

# Retrospective Comparative Study of Semi Rigid Ureteroscopy and ESWL for Treatment of Upper Ureteric Calculus

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## ABSTRACT

**Aim:** To compare the stone clearance of upper ureteric calculus by using semi rigid URS & ESWL

**Setting & design:** Avicenna Medical College and Hospital Lahore, Retrospective case series

**Method:** Retrospective data of one hundred patients (67 males, and 33 females) subjected to either semi rigid URS or ESWL for treatment of upper ureteric calculus were analyzed. These patients presented to our department from May 2017 to September 2019. Patients were divided in two groups. Group 1 (52 patients) (34 male+18 female) were subjected to semi rigid URS and Group 2 (48 patients) (33 male+15 female) were treated by ESWL. We compared two groups for clearance of calculus.

**Results:** The stone clearance was observed in 35 out of 52 patients (67%) who were subjected to semi rigid URS and pneumatic lithoclast. In group 2, we observed stone clearance in 34 out of 48 patients (70%).

**Conclusion:** Both URS with pneumatic lithoclast and ESWL can be a valid option for treatment of upper ureteric calculus.

**Key words:** Calculus, URS, Pneumatic lithoclast, upper ureter, ESWL

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## INTRODUCTION

According to European association of Urology ureteric stone guidelines ESWL and URS remain the primary treatment modalities for the management of upper ureteric calculi with comparable stone clearance rate<sup>1,2</sup>. ESWL has a clear edge over URS because it doesn't require anaesthesia<sup>3</sup>. Recently introduced flexible URS equipped with LASER lithotripsy has made major changes in the management of upper ureteric calculi with less complications and more stone clearance rate<sup>4</sup>. Flexible URS with laser is not available in all centres. Conventionally semi rigid URS with pneumatic lithoclast is being used in majority of centres in Pakistan. In contrast to ESWL which requires multiple sessions, URS is usually a single procedure.

ESWL was 1<sup>st</sup> introduced in 1980<sup>5</sup>. It has now become a preferred treatment modality for uncomplicated renal and ureteric calculi as it is safe and non invasive<sup>6,7,8,9</sup>. ESWL efficacy depends upon many factors like stone size, location, composition, skin to stone distance, obesity, ESWL machine type and its efficacy<sup>10</sup>.

There are certain indications of intervention in cases of upper ureteric calculus. They include calculus larger than 7mm in size and absence of spontaneous clearance assessed by duration of symptoms more than 30 days, severity of symptoms, sepsis, calculus anuria and patient choice<sup>11</sup>

## METHODS

The record of one hundred patients who underwent URS and ESWL for upper ureteric calculus between May 2016 to September 2019 were investigated retrospectively. Patients were divided in two groups. 52 patients (group 1) were subjected to URS and 48 patients (group2) underwent ESWL. All these patients were meeting the inclusion and exclusion criteria set for this study. All patients had pre

operative work up including detailed history, examination, basic laboratory investigations (renal function tests, urine analysis, urine culture (if necessary)) and radiological investigations (USG KUB, X-RAY KUB or CT KUB). Follow up of patients was done for 3 months after URS, similarly for 3 months after the last session.

Semi rigid URS was performed under spinal or general anaesthesia. Patients were given 200mg intravenous ciprofloxacin one hour before procedure.

Patients were put in lithotomy position. Cystoscopy was done and .038 fr guide wire advanced in ureteric orifice and URS advanced over guide wire under vision, once stone was identified, it was broken with pneumatic lithoclast. At the end of the procedure ureter was inspected for any residual stone which needed further strokes and any ureteral injury. In some cases 6fr DJ stent was passed depending upon operating surgeons preference. ESWL was performed without any anaesthesia. We used electromagnetic source which has both ultrasonic and fluoroscopic display.

Maximum number of shocks used for single session was 3000 n energy was variable depending on the size and location of the calculus. Shock waves were conveyed to the body through water.

## RESULTS

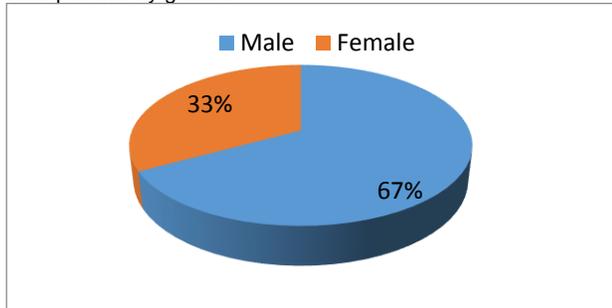
Total of 52 patients were enrolled in Group 1, of these 52 patients, 35 achieved stone clearance. This was confirmed by x ray KUB on 1<sup>st</sup> post operative day. 67% clearance was achieved with URS. In the 17 patients in whom we couldn't achieve stone clearance was due to the following reasons:

- 1) Inability to advance the URS to the level of stone (3 patients) either due to ureteral stricture or ureteral edema.
- 2) Proximal migration of ureteral calculus (9 patients)
- 3) In 5 patients procedure was declared a failure due to large residual fragments that needed a secondary procedure, either repeat URS or ESWL.

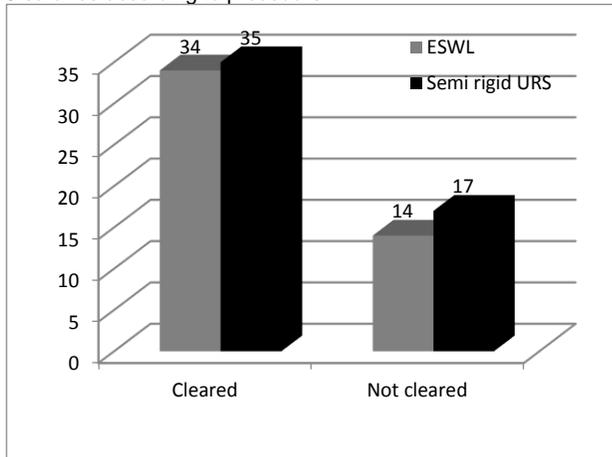
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Total patients by gender



Clearance according to procedure



Forty eight patients were enrolled in Group 2 and were subjected to ESWL. Of these 48 patients 34 patients achieved stone clearance. It resulted in 70% of stone clearance. Mean stone size was 8.4 mm. Majority of patients required 5 sessions one week to ten days apart. 14 patients failed to respond to treatment due to:

- 1) Hard stones failing to respond to ESWL
- 2) Steinstrasse formation with a large fragment requiring other modalities
- 3) Patient characteristics like obesity

## DISCUSSION

Calculi in upper ureter can be treated by many modalities of which ESWL is an easy and useful method of treatment and usually as treatment of choice in upper ureteric stone of less than 1cm in size. It is least invasive than all modalities available with almost 80% success rate. Previous clinical and epidemiological studies show that ESWL treatment offered to patients depend upon several factors like stone size, location, consistency and other factors pertaining to the patient.

There are certain contra indications like pregnancy, UTI, solitary obstructed kidney, abdominal aortic aneurysm, and bleeding disorders<sup>12</sup>. There is positive correlation between size of stone and number of ESWL sessions required for achieving clearance. Not all stones are equally sensitive to ESWL. The composition of stone has impact on its dissolution and breakdown with ESWL.

Although ESWL is the standard modality for upper ureteric calculus of upto 1cm in size, still the urologist has

to offer other treatment options to patient because sometime there are contraindications to ESWL as discussed before or the patient is not willing to accept ESWL because of longer duration of treatment and multiple sessions<sup>13</sup>. Most of patients preferred URS as therapeutic option due to early relief of symptoms and faster return to work. Multiple studies showed wide range of success with URS for treating upper ureteric calculus. Tinc et al<sup>14</sup> reported their experience as 60% stone clearance in upper ureter with median stone size of 12.8 mm.

Other studies showed higher success but with flexible URS and laser litholepexy. Sofer et al<sup>15</sup> reported 97% success rate for upper ureteric calculus with mean size of 11.3 mm.

## CONCLUSION

Both semi rigid URS and ESWL could be a valid option for treatment of upper ureteric calculus. Both have almost comparable stone clearance rate. In our experience semi rigid URS has an edge over ESWL in terms of quick relief of symptoms, less hospital visits, and early return to work. Quality of life was much better in patients undergoing URS in early 4 to 6 weeks post operatively; whereas in this duration patients in group 2 were undergoing sessions of ESWL and were having off and on pain, haematuria, and absence from work.

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