

Urgent Ureteroscopies in Acute Ureteric Colic Requiring Intervention

Elsawi Osman, MRCS, FRCS (Urol)* Tanweer Bhatti, FRCS (UK)** Mohamed Elzoubair, MBBS***
Shehab Khashaba, MBBCh*** Alaeddin Yaqoob, BSc MD*** Ziauddin Khan, FCPS (Surg), FRCS (Glasg), MSc****

Background: Urolithiasis, in general, constitutes a significant volume of the daily clinical activities in our institution.

Objective: To evaluate the outcome of ureteroscopies performed in patients admitted acutely with symptomatic ureteric calculi compared with elective ureteroscopies.

Design: A Retrospective Review.

Setting: Department of Urology, King Hamad University Hospital, Bahrain.

Method: All ureteroscopy (URS) procedures performed for symptomatic ureteric calculi between 1 January 2013 to 31 December 2013 were reviewed. These procedures were divided into two groups: urgent URS and elective URS group. Both groups were comparable in personal and stone characteristics.

Result: One hundred ninety-five procedures were performed on 167 patients. One hundred twenty-seven (65.1%) procedures were urgent and 68 (34.9%) were elective. The cohort included 131 males and 36 females with a mean age of 41.5 years, a range of 19 to 74. One hundred forty-nine (76.4%) procedures were performed on male patients, while 46 (23.5%) were performed on female patients. The mean stone size for patients undergoing urgent URS was 7.7 mm and 8.3 mm for elective procedures; approximately one-third of patients had more than one stone.

Eighty-one stones in the urgent group were distally located; fifty-seven were in the elective group. The most common indication for urgent URS was pain refractory to injectable analgesia. LASER was used in 182 (93.3%) procedures, 179 (91.7%) procedures were urgent.

Seventeen (8.7%) complications were documented for urgent URS and 8 (4.1%) for elective cases, no statistical significance, P value = 0.74.

Conclusion: Urgent URS procedure is a safe and cost effective option compared with Elective URS. It should be the preferred option when resources and expertise are available.

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Acute presentations to the emergency department with ureteric stones represent a significant proportion of daily hospital admissions. It has a genuine impact on productivity in general as the affected group of patients is usually within the working age. Ali et al found that ureteroscopy is safe as a day-case procedure in selected cases; however, it focused on the need for double J insertion after the procedure¹. There are no published data regarding the remaining aspects of ureteroscopy, nor there are any comparative studies about any international or regional results.

A recent systematic review confirmed the association between the metabolic syndrome and the increased incidence of kidney

stones². They recommended healthier lifestyle and diet as preventive measures. Emergency Department visits with upper urinary tract stones shown to have increased with a stable rate of hospitalization of approximately 12%³.

The trend is that all the major treatment guidelines recommend the use of medical expulsive therapy as an initial stage in the treatment of acutely presenting ureteric stones in the absence of infection. In other words, there are patients who would require acute surgical intervention due to the unsuitability of medical expulsive therapy. In the last two decades, open surgery for ureteric stones has become an obsolete option and is only performed under the very exceptional circumstances.

* Registrar
** Consultant
Department of Pathology
*** Senior House Officer
Department of General Surgery
**** Head of Department Urology Services, Consultant Urology
Department of Pathology
King Hamad University Hospital
Kingdom of Bahrain
E-mail: elsawi.osman@khuh.org.bh

Semi-rigid URS has become the procedure of choice. The first rigid ureteroscopy was performed in 1977 by Goodman et al. Several advances have contributed to the improvement in the safety and efficacy of the procedure; the miniaturization of the instruments have made the need for ureteral dilatation with its associated morbidity unnecessary, the introduction of the different types of energy used to disintegrate the stones. These were manufactured in the form of probes to be introduced through the ureteroscope channels as intracorporeal lithotripters. Electrohydraulic lithotripsy was used initially and was followed by ultrasound and more recently, pneumatic and LASER Lithotripsy. A further adjunct to the increased safety and efficacy of URS was the intra-operative use of fluoroscopy imaging (C-arm).

The aim of this study is to evaluate the outcome of ureteroscopies performed in patients admitted acutely with symptomatic ureteric calculi compared to elective ureteroscopies.

METHOD

Medical records of patients undergoing URS from 1 January 2013 to 31 December 2013 were reviewed. The following data were documented: mode of presentation, clinical findings, laboratory and imaging results, procedures performed, the outcome and complications. Auxiliary procedures performed for the same stone were reviewed. Patients presenting more than once due to a different stone requiring intervention were regarded as having two separate episodes. Non-contrast enhanced spiral CT scan was performed on all patients.

The presence of five or more RBCs in urine was regarded as significant microscopic hematuria. Ureteroscopies were classified as urgent or elective based on the source of patient's admission. Any ureteroscopy performed during a regular operating list would be regarded as urgent if the patient was admitted acutely within the preceding 72 hours. Stone free rate was defined as residual fragments of 3 mm or less, assessed visually, intra-operatively (as compared to LASER fibre or Lithoclast diameter) or through imaging within four weeks postoperatively. Plain KUB X-ray was used in the follow-up of the majority of patients and non-contrast CT scan was requested in selected cases. The decision to insert ureteric stent after active stone removal was based on the intra-operative findings, taking into consideration the guidelines of the European Association of Urology (EAU) or the American Urological Association (AUA). Subsequent stent removal was not regarded as an auxiliary procedure even if it was performed under anesthesia. P-value was calculated whenever indicated.

RESULT

One hundred sixty-seven patients had 195 procedures from 1 January 2013 to 31 December 2013, 131 males and 36 females with a mean age of 41.5 years, a range of 19 to 74.

One-hundred four (62.2%) patients had BMI of more than 25. One hundred forty (83.8%) patients had either visible or microscopic hematuria; 51 (30.5%) patients had an abnormal serum creatinine level, out of whom 33 (19.7%) patients had urgent URS (the cut off value was 140 micromole/L for males and 118 micromole/L for females). Serum uric acid was abnormal in 20 (11.9%) patients.

The mean size of the stones was 7.7 mm, ranging from 3.5 to 17 mm for urgent URS and 8.3 mm, ranging from 3.1 to 18.2 mm for elective procedures, nearly one-third of patients having more than one stone.

One hundred twenty-seven (65.1%) procedures were performed as urgent, while 68 (34.9%) procedures were elective. One hundred forty-nine (76.4%) procedures were performed on males and 46 (23.6%) procedures were performed on females. According to the ASA, 90 (46.2) procedures from the urgent URS group were performed on ASA1 patients, while 46 (23.6%) procedures from the elective URS group were performed on ASA1 patients.

One hundred fifteen (58.9%) procedures were performed for stones on the right side and 6 (3%) bilateral procedures were performed.

Urgent URS group had 30 (15.4%) procedures performed for stones in the upper ureter, 9 (4.6%) procedures performed for stones in the middle ureter and 81 (41.5%) procedures performed for stones in the lower ureter. The remaining percentage had stones in more than one location. In the elective group, 6 (3%) procedures performed for stones in the upper ureter, 5 (2.6%) procedures performed for stones were in the middle ureter and 57 (29.2%) procedures performed for stones in the lower ureter, the rest had stones in multiple locations.

Either 6.5F or 4.5F semi-rigid ureteroscopy were used as standard instruments. LASER was used to disintegrate the stones in 179 (91.8%) procedures. Lithoclast was used in 6 (3%) procedures, half of which were in the urgent group. The rest had their stones directly extracted using graspers. The mean operative time was 56.6 minutes for urgent URS and 49.2 minutes for elective URS, a range of 19 to 117.5 min.

Stone clearance was achieved in 116 of the urgent URS and in 64 of elective URS cases, no statistically significant difference, P value = 0.49. Insertion of double (DJ) stent was performed in 181 (92.8%) procedures. DJ stenting was performed on 119 for urgent URS and 62 for elective URS. Average hospital stay was 2.7 days for elective patients and 3.1 days for urgent patients, including preoperative hospital stay, see table 1.

Table 1: Preoperative, Intra-operative and Postoperative Comparison

	Variables	URG Group (N=127)	EL Group (N=68)	
Preoperative	ASA1 status	90	46	
	Abnormal RFT	33	19	
	Stone size	7.7 mm (3.5 to 17mm)	8.3 mm (3.1 to 18.2 mm)	
Operative	Stone Location	Upper	30	6
		Middle	9	5
		Lower	81	57
	Energy used	LASER	119	60
		Lithoclast	3	3
	Average Operative Time	56.6 minutes	49.2 minutes	
DJ stenting rate	119	62		
Stone clearance rate	116	64		
Postoperative	Length of hospital stay (post procedure)	1.4 days	1.9 days	

URG: Urgent Ureteroscopy Procedures

EL: Elective Ureteroscopy Procedures

ASA: American Society of Anesthesiologists

RFT: Renal Function Test

DJ stent: Double (J-shaped) Stent

Seventeen (8.7%) complications were documented for urgent URS and 8 (4.1%) for elective cases, no statistical significance, P value = 0.74, see table 2.

Table 2: Complications

	Complication Type	URG	EL
		Group	Group
		(Number of patients)	
Intraoperative/ Immediate	Perforation/Deep Urothelial Abrasion	2	1
	False Passage	2	2
	Stone Retropulsion (migration)	3	1
Early	Jammed Basket	1	0
	Prolonged Hematuria/Stent Discomfort	3	2
	UTI	2	1
	Stent Migration (stent with strings)	2	0
Late	Stricture	1	0
	Residual Significant Fragments	1	1

URG: Urgent Ureteroscopy Procedures **EL:** Elective Ureteroscopy Procedures **UTI:** Urinary Tract Infection

DISCUSSION

There are no published data on the exact incidence or prevalence of urolithiasis in Bahrain; however, it appears to be the most common urological emergency anecdotally.

A comprehensive review of stone formation in the Arabian Gulf region by Robertson et al highlighted the direct relationship between the increased incidence of urolithiasis and the increased national affluence, along with the dietary habits of increased animal protein and oxalate-rich diet¹. In addition, he pointed out the low urine volume as a possible consequence of the hot and dry climate.

In our study, some patients were of non-Bahraini origin and of low economic class. Their main diet was vegetable based, making the effect of the climate factor more evident. Furthermore, the epidemiological figures quoted in the study were rather historical as mentioned by the author dating back to 1990s^{2,3,4}. The efficacy of ureteroscopy was well-documented in several studies including reports from the Arabian Gulf region^{5,6,7}. Further, some studies and meta-analysis focused on the urgent URS and concluded its safety^{8,9,10}.

There is no published data on the outcome of urgent URS as compared to elective URS from the Arabian Gulf region to compare our results to. However, a study by Matani et al was similar to ours¹¹. In our study, we used the standard ASA classification to assess patients' comorbidities while in Matani et al study the scoring system for the comorbidities was designed by the authors. Therefore, it was not possible to compare the two studies. Nevertheless, the personal data of the subjects in both studies were comparable. Our main energy source was LASER, while they used mainly Lithoclast. Our DJ

stenting rate was higher than the Matani et al study; however, the outcome regarding stone-free rates was very similar.

Our study had some limitations because of being retrospective and non-controlled. In retrospective study, frequently there are absence of data on potential confounding factors because the data were recorded in the past and it is difficult to identify an appropriate exposed cohort and an appropriate comparison group. However, the included number is relatively high for a single institution in the first year of its functionality.

CONCLUSION

This study further confirms the efficacy and safety of urgent ureteroscopies. Therefore, it should be utilized whenever possible. Proper health education and further research into the preventive aspects of urolithiasis are required given the significance of the problem.

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