

## BILATERAL SINGLE SESSION URETEROSCOPY FOR URETERAL CALCULI: IS IT SAFE AND EFFECTIVE?

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**Objectives:** To determine the feasibility, safety and success rate of bilateral single session rigid retrograde ureteroscopy (URS) for bilateral ureteral calculi.

**Patients and Methods:** Thirty-five patients underwent bilateral single session ureteroscopic calculus removal.

**Results:** Out of 70 renal units in 35 patients treated, clearance of the calculus was successful in the first session of ureteroscopy in 63 (90%). A total of 28 patients (80%) were completely rendered stone-free bilaterally in one operative session. Two patients needed a second session of URS,

while five required ESWL for residual or migrated stone fragments. No major procedure-related complications were encountered in any of our patients.

**Conclusion:** Bilateral single-session rigid URS for ureteral calculi is feasible, safe and effective. There is no significant increase in ureteroscopy-related complications. It spares the patients a second anaesthesia and a second procedure and, thus, reduces the total hospital stay, total expenditure and enables the patient to resume work earlier.

**Key Words** ureteric calculus, ureteroscopy, calculus disease, lithotripsy

### INTRODUCTION

Ureteroscopy (URS) remains one of the most effective and widely used modalities for the treatment of ureteral calculi. The refinements in endoscopic technology combined with advances in intracorporeal lithotripsy have rendered minimally invasive endoscopic management applicable for all ureteral calculi. Ureteroscopy can help to remove safely even a large-size calculus located along the entire length of the ureter.

The reported incidence of major ureteral injuries following ureterorenoscopy has decreased dramatically during the last few years<sup>1</sup>. However, many authors have questioned the safety of bilateral single-session ureteroscopic procedures, possibly for fear of creating bilateral ureteral injuries.

We carried out this prospective study of bilateral single-session rigid retrograde ureteroscopy for ureteral calculi to determine its feasibility, safety and success rate.

### PATIENTS AND METHODS

Thirty-five patients needing intervention for bilateral ureteral calculi were included in this study. The treatment modality was selected individually based on size and site of the calculus and the degree of associated hydronephrosis. For this purpose the ureter was classified into proximal and distal ureter based on its relationship with the iliac vessels. Extracorporeal shockwave lithotripsy (ESWL) was offered to patients with small (<1 cm) non-obstructive proximal ureteric calculi. Retro-grade ureteroscopy was offered to all patients with distal ureteric calculi, while antegrade ureteroscopy<sup>2</sup> was reserved for patients with large (>1.5 cm) and impacted proximal ureteral calculi. The flexible ureteroscope was not used in this study. Retrograde URS for proximal ureteric calculi was used for patients with small upper ureteric calculi who refused or failed ESWL.

Patients with bilateral ureteric calculi in whom the treatment plans included URS on one side and ESWL on the other, or bilateral

**Table 1:** Methods of Treatment in 66 Patients with Bilateral Ureteral Calculi

Treatment	No. of Patients
Bilateral URS	35
Bilateral ESWL	17
URS + ESWL	7
Bilateral antegrade URS	4
A-URS + URS	3
Total	66

ESWL with or without stenting, or antegrade ureteroscopy were not included in the study. One patient who did not consent to bilateral URS in a single session was also excluded from this study.

An informed consent to the bilateral procedure was obtained from all patients, and they were informed that the second side would be attempted only, if the first side was accomplished in a satisfactory way. All patients received specific peri-operative antibiotics. The procedures were carried out under general or spinal anaesthesia on a table with a radio-lucent top and fluoroscopy provided with the Siemens Lithostar.

Ureteroscopy was carried out first on the side that was obstructed or infected. In others the side that was considered technically simple was treated first.

Retrograde ureteroscopy was performed with a rigid 8 Fr. ureteroscope. The ureteric orifice was dilated under radiological control using teflon or balloon ureteric dilators. The calculus was fragmented with ballistic or holmium laser lithotripsy. A ureteric catheter was kept on both sides at the end of the procedure for 24 hours. A double-J stent was utilized in patients with large impacted calculi, patients having residual or migrated fragments or mucosal injuries.

X-ray KUB was done in all patients before discharge from the hospital and after two weeks, if necessary, to confirm clearance of the calculus fragments. The latter patients were advised a three-monthly follow up. Ultrasonography and assessment of serum

creatinine were carried out at the end of three months and after one year.

## RESULTS

A total of 315 patients with ureteral calculi were treated during the last three years. Of these, 66 patients were identified to have bilateral ureteral calculi with an indication for treatment on both sides. However, 31 patients in whom URS on one side was combined with antegrade URS or ESWL on the other side or in whom treatment included bilateral ESWL were excluded from the study (Table 1). Only 35 patients in whom bilateral ureteroscopy in a single session was planned were included in this study. Out of 70 renal units included, 19 had a proximal ureteric calculus, while 51 had a distal ureteric calculus.

Sixty-three renal units (90%) were cleared of their calculi in the first session of ureteroscopy. A total of 28 patients (80%) were rendered stone-free on both sides in one operative session. A second procedure was required in four renal units with proximal ureteric calculi and in three renal units with distal ureteric calculi. Ureteroscopy on the second side had to be abandoned in two patients with distal ureteric calculi. This was due to difficulties in the dilatation of the ureteric orifice. A double-J stent was inserted, and URS was accomplished successfully after two weeks. Five patients needed ESWL for residual or migrated stone fragments. Of these, four were located in the proximal ureter and only one in the distal ureter. In these patients ESWL was administered two weeks after URS on an outpatient basis. (Table 2). All the patients were finally rendered stone-free.

The average operating time was 108 minutes ranging from 50 to 145 minutes.

We did not encounter any major procedure-related complications in these patients. Small mucosal injuries occurred in two patients. These were managed by double-J stenting. Five patients had postoperative fever that responded to culture-specific antibiotics. Nine patients had severe stent-related dysuria necessitating an early stent removal in five of them. Of these patients, eight had bilateral double-J stent.

The duration of follow up ranged from three months to thirty months. Thirty patients who

**Table 2:** Results of Bilateral Single Session Ureteroscopy

Site of Ureteric Calculus	Nö. Patients	No. Renal Units	Renal Units Cleared in 1 <sup>st</sup> Session		2 <sup>nd</sup> Procedure Required	
			No.	%	ESWL	URS
Bilateral distal ureter	24	48	45	93.75%	1	2
Bilateral proximal ureter	8	16	13	81.25%	3	0
One side proximal + opposite side distal ureter	3	6	5	83.34%	1	0
Total	35	70	63	90.0%	5	2

were available for follow-up for more than six months did not show any ureteroscopy-related long-term complications on either side.

## DISCUSSION

Although renal or ureteral calculi can present as a bilateral pathology in 10-25% of patients, bilateral single session manipulations were rarely done in the past for fear of complications. The refinements in endoscopic technology and availability of smaller size ureteroscopes with improved optics<sup>1</sup> have decreased the incidence of major injuries related to ureteroscopy. Modern-day anaesthetic agents coupled with highly potent antibiotics have made long-duration procedures safe.

Our approach to bilateral calculus disease has been to try and render these patients stone free in a single operative session. This helps in reducing the hospital stay, repeat operation procedures with their associated anaesthesia, thus reducing the total expenditure and time of convalescence.

Bilateral single-session ureteroscopy for ureteral calculi has been shown to be safe and effective<sup>3,4</sup>. Camilleri et al.<sup>3</sup> described fifteen bilateral one-session ureteroscopic examinations in thirteen patients. Of these, eight bilateral manipulations were performed for stone disease. They achieved 100% success in removal of bilateral distal ureteral calculi and 66% (2 of 3) in proximal ureteral calculi.

The fear of bilateral ureteral injuries prevented urologists from performing bilateral ureteroscopy in single session. While literature showed only anecdotal reports of bilateral one-session ureteroscopy<sup>5,6</sup>, Camilleri et al. found no increase in the incidence of acute or chronic complications associated with its performance. The reduction in complications was thought to be a result of careful patient selection and limiting bilateral stone extractions to the lower ureter alone.

Deliveliotis et al.<sup>7</sup> reported a study of twenty-two patients who underwent bilateral ureteroscopy in one session of which 18 patients had bilateral ureteral stones. They reported a stone free rate of 83% with no major complication using a rigid ureteroscope. They performed micturating cystourethrography at three months and a renal scan at one year to document a normal renal function. The success rate in the present study was comparable with those of Camilleri et al. and Deliveliotis et al.

Ureteroscopy is a safe procedure. Although complications are rare, yet, some major complications like ureteric perforations, ureteric avulsions and late ureteric strictures following ureteroscopy have been described. These problems can be prevented by an appropriate case selection, a proper instrument selection, availability of intracorporeal lithotripsy devices. The intraoperative complication observed by us included mucosal injuries and minor perforations in two patients. Five patients developed postoperative fever of 38°C. None of these

were attributable to the performance of the bilateral procedure in the same session. None of our patients had any ureteroscopy-related long-term complications. We attribute this to our criteria of patient selection. We prefer ESWL to retrograde URS in patients with small proximal ureteral calculi. If the proximal ureteric calculus is impacted and large, with associated significant hydro-nephrosis, we prefer antegrade ureteroscopy thus reducing the incidence of prolonged procedures and resultant ureteral injuries<sup>2</sup>.

In conclusion, bilateral single session rigid ureteroscopy for ureteral calculi is feasible and can be performed safely in selected patients. The method does not yield any major short-term or long-term complications and spares patients a second procedure and a second anaesthesia. Hence it will reduce the total hospital stay, total expenditure and will enable the patient to resume his daily activities earlier.

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#### RESUME

##### L'Ureteroscopie Bilatérale en un Seul Temps pour Calcul Urétéral: Est-Elle Sûre et Efficace ?

**Objectifs:** De déterminer la praticabilité, taux de sûreté et de succès de l'ureteroscopie rétrograde rigide (URS) bilatérale en une session pour calculs urétéraux bilatéraux. **Patients et méthodes:** Trente-cinq patients ont subi une ureteroscopie bilatérale pour calculs de l'uretère en une simple session. **Résultats:** Sur 70 unités rénales chez 35 patients traités, le traitement du calcul était réussi en la première session d'ureteroscopie dans 63 cas (90%). Un total de 28 patients (80%) ont été complètement débarrassés de leurs calculs (stone-free) bilatéralement en une session effective. Deux patients ont eu besoin d'une deuxième session d'URS, alors que cinq exigeaient ESWL pour les fragments lithiasiques résiduels ou émigrés. Aucune complication n'a été notée chez aucun de nos patients. **Conclusion:** L'URS rigide bilatérale en simple-session pour calculs de l'uretère est faisable, sûre et efficace. Il n'y a aucune augmentation significative des complications. Il épargne les patients d'une deuxième anesthésie et une deuxième URS et réduit, ainsi, le séjour à l'hôpital, les dépenses de santé et permet au patient de reprendre le travail plus tôt.

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