

Covid 19 Make us Confident to Perform ESWL Sessions for Treatment of Ureteric Stone

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Abstract

The clinicians prefer URS as a first-line treatment of upper ureteric stones but with COVID-19 restrictions and considering the patient's benefit, ESWL sessions to remove ureteric stones were preferred as first-line treatment of upper ureteric stones. The aims of this study was to compare the level of stone clearance with ESWL sessions during COVID-19 pandemic as a first-line treatment. A longitudinal study was conducted at the Department of Urology, Liaquat University Hospital for the duration of 6 months. Total thirty patients of age more than 15 years who presented with an upper ureteric stone of 0. Patients were managed for upper ureteric stone with ESWL and complete stone clearance was considered a satisfactory outcome. The mean age of patients enrolled in the study was 31.82 years with a preponderance of males that is 55%. The mean size of the stone observed was 1.10 cm. Upon exposure to ESWL sessions, 68% of patients showed complete clearance of stones whereas 10% of patients had no clearance and 16% of patients showed partial clearance. The comparison of different variables among the level of stone clearance showed that complete removal of stone was carried out by a maximum of 4 ESWL sessions having a mean stone size of 1.09 cm whereas maximum of 3 sessions were given to patients that resulted in incomplete stone clearance. In conclusion, the decision for carrying out ESWL sessions for ureteric stone clearance was successful in the majority of patients during a pandemic.

Introduction

The management of ureteric stones has always been a challenging issue in the health care system. Therefore, the prevalence of ureteric stones remains high¹. The management of ureteric stones ranges from surgical intervention to minimally invasive treatment. The treatment can either be extracorporeal shockwave lithotripsy (ESWL), ureterorenoscopy (URS), or laser fragmentation for the removal of ureteric stone². Among all the treatment options, ESWL remained the mainstay of treatment. However, with advances in the field, URS surpassed ESWL³.

Unfortunately, considering the burden of patients in the hospital due to the COVID-19 pandemic, surgeons managed patients based on triage. The conditions such as obstructed kidneys with or without infection and renal failure have been treated as a priority whereas other conditions such as asymptomatic ureteric stones must be postponed. The main goal of treatment during a pandemic is to prevent further complications from any treatment⁴. The delay in the treatment resulted in unwanted effects such as weight gain, pain, infection, and difficulty in urination leading to stone formation⁵. Hence, ESWL was the main choice of treatment during covid-19 for ureteric stone clearance.

ESWL is a minimally invasive and cost-effective treatment for ureteric stone clearance. The stone clearance takes place by using high-energy shockwaves. The shock waves penetrate the soft tissue having minimum energy until hits the stone where an exchange of energy occurs. The exchange of energy onto the stone causes compression, erosion, and shattering of the stone leading to fragmentation into small pieces. The small pieces (< 1mm) are then cleared via urination⁶. The procedure does not require general anesthesia. The success rate in terms of stone clearance is almost 80%⁷. Previous

literature supports the efficacy and safety of ESWL for a patient having < 2mm of stones⁸. Therefore, owing to complications and risks involved with the hazard of COVID-19, an ESWL session was the preferred treatment for the removal of ureteric stones during a pandemic. Hence, the present study compares the level of stone clearance with ESWL sessions in the management of ureteric stones during the COVID-19 pandemic.

Methodology

A longitudinal study was conducted at the Department of Urology, LUMHS for the duration of 6 months. Total thirty patients of age more than 15 years of either gender, who presented with upper ureteric stones of 0.5 to 2 cm in diameter were enrolled. Patients having a congenital anomaly, a solitary functioning kidney, with stenting or nephrostomy, having a BMI > 30 kg/m², or suffering from a bleeding disorder were excluded from the study.

The study was approved by the LUMS ethical review board. After explaining the advantages and risks of the treatment, all patients provided written informed consent, and the confidentiality of the data was assured. All patients had ESWL under general anesthesia with sedation administered by a senior resident (training > third year). The following ESWL sessions were 14 days apart, with each session delivering 3000 shock waves. Following each ESWL session, an X-ray was used to assess fragmentation, location, and clearance. The procedure's success was assessed at the final ESWL session after three months. A satisfactory outcome was defined as complete stone removal in fewer than or equal to three ESWL sessions.

SPSS version 23 was used to analyze the data. The mean and SD were reported for numeric data, whereas frequency and percentage were reported for categorical data.

Results

The study included 30 patients that needed management of upper ureteric stone. The mean age of patients enrolled in the study was 31 ± 10.82 years with a preponderance of males that is 55%. (Fig. 1)

The mean size of the stone observed was 1.10 ± 0.195 cm. The maximum number of ESWL sessions given to the patients was 4 with maximum of 3000 shock waves. The mean energy used during the session was 5.36 ± 0.94 . Upon exposure to EWSL sessions, 68% of patients showed complete clearance of stones whereas 10% of patients had no clearance, and 16% of patients showed partial clearance. (Table 1).

Table 1
Information regarding stone size, ESWL sessions,
and stone clearance

Variables	Measurables
Size of Stone	1.10 ± 0.2cm
ESWL Sessions	1–4
Number of Shock Waves	1131–3000
Energy Used	5.36 ± 0.94
Stone Clearance	Complete: 21 (68%) Incomplete: 3 (10%) Partial: 5 (16%)

The comparison of different variables among the levels of stone clearance showed that complete removal of stone was carried out by a maximum of 4 ESWL sessions having a mean stone size of 1.09 ± 0.22 cm whereas maximum of 3 sessions were given to patients that resulted in incomplete stone clearance. (Table 2)

Table 2
Comparison of age, size of the stone, and ESWL sessions among different levels of stone clearance

	Complete Clearance	Partial Clearance	No Clearance
Age (years)	29 ± 9.63	38 ± 12.55	27 ± 15.39
Size of stone (cm)	1.09 ± 0.22	1.12 ± 0.13	1.2 ± 0.1
ESWL Sessions (Maximum)	4	1	3
No. of Shockwaves	3000	3000	3000
Energy Used (Maximum)	8	6	7

Discussion

The present study was conducted to compare different levels of ureteric stone clearance with ESWL sessions during the COVID-19 pandemic. The study results revealed that ESWL sessions were completely successful in 68% of patients having ureteric stones. Al Mahroon *et al.* study assessed the efficacy of ESWL sessions in patients having ureteric and renal stones⁹. The findings of the present study disagreed as the study population presented with a higher mean size of the stone (9.9 ± 3 mm). Moreover, the study showed that one session was adequate for ureteric stone removal. The successful stone clearance was found in 88% of patients⁹. However, the study revealed complications associated with ESWL such as

pain⁹. However, no complications were reported in the present study findings. In another study conducted by Khalique *et al.* in the Pakistani population; ESWL sessions were given for renal stone clearance in patients with insufficient renal function resulting in 71% stone clearance¹⁰ which is higher in comparison to the present study results. Moreover, the present study had a slight male preponderance explaining ureteric stones are more prevalent in men which is similar to another study¹⁰.

There is a number of published studies evident of successful stone clearance with ESWL sessions¹¹⁻¹³. Yoon *et al.* revealed 65% successful results in ureteric stone clearance which is slightly less than reported in the present study¹⁴. The study also revealed no association between energy intensity and ESWL session¹⁴. The present study did not reveal any strong association between energy and the number of shockwaves provided with ESWL sessions. Another study revealed higher stone clearance results (79%) whereas there were no significant outcomes related to ESWL sessions¹⁵.

Although, previous literature has emphasized over efficacy and success of ESWL sessions in the majority of the patients^{7,16}. A study still emphasizes careful examination and patient selection ESWL sessions and better availability of lithotripsy set up¹⁷. Undoubtedly, during the pandemic ESWL has prevented complications posed by my general anesthesia. Due to economic and pandemic circumstances, patients belonging to any socioeconomic status were not offered any aesthetic options which were also beneficial in patients diagnosed with COVID-19 to prevent infection and other complications. Hence, in the present study, the pandemic develop confidence among surgeons to carry out ESWL sessions and fortunately, the results were satisfying with no complications reported. However, few patients reported incomplete removal and few have no effect on treatment which emphasizes further assessment and determination of causality.

Conclusion

The decision for carrying out EWSL sessions for ureteric stone clearance was successful in the majority of patients during a pandemic.

Declarations

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Conflict of interest

None

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Figures

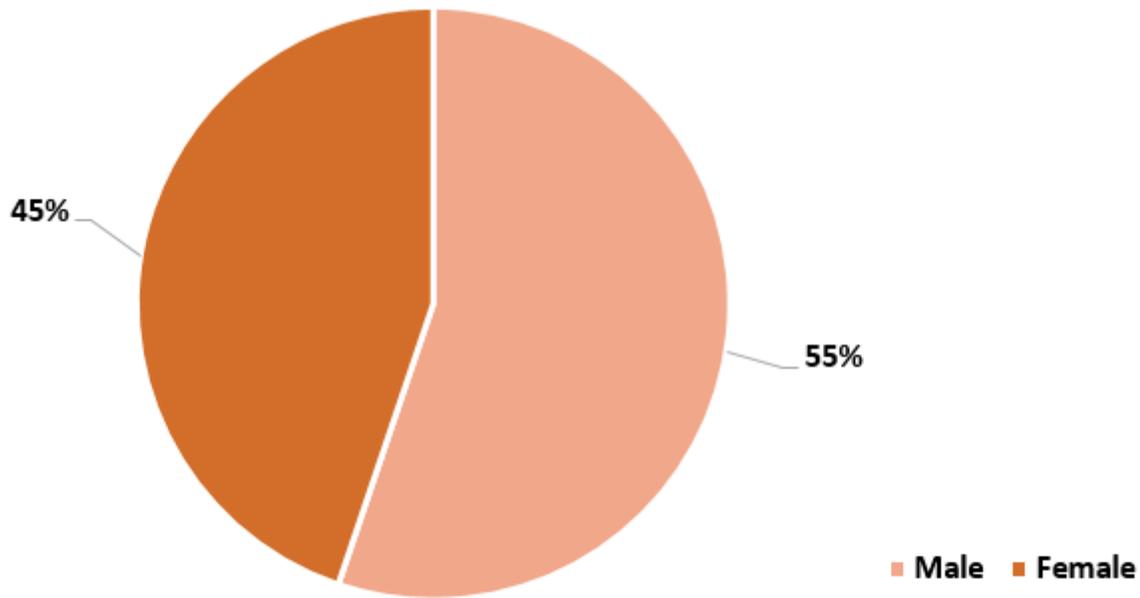


Figure 1

Frequency distribution of gender