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Research Article

### MANAGEMENT OF PROXIMAL URETERIC STONE (10 – 15 MM SIZE) VIA URS & ESWL

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**Abstract:**

**Background:** Urinary stone disease or nephrolithiasis is the third most common disease of the urinary tract is major health issue due to its high prevalence, occurrence and recurrence. The hallmark of a stone that obstructs the ureter or renal pelvis is excruciating, intermittent pain that radiates from the flank to the groin or to the inner thigh. Stone size influences the rate of spontaneous stone passage.

**Objective:** To compare the efficacy (frequency of stone free patients) at one week after extracorporeal shock wave lithotripsy (ESWL) and ureterorenoscopic (URS) manipulation for proximal ureteric stone (10 – 15 mm size)

**Material & Methods: Study Design:** Randomized control trial

**Setting:** Department of Urology, KRL Hospital Islamabad

**Duration:** 6 months i.e. 18-11-2019 to 18-5-2020

**Data collection:** After meeting the inclusion criteria 100 patients were enrolled and were divided into 02 groups. One group treated with ESWL and other with URS. Then procedures were done. Follow-up was noted after one week in stone clinic. All the data was collected on pre-designed proforma.

**Results:** The average age of the patients was 39.71±10.17 years. The efficacy in ESWL group was noted in 68% cases while in URS group the efficacy was achieved in 76% cases (p-value>0.05). Male were 3 times at higher risk as compared to females.

**Conclusion:** This study concluded that both ESWL and URS are statistically equally effective in terms of frequency of stone free patients at one week for proximal ureteric stone (10 – 15 mm size).

**Keywords:** Proximal Ureteric Stone, extracorporeal shock wave lithotripsy, ureterorenoscopic, manipulation

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**INTRODUCTION:**

Urinary stone disease or nephrolithiasis is the third most common disease of the urinary tract is major health issue due to its high prevalence, occurrence and recurrence. The life span frequency of kidney stones for both men and women is approximately 13% and 7% respectively<sup>1</sup>.

According to recent estimates the prevalence in the United States (US) population at 10.6% for men and 7.1% for women respectively<sup>2</sup>. When we talk about the world prevalence is 4–20% and incidence is 0.03–0.1%, in adults<sup>3</sup>.

ESWL and URS are two foremost methods of treating proximal ureteric stones. The overall efficacy of ESWL for nephrolithiasis depends mainly on stone size, location, stone composition, patient habit and performance of ESWL.

A combination of URS and intracorporeal lithotripsy has proven to be a viable alternative to ESWL. However, some urologists have recommended URS manipulation as first line treatment. For proximal ureteric stone, the debate still continues whether ESWL or URS manipulation should be the first line treatment for proximal ureteric stone. But ESWL is better in terms of decrease hospital stay and no requirement of anesthesia. ESWL is desirable in poor-resource countries because of its noninvasiveness, low morbidity, and usability in patients who are unfit for open surgery.<sup>4</sup>

Our objective is that ESWL is safe alternative to URS as it based on the study results we may recommend use of better procedure for management.

**MATERIAL AND METHODS:****Study design:**

Randomized Control Trial

**Duration of study:**

The duration of this study was 6 months. 18-11-2019 to 18-5-2020

**Setting:**

Department of Urology, KRL Hospital Islamabad.

**Sample size:**Population proportion of clear the stone in group 1 (ESWL) = 0.492<sup>[5]</sup>Population proportion of clear the stone in group 2 (URS) = 0.881<sup>[6]</sup>

Level of significance= 5%

Power of test= 80%

Sample size= 50 in each group

Total sample size= 100

**Sampling technique:**

(Non-Probability) Consecutive sampling

**Sample selection****Inclusion Criteria:**

1. Patients over 16 years of age to 70 years
2. Both Male and female
3. Diagnosed cases of solitary proximal ureteric stone.
4. Proximal ureteric stone of 10 – 15 mm size with normal renal function (serum creatinine 0.7 – 1.5 mg/dl).

**Exclusion Criteria:**

1. Patients with solitary functioning kidney.
2. Patients with renal failure
3. Pregnant women
4. Deranged coagulation profile
5. Having Sepsis
6. Having effected from any Co-morbid
7. Severe hydronephrosis (renal pelvis > 6 mm diameter and cortex < 1 cm on ultrasound KUB)
8. Multiple stones

**Data analysis:**

Data was enter and analyzed in statistical software Statistical Package for Social Sciences (SPSS) version 22. Post-stratification Chi-square test was applied.  $p \leq 0.05$  was considered significance.

**RESULTS:**

Total 100 patients were participated in this study. The average age of the patients was  $39.71 \pm 10.17$  years with minimum age of 16 years and maximum age of 55 years. **Table 1**

Out of 100 patients, 75(75%) patients were male whereas 25(25%) were females. Male to female ratio of the patients was 3:1. **Fig 1**

The study results showed that the mean BMI of the patients was  $25.23 \pm 3.96$  Kg/m<sup>2</sup> with minimum and maximum BMI of 19.42 & 32.75 Kg/m<sup>2</sup> respectively. **Table 2**

In our study left side stone location was noted in 60(60%) patients and the right side stone location was noted in 40(40%) patients. **Fig 2**

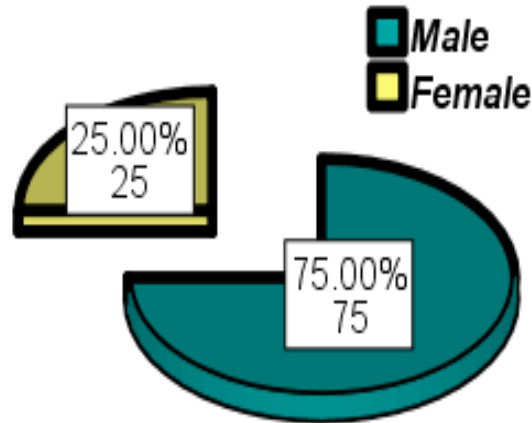
The mean stone density of the patients was  $798.30 \pm 256.98$  with minimum and maximum stone density of 100 & 1500 respectively. **Table 3**

The mean stone size of the patients was  $12.504 \pm 1.65$ mm with minimum and maximum stone size of 10 & 15 mm respectively. **Table 4.**

In our study the efficacy was achieved in 72(72%) patients. **Fig 3**

**Table 1. Summary statistics of age (years)**

Age (years)	n	100
	Mean	39.71
	Standard Deviation	10.17
	Minimum	16
	Maximum	55



**Fig 1: Frequency distribution of gender**

**Table 2. . Summary statistics of BMI (kg/m<sup>2</sup>)**

BMI (Kg/m <sup>2</sup> )	n	100
	Mean	25.23
	Standard Deviation	3.96
	Minimum	19.42
	Maximum	32.75

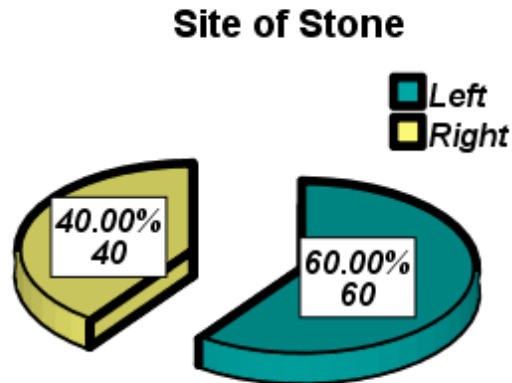


Fig 2. Frequency distribution of site of stone

Table 3. Summary statistics of density of stone

Density	n	100
	Mean	798.30
	Standard Deviation	256.98
	Minimum	100
	Maximum	1500

Table 4. Summary statistics of size of stone (mm)

Size of stone (mm)	n	100
	Mean	12.504
	Standard Deviation	1.65
	Minimum	10.0
	Maximum	15.0

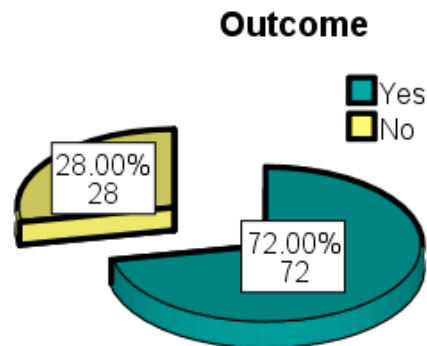


Fig 3. Frequency distribution of outcome

**DISCUSSION:**

Our randomized control trial was conducted at department of Urology, KRL Hospital Islamabad to compare the efficacy (frequency of stone free patients) at one week after ESWL and URS manipulation for proximal ureteric stone (10 – 15 mm size).

Urolithiasis is one of the leading causes of morbidity of the urinary tract system in the world. Within the last few decades the treatment of urinary tract stones has been revolutionized due to introduction of minimally invasive techniques. Few decades back ureteral stones were managed by open ureterolithotomy. Then with time there was refinement of semi-rigid URS, ESWL machines, laparoscopic procedures and flexible URS resulting in enormous change in the management of ureteral stones.<sup>8,9</sup>

In this study the average age of the patients was 39.71±10.17 years, In patients treated with ESWL the mean age of the patients was 40.78± 10.19 years whereas in patients treated with URS the mean age of the patients was 38.52± 10.44 years.

According to Salman Manzoor *et al* the average age of the patients was 42.54 ± 14.07 years<sup>6</sup>. Another study by Nadeem Iqbal *et al*<sup>10</sup> showed that the mean age in ESWL and URS groups were 39.21±13.36, and 43.13±13.65 years respectively. Mean stone size was 10.47±3.7 mm (ESWL) and 13.6±6.6 mm (URS). There were no significant differences regarding age, gender, BMI and the comorbidities of patients in both groups. Their age ranged from 17 to 58 years and the mean age was 36.9±11.7 years.<sup>11</sup>

Literature on ureteral stone disease has documented that males are at greatest risk of developing urolithiasis. The incidence rate among men is two times higher and the prevalence rate about four times higher among men compared to women<sup>12</sup>. In developing countries the male-to-female ratio ranges from 1.15:1 in Iran (14) and 1.6:1 in Thailand<sup>13</sup> to 2.5:1 in Iraq<sup>14</sup> and 5:1 in Saudi Arabia<sup>15</sup>.

In our study the efficacy achieved in 72(72%) patients, In ESWL group the efficacy was achieved in 334(68%) patients while in URS group the efficacy was achieved in 38(76%) patients. Although this difference was statistically insignificant but URS group in our study showed higher efficacy as compared to ESWL group.

Salman achieved stone free rate of 88% with URS and 60% with ESWL for stone size greater than or

equal to 1 cm size.<sup>16</sup> One study by Salman Manzoor *et al*<sup>6</sup> documented that Success rate was 49.2% for ESWL and 57.8% for URS ( $p = 0.008$ ). The re-treatment rate was significantly higher in ESWL group than in URS group (40% vs. 11 and 18% in URS group).

Fong *et al.* experienced an overall stone free rate of 50% in ESWL and 80% in URS<sup>7</sup>. Wu *et al.* suggested that URS achieved excellent result and should be considered first-line therapy for proximal ureteric stones greater than 1 cm.<sup>17</sup>

Kawano *et al.* found that 83.6% of patients with proximal ureteric stone became stone free after one session of ESWL.<sup>18</sup> Tawfik achieved the 92% stone free rate with ureteroscopic lithotripsy of proximal ureteric stone, and initial stone free rate for in situ SWL was 58%.<sup>19</sup>

**CONCLUSION:**

This study concluded that both ESWL and URS are statistically equally effective in terms of frequency of stone free patients at one week for proximal ureteric stone (10 – 15 mm size). Although difference is insignificant but URS group showed high stone free frequency than ESWL group.

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