal ultrasonography, Plain X-Ray KUB and intravenous Urography. Inclusion criteria were that all patients from both sexes between the ages of 15-45 years suffering from renal stones 2-3cm will be included in the study. In Exclusion criteria; patients are unfit for general anesthesia, advance cardiac diseases, bleeding disorders, pregnant women, lower ureteral stones, malignancy and severe urinary infection. **Results:** 60 patients, there were 40 males and 20 females, with male to female ratio of 2:1. Minimum of 15 year to 45 years in both group. Mean age was 32+ 2.1years. 38(63.33%) of patients has 2.5 -3 cm stone and 22(36.66%) patients has 2-2.5cm stone. Commonest location of stone was 34(57%) cases were lying in calyces followed by pelvis stones which accounted for 26(43%) stones. The average number of retreatment sessions was 2 to 3 sessions, ranged 1 to 5 sessions. The majority 39 (65%) patients needed one & two sessions. Three & four sessions were used in 17 (28.33%) and in five session 04(06%) cases needed. Stone clearance observed 5 to 45days in 2 to 2.5 cm stone. Means clearance were seen 35+4.6 days in without Double-J-Ureteric Stent while 29+3.8 days in with Double-J-Ureteric Stent. **Conclusion:** In conclusion our study revealed that The extra corporeal shock waves lithotripsy with double-j-ureteric stent is safe, effective and with less complication rate then without double-j-ureteric stent.

Key words: Double-J-Ureteric Stent, Urolithiasis, extracorporeal shock waves lithotripsy (ESWL).

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INTRODUCTION

Urolithiasis has afflicted mankind since antiquity and also reorganization of this disease is as old as the history of human knowledge. Stone disease of the urinary tract is common, often very painful and sometimes life threatening, many forms of treatment has been in vogue and often proved to be unsuccessful and at times even dangerous. Until early eighties open surgery and other endoscopic techniques were the treatment modalities available for urolithiasis.[1] Since the mid 1980's ESWL (Extracorporeal shock waves lithotripsy) has been established as a minimally invasive procedure for a wide indications of urinary stones.[2,3] In 1980, first patient got treatment of renal stones with ESWL. This revolutionized the management of the stone disease and although expensive, rapidly became in practice throughout the world.[4] ESWL is usually an out patient procedure.

Patients can go home after the treatment, and do not have to spend a night in the hospital. Patient who harbor stones for years are afraid of hospitalization because of morbidity & mortality of open surgery and anesthesia as the incidence of residual and recurrent stones is significantly high and second or third surgery carries high morbidity and mortality rate, hence a less invasive technique of percutaneous renal surgery was introduced.[5]

Extra corporeal shock wave lithotripsy may be used to people with kidney stone between 4mm to 2cm in diameter[6] or renal calculi less than 3cm in size.[7,8] ESWL was recommended for some <2 cm. This size limit was recommended because of problems with high treatment failure rates and steinstrase for longer calculi.[9] This non-invasive technique of extra corporeal Shock Waves Lithotripsy (ESWL) was introduced by Chaussy and its first clinical application was performed in February 1980.[10] In an effort to decrease the incidence of ureteral obstruction. Double pigtail stents are commonly placed in patients before ESWL.[11] The use of double pigtail stents has contributed to successful stone passage and reduced post ESWL morbidity but there also have been reports of complications that might have been caused by these indwelling ureteral stents.[12] It may causes frequency, dysuria, pain, haematuria, urinary tract infection, fever[13] and encrustations. Insertion of double-j-stent in patients is still an unresolved issue.[14] Double-J-ureteric stent removed after all stone clearance up to 3 months.[15] ESWL is contraindicated in the presence of bleeding disorders, severe urinary tract infection, any malignancy, abnormal functions of kidney, and pregnancy.[9]

This study is aimed to evaluate the merits and the demerits of double-J-ureteric stent insertion in patients with moderate stone burden.

MATERIALS AND METHODS

This study were conducted at Lithotripsy Center, Department of Urology & Renal Transplantation, KEMU/ Mayo Hospital, Lahore, from June 2015to May 2016. This study consisted of 60 patients admitted. All patients were divided into two equal groups. Thirty patients of kidney stones were included in group A, who were treated by ESWL without double-j-ureteric stent. Group B, who were treated by ESWL with prior double-j-ureteric stent insertion. “Detailed History was taken from all the patients with special regard to the renal stone pain. All patients underwent for base line and specific investigations like Urinalysis” Pre-ESWL and at monthly intervals post ESWL, mid-stream urine examination for Gram’s staining; culture and sensitivity were performed in selected patients, renal ultrasonography, Plain X-Ray KUB and intravenous Urography. Inclusion criteria were that all patients from both sexes between the ages of 15-45 years suffering from renal stones 2-3cm will be included in the study. In Exclusion criteria; patients are unfit for general anesthesia, advance cardiac diseases, bleeding disorders, pregnant women, lower ureteral stones, malignancy and severe urinary infection.

The treatment was planned with follow up visits, spaced at 7-30 days. A plain X-ray KUB, Ultrasonography KUB was required from every patient to assess the fragmentation, steinstrasse, clearance of fragmentation, type of stone and to decide about next sessions. Stone biochemistry was done after stone clearance. Fragmentation was considered adequate if stone 4 mm in size or less, were left behind (consider as insignificant residual fragments). ESWL treatment was declared successful if a patient was stone free or had residual fragment 4 mm or less. U/S and plain x-ray KUB were the tools used for assessment of stone status. Plan for Double-J-Ureteric stenting removal.

RESULTS

Of 60 patients, there were 40 males and 20 females, with male to female ratio of 2:1. There was wide variation of age ranging from a minimum of 15 year to 45 years in both group. The mean age was 32+ 2.1years. In our study, 38(63.33%) of patients has 2.5 -3 cm stone and 22(36.66%) patients has 2-2.5cm stone. The commonest location of stone was 34(57%) cases were lying in calyces followed by pelvis stones which accounted for

26(43%) stones, the calyceal stones 06(10%) were present in lower calyx, 12(20%) in upper calyx, 16(26.60%) in middle calyx (Table-I). The average number of retreatment sessions was 2 to 3 sessions, ranged 1 to 5 sessions. The majority 39 (65%) patients needed one & two sessions. Three & four sessions were used in 17 (28.33%) and in five session 04(06%) cases needed (Table-II). The stone clearance observed 5 to 45days in 2 to 2.5 cm stone. Means clearance were seen 35+4.6 days in without Double-J-Ureteric Stent while 29+3.8 days in with Double-J-Ureteric Stent. The stone clearance observed 5 to 45days in 2 to 2.5 cm stone. Means clearance were seen 78+8.1 days in without Double-J-Ureteric Stent while 61+4.5 days in with Double-J-Ureteric Stent (Table-III). The common complications seen in this study were urinary retention in 16 (53.33%) cases, pain in 14(46.66%) cases, haematuria in 13(43.33%) cases and steinstrasse in 13(43.33%) cases Without Double-J-Ureteric Stent. While in With Double-J-Ureteric Stent were haematuria in 13(43.33%) cases, pain in 12(40%) cases and UTI in 11(36.66%) cases (Table-IV).

Variable	No. Patients	Percentage
Gender		
Male	40	66.66%
Female	20	33.33%
Age		
15 – 24 years	18	30%
25 – 34 years	26	1.33 %
35 – 45 years	16	26.66 %
Stone burden (cm)		
2-2.5cm	32	36.66%
2.5-3cm	38	63.33%
Location Of Stone		
Upper Calyx	12	20%
Middle Calyx	16	26.60%
Lower Calyx	6	10%
Pelvis	26	43.33%

Table-I. Demographic Variable N=2645

Stone burden	No: of Patients	No of Session				
		1st	2nd	3rd	4th	5th
2-2.5cm	22	15/22	04/22	03/22	-	-
2.5-3cm	38	09/38	11/38	10/38	04/38	04/38

Table-II. ESWL Session

Days clearance	Without Double-J-Ureteric Stent (n=30)		With Double-J-Ureteric Stent (n=30)	
	No: of Patients	% Age	No: of Patients	% Age
Stone Size 2 – 2.5cm (n=11 each group)				
05-15	0	0%	1	9.09%
16-25	2	18.18%	4	36.36%
26-35	3	27.27%	6	54.54%
36-45	6	54.54%	0	0%
Total	11	100%	11	100%
Mean	35±4.6		29±3.8	
Stone Size 2.5 – 3cm(n=19 each group)				
15-30	0	0 %	1	5.26%
31-45	2	10.52 %	3	15.78%
46-60	1	5.26 %	12	63.15%
61-75	3	15.78%	3	15.78%
76-90	13	68.42%	0	0%
Total	19	100%	19	100%
Mean	78±8.1		61±4.5	

Table-III. Days Clearance According To Stone Size

Complications	Without Double-J-Ureteric Stent (n=30)		With Double-J-Ureteric Stent (n=30)	
	No: of Patients	% Age	No: of Patients	% Age
Steinstrasse	13	43.33%	1	3.33%
Pain	14	46.66%	12	40%
UTI	8	26.66%	11	36.66%
Urinary retention	16	53.33%	1	3.33%
Haematuria	13	43.33%	13	43.33%
Perirenal hematoma	4	13.33%	1	3.33%

Table-IV. Complications

DISCUSSION

"Geographic variation in the rates of urinary stones has been observed for many years not only among countries with higher rates in industrialized nations compared with developing and Third World countries.[16-18]"

ESWL was first clinically used by Chaussy in 1980 .Because of the less invasive nature, low morbidity and patient preference. ESWL has become a primary treatment modality for almost 80 % of urinary tract calculi[19], initially it was only indicated for renal pelvic calculi of small size but

now the indication have increased. So that most of the upper urinary tract calculi can be treated by this modality.[20] ESWL mono therapy had been employed in 75 % of patient and open surgery was indicated in less than 3 % in some specialized centers.

In our study male is dominant, there were 40 males and 20 females, with male to female ratio of 2:1. However in the study of Jan Muhammad Memon was reported that Out of 257 patients 181 (70.42%) were male and 76 (29.56%) female with male to female ratio of 2.3:1.[18]

In our study there was wide variation of age ranging from a minimum of 15 year to 45 years in both group. The mean age was 32± 2.1years. However the study of Kangjam Sholay Meitei[21] reported that the mean age of the patients was 43.8 years. Only 3 patients were below 18 years of age. More than 70 percent of the patients were in the age group of 30 - 60 years.

Though large size stones required more treatment sessions & auxiliary procedures still it was a preferred treatment choice for our patient population due to the fact that the treatment was non-invasive, anaesthesia free & day care procedure.[22] Previously we were not doing PCNL at the Institute & surgery was not preferred by the patients therefore we were compelled to do ESWL monotherapy to large size stones. After the addition of PCNL in treatment armamentaria at our institute, large size stones are now treated by combination therapy.[23] In our study, 38(63.33%) of patients has 2.5 -3 cm stone and 22(36.66%) patients has 2-2.5cm stone.

In our study commonest location of stone was 34(57%) cases were lying in calyces followed by pelvis stones which accounted for 26(43%) stones, the calyceal stones 06(10%) were present in lower calyx, 12(20%) in upper calyx, 16(26.60%) in middle calyx. While in the international study reported forty-three (20.67 %) patients had stones in the pelvicalyx, one hundred forty-nine (71.64 %) had in the renal pelvis, four (1.92 %) had in the upper calyx, two (0.96 %) had in the middle calyx and ten (4.81 %) had in the lower calyx.[21]

"Although the results of shock wave treatment clinic were more effective evaluated, in vitro studies have shown that the reduction in the frequency improves the possibility of fragmentation and the increase in supply voltage is related to the reduction of the roll of the small fragments.[24-56]" In our study average number of retreatment sessions was 2 to 3 sessions, ranged 1 to 5 sessions. The majority 39 (65%) patients needed one & two sessions. Three & four sessions were used in 17 (28.33%) and in five session 04(06%) cases needed. While in international study difference in the number of ESWL sessions required in staghorn and non-staghorn calculi in all the size range is not clinically significant (p-value > 0.05). For stones in the size ranges of 21-30 mm, 31-40 mm, 41-50 mm, 51-60 mm and 61-70 mm, the success rates of ESWL were 85.29% (116 patients), 31.37% (16 patients), 33.33% (5 patients), 40.00% (2 patients) and 100.00% (1 patient).[21]

"However, many institutions around the world to treat these patients with SWL monotherapy with good success rates. Over the past decade, the results of SWL monotherapy for solitary kidney stones> 2 cm were the absence of test statistics variables varied from 33% to 65%.[27]" The advancement of technology and current expertise in ESWL has yielded much higher stone-free rates.[28] Kidney stone was early clear in DJ stent and stone clearance observed 5 to 45 days in 2 to 2.5 cm stone. Means clearance were seen 35±4.6 days in without Double-J-Ureteric Stent while 29±3.8 days in with Double-J-Ureteric Stent. The stone clearance observed 5 to 45 days in 2 to 2.5 cm stone. Means clearance were seen 78±8.1 days in without Double-J-Ureteric Stent while 61±4.5 days in with Double-J-Ureteric Stent.

"Complications Related to the Formation and Passage of Lithiasic Fragments. The main aim of an SWL is the pulverization of stones and asymptomatic elimination of fragments. This procedure may not always be completely

successful due to incomplete fragmentation, with residual fragments of a significant size, and ureteral blockage by fragments (Steinstrasse) which ends up with an obstruction to the urinary flow." In our study observed more commom in Without Double-J-Ureteric stent group were urinary retention 16(53.33%) cases and steinstrasse in 13(43.33%) cases while in With Double-J-Ureteric group observed less complications like urinary retention 16(53.33%) cases and steinstrasse in 13(43.33%) cases 1(3.33)cases in each respectively. However in the study of Mahmoud Mustafa[29] reported Steinstrasse occurred in two patients without "clinical symptoms along with spontaneous passage of the fragments. One of these patients was from stented group and the fragments were passed after the removal of DJS". This supports the claim that DJS may interfere with the delivery of the fragments, and the stent should removed.[30] Beirkens et al. did not find any difference in the occurrence rate of the steinstrasse with or without DJ stents.[31]

In our study after ESWL observed haematuria was 13(43.33%) cases in each group with and without Double-J-Ureteric Stent, Pain were observed 14(46.66%) cases in without Double-J-Ureteric Stent and 12(40%) cases in with Double-J-Ureteric Stent. However in the study of Mudassar Saeed Pansota reported Haematuria was seen in 11 (11.0%) patients and painful trigone irritation was common and distressing in 13 (13.0%) patients and was settled by anti-cholinergics in 10 patients while in 03 patients it resulted in early DJ Stent removal.[32]

CONCLUSION

The extra corporeal shock waves lithotripsy with double-j-ureteric stent is safe, effective and with less complication rate then without double-j-ureteric stent. Double-j-ureteric stent neither enhance the passage of stone fragments with diameter more than 2.5cm and early clear fragment than without double-j-ureteric stent.

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3	Dr. Nauman Khalid	Drafting of the article	