

Outcome of extracorporeal shockwave lithotripsy for renal pelvic stone with and without double J stent

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Abstract

Background: Extracorporeal shock wave lithotripsy treatment of renal pelvic stone may need JJ Stent in its management.

Objective: To determine the postoperative outcome of extracorporeal shock wave lithotripsy for renal pelvic stone with and without double J stent.

Methodology: Comparative study. Place and duration of study: Department of Urology Pakistan ordinance factory Wah cantt from 1st July to 31st December 2016. This study started after taking approval from hospital ethical review committee and informed consent. From each patients and with non-probability consecutive sampling. All patients suffering from renal calculi 1.5 cm to 2.5 cm were included in the study. A total of 100 patients were selected and divided into two groups of 50 each by lottery method. Group A patients were selected for ESWL with JJ stent and Group B for ESWL without JJ stent. Patients of both the groups were subjected to shockwave via ESWL machine, stone localized with fluoroscopy and 3000 shockwaves given. All patients were followed in OPD after 1 week and assessed for symptoms of urinary urgency, hesitancy and need for analgesia during the week. The data entered in SPSS version 22.

Results: The patients after ESWL with DJ stent group has significantly less need for analgesia ($p=0.02$), in Group A; 10 patients needed analgesia while 40 patients did not need intramuscular / intravascular analgesia while in group B, 26 patients needed and 24 patients did not need analgesia. However, the use of Dj Stent in patients before ESWL reduces the chances of ureteric obstruction and improve patient comfort, in DJ stent group A; 22 patient had increased increased urinary frequency versus without stent Group B, 12 patients had increased urinary frequency. P- Value was 0.035 which is significant.

Conclusion: Use of Double J Stent in patients before ESWL reduces the chances of ureteric obstruction, need for intramuscular analgesia and improves patient comfort.

Key words: Extracorporeal shockwave lithotripsy, Stent, Hematuria, Renal calculi

Introduction

There was a dramatic change in management of renal calculi once beginning of extracorporeal shockwave lithotripsy (ESWL).¹ Majority of ESWL procedures are often done as outpatient surgeries. Presently about 80 to 85 % of patients having simple renal calculi is undergoing shock wave lithotripsy worldwide.² New generation of lithotripter operate as electroconductive or electromagnetic source to focus energy onto calculus. As per few studies it has efficacy of as high as 90%.³⁻⁶

Now a days, ESWL is considered modality of choice for kidney stones less than 20 mm, however for bigger, irregular or staghorn stones, percutaneous nephrolithotomy (PCNL) is usually recommended.⁷ Therefore, extracorporeal shock wave lithotripsy (ESWL) is an ideal treatment for renal calculi less than 2 cm due to its minimal

morbidity and simplicity.⁸ However, the efficacy of ESWL drops significantly for large renal calculi.⁹ Several factors such as stone composition, position, kidney malposition and obesity decreases the success rate of ESWL.¹⁰

Kidney calculus is a common disease in a country like Pakistan. There is a stone belt which covers countries from Indonesia to Egypt. Poor economy, low diet, dehydration and increased environmental temperature are the key etiological factors for renal calculus.^{11,12} As per guidelines of American and European urologist association, it is recommend that JJ stent to be used before ESWL procedure for renal pelvic calculi above 20 mm in size.^{13,14} Ureteral stents have been used commonly before ESWL procedures in many cases, which helps stone fragments to pass through the ureter into bladder and reduces the blockage of ureter.¹⁵

JJ stent has been used frequently for kidney stone

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causing obstructive pyelonephritis, acute obstructive renal failure, renal colic not responding to analgesics and renal system blockage as in emergency cases. Use of ureteral stent in patients with kidney stone undergoing ESWL is still controversial.¹⁴ In some patients undergoing JJ stenting after ESWL, lower urinary tract irritative symptoms and pain in lumbar and hypogastric area may be observed.

Our study was planned to determine postoperative outcomes in term of urinary frequency, urgency, hematuria, UTI, pain and use of analgesia in patients who underwent JJ stenting when compared to those in which no stent was placed after ESWL.

Methodology

This comparative study was started after taking approval from hospital ethical review committee and informed consent form each patients. Non-probability consecutive sampling technique was used. This study was conducted in Urology Department, Pakistan Ordinance Factory Hospital, Wah Cantt from July to December 2016. All patients of 18-60 years of age presenting to Urology department of POF Hospital, Wah Cantt, suffering from renal stones 1.5 cm to 2.5 cm included in the study. The patients with the history of recurrent renal stones, previous renal surgery, anatomical abnormality on IVU or CT scan abdomen, diabetes, hypertension or chronic renal failure were excluded from this study. Initial data about age, gender, were recorded on predesigned proforma. In all patients complete history and a relevant examination was performed and basic investigations was ordered including CBC, serum urea, creatinine, and urine culture. An ultrasound and intravenous pyelogram was performed in all patients. Total 100 patients were selected for this study and randomized into two groups by lottery method 50 in each group (Group A & B). Group A patients underwent ESWL with JJ stent and Group B ESWL without JJ stent respectively. All the patients in group A received a prophylactic antibiotic injection (sulzone 2 gm i/v) and under fluoroscopic guidance, a 4.8 Fr JJ stent was placed under local or general anesthesia before ESWL. In both the groups stone was localized under fluoroscopic guidance and shockwaves were

adjusted at 3000 and the energy level kept between 4 and 6 at the rate of 70 per minute. Patients of both groups were then subjected to shockwave via ESWL machine.

All the patients of both groups were assessed and followed in OPD after 1 week for symptoms of urinary urgency, urinary hesitancy and need for intramuscular/intravascular analgesia. Urine report sent and report assessed for microscopic RBC and WBC count. Pain score assessed with visual analogue scale (VAS) and noted in proforma. The data was entered in SPSS version 22. Descriptive statistics used to calculate mean± standard deviation for quantitative variables i.e. age and visual analogue pain score. Frequencies with percentage calculated for qualitative variable i.e. gender, renal stone size, side of body involved, urinary hesitancy, urinary frequency, hematuria, UTI and need for analgesia for both group. P value equal or less to 0.05 was considered as significant.

Results

Total of 100 patients which were randomly divided into two groups of 50 each. In group A, patients received ESWL with DJ stent while Group B received without stent. Descriptive statistics of patients in both group showed that mean ages in Group A, 47.08±7.42 years and in Group B, 45.54 ± 7.677 years. Maximum and minimum ages in groups were, 59 and 28 years (Gp A) and 58 and 26 years (Gp B). In group A, male to female proportion was 66% vs 34% and in Group B, 60% (Vs 40%). Frequency statistics of age in group A showed that 01 patient was in 18-30 years, 08 patients were in 31-40 years, 22 patients were in 41-50 years group and 19 patients were in 51-60 years group. In Group B, 02 patients were in 18-30 years, 09 patients were in 31-40 years, 25 patients were in 41-50 years and 14 patients were in 51-60 years. Patients were categorized in both groups on the basis of stone size. In Group A; 13 patients were in 0.1-0.9 cm size group and 09 patients were in 1.6-2.0cm group. In Group B; 12 patients were in 0.1-0.9 cm size group, 28 patients were in 1.0-1.5 cm size group and 10 patients were in 1.6-2.0 cm size group. In Group A, 22 patient had right sided renal stone and 28 patients had left sided renal stone. In Group B, 24 patient had right sided renal stone, 23 patients had left renal stone and 03 patients had bilateral renal stone.

Table I: Comparison of outcome variables versus group

Group	Occurrence of Urinary Frequency		P- Value
	Yes	No	
DJ stenting Group	22	28	0.035
Without Stent Group	12	38	
Total	34	66	
Group	Occurrence of Urinary Urgency		P- Value
	Yes	No	
DJ stenting Group	24	26	0.031
Without Stent Group	11	39	
Total	35	65	
Group	Occurrence of Hematuria		P- Value
	Yes	No	
DJ stenting Group	12	38	1.000
Without Stent Group	12	38	
Total	24	76	
Group	Occurrence of UTI		P- Value
	Yes	No	
DJ stenting Group	13	37	0.817
Without Stent Group	12	38	
Total	25	75	
Group	Need for Intramuscular/ Intravascular Analgesia		P- Value
	Yes	No	
DJ stenting Group	10	40	0.027
Without Stent Group	26	24	
Total	36	64	
Group	Ureteric obstruction		P- Value
	Mean	Std. Deviation	
DJ Stent Group	2.78	1.657	0.046
Without Stent Group	4.3	2.621	

Results were stratified in both groups for urinary frequency, urgency, hematuria and UTI. Results were inferred on the basis of increased urinary frequency in DJ stent group A; 22 patient had increased increased urinary frequency while 28 patients did not have urinary frequency while in without Stent Group B, 12 patients had increased urinary frequency and 38 patients did not have increased urinary frequency. P- Value was 0.035 which is significant. Results for urinary urgency showed that in group A, 24 patients had urinary urgency while 11 patients in group B had urinary urgency. In Group A, 26 patient did not have urinary urgency while in Group B, 39 patient s did not have urinary urgency. P-Value was 0.031 which is significant.

In DJ stent group as well as without Stent Group, 12 patient had hematuria and 38 patients did not have hematuria, P- value was 1.000 which is insignificant. Similar results were observed in term of UTI; 13 patients in DJ stent group and 12 patients in without Stent Group had UTI and similarly 37 patients in DJ stent group and 38 patients in without Stent Group did not have UTI. P- Value was 0.817 which is insignificant. Results were determined for need intramuscular / intravascular analgesia in both groups. In Group A, 10 patients needed analgesia while 40 patients did not need intramuscular / intravascular analgesia while in group B, 26 patients needed and 24 patients did not need analgesia. P- Value was 0.027 which is significant. (Table I)

Descriptive statistics of VAS (Visual Analogue Scale) after 07 days were calculated for both groups. In group A, mean age, VAS was 2.78 ± 1.657 , maximum VAS was 7 and minimum VAS was 1. In Group B, mean age, VAS was 4.30 ± 2.621 , maximum VAS was 7 and minimum VAS was 1. P- Value was 0.046 which significant. (Table I)

Discussion

ESWL is now established as treatment choice for renal pelvic stone up to 2cm size with wide and easy accessibility of equipment, Lithotripsy is commonly being performed as a day care procedure with good patient compliance. However, post procedure ureteric obstruction or loin pain by the disintegrated smaller stone particles led to passing of Dj stent along with ESWL to prevent these complications but DJ stent has itself been associated with LUTS in many studies.¹⁵⁻¹⁹ This study aimed to compare

effects on patient symptoms after ESWL with and without DJ stent. In our study, 52% of patient without stent had renal colic and needed intramuscular/ intravascular analgesia even after discharge from hospital however, only 20% of DJ stent group needed analgesia. When we compared our results with other studies the results are almost a like, as Mohayuddin N et al. observed that there was incidence of renal colic in 32.5% of patients without stent and 7.5% with DJ stent.¹⁶ Similarly, Chandhoke PS observed pain scores higher in the group without JJ stent when compared to JJ stent placed before ESWL.¹⁷ Different results were observed by Musa et al. and Taku Abi et al reported no satisfical difference in pain in both the stent or without stent groups.^{18,19}

The result of our study is comparable to a study by Ghoneim IA et al.²⁰ Patient in the stent group significantly complained of side effect attribute able to the stent predominantly dysuria, urgency, frequency, and suprapubic pain.²⁰ The results were similar to our study which also showed significant increase in urinary frequency and urgency in DJ stent group as compared to without stent group. Similar findings have been observed by Musa AA in 120 patients with kidney stone who underwent ESWL Fifty-one patients (85%) patients of stented group had increased urine frequency and urgency, bladder pain and hematuria.¹⁸

In another study of 50 patients by Pryor JL, Jenkins AD, observed post stent survey on pain and associated symptoms at one and fourteen days after treatment. There was no statistical difference in nausea, vomiting, flank or abdominal pain, use of analgesia after extracorporeal shockwave lithotripsy in both groups. All patients in the stented groups complained of side effects attributable to the stent including urinary frequency and Urgency, bladder pain, hematuria and flank pain with urination.²¹ Eight randomized controlled trials in 876 patients were interoperated in one analysis and reported incident of lower urinary tract symptoms was significantly higher in the stent group than in the without stent group ($p < 0.00001$). Significant difference could not be found in fever, hematuria, pain and analgesia, urinary tract infection, supplementary treatment, or nausea and vomiting between the groups.²² At the end of our study we found it that the use of double-pigtail stents before ESWL in renal stones

2cm and above greatly reduce colic episodes and need for analgesia.

Conclusion

Most of the patients after extracorporeal shockwave lithotripsy suffer from a constellation of symptoms such as pain, lower abdominal discomfort, nausea, vomiting, hematuria and fever because of passage of stone fragments. However, the use of Dj Stent in patients before ESWL reduces the chances of ureteric obstruction, improves patient comfort. And decreases need of analgesia.

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