

Intraoperative and early postoperative complications of semi-rigid ureterorenoscopy: A prospective study

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Abstract

Objectives To analyze the intraoperative and early postoperative complications associated with uretero-rensoscopy (URS).

Methods A prospective analysis of patients who underwent URS during a period of six months from June 2014 at the Department of Urology, Teaching Hospital, Kurunegala was carried out. Management of upper urinary tract disease with regards to its associated complications were evaluated. Early postoperative period was taken as the first week of ureterorenoscopy.

Results A total of 150 patients had undergone URS. Nine patients had bilateral URS making the total number of (URS) renal units 159. Sixty eight percent of them were males and the mean age was 50 years with a range of 12 to 79 years. The main indication for URS was therapeutic intervention for ureteral calculi (85/150). Complications were graded according to the modified Clavien classification. Fifty nine complications occurred in 49 patients (59/150) with 36 intraoperative incidents (36/150=24%) and 23 early postoperative complications (23/150=15%). Majority of the complications were of Clavien Grade 1. Fifteen ureteral injuries have been encountered and all were managed with a Double J (DJ) stent. All early postoperative complications were accompanied by fever/UTI (23/59).

Conclusion Common complications include ureteral injury and postoperative fever and or sepsis. Most of the ureteral injuries could be managed with Double J (DJ) stent simple placement. Fever or sepsis occurs despite antibiotic prophylaxis.

Introduction

Ureterorenoscopy is a well-established widely practiced endourological procedure which is used as a diagnostic as well as therapeutic technique in upper urinary tract disease. Although ureteroscopy has been performed using a cystoscope in 1912 by Young and McKay (1), a rigid ureteroscope has been used for the first time in late 1970s (2).

At present the commonest indication for use of ureteroscope is for management of ureteral stones. It has its inherent complications some of which are severe in nature requiring immediate intervention including ureteral perforation, evulsion and bleeding. Modified Clavien classification system (3) has been used to grade the complications.

Methods

This is a prospective study of 150 consecutive patients who underwent semirigid ureteroscopy in the evaluation and management of upper tract disease by a single urological surgeon. All patients were assessed pre-operatively by urine culture, renal function tests, X-ray-KUB, USS of the KUB and Intravenous Urogram and or NCCT as indicated in certain instances.

Data were collected and recorded on a preformed data sheet and updated regularly. Early postoperative period was considered up to seven days after URS.

All patients with positive urine cultures were treated with appropriate antibiotics for one week and confirmed with subsequent negative cultures.



All procedures were performed by a single urological surgeon using 9.5Fr semirigid ureteroscope. All the patients received either 1 gm of Ceftriaxone or 500 mg of Amikacin intravenously as the prophylactic antibiotics at the time of induction of anaesthesia. Under general anaesthesia in lithotomy position, rigid cystoscope was inserted and the respective ureteric orifice was dilated using a series of ureteric catheters (4Fr, 5Fr, 6Fr, 7Fr and 8 Fr) in order to facilitate the entry of 9.5Fr semirigid ureteroscope. Only fragmentation technique available for ureteral stones was pneumatic device. Stone forceps and dormia baskets were used when indicated to retrieve stone fragments. Double J stents were inserted for stone patients who had residual stone fragments, stone migration, and ureteral injury in addition to the non-stone patients who required stents. All the patients were evaluated postoperatively on same night, next morning and one week later. All patients who had no fever or pain on postoperative day one were discharged home on appropriate oral antibiotics for seven days.

Results

Age distribution

Total of 150 patients (159 renal units) were included in the study. Mean age was 50 years (median 51 years) with a range of 12-78. Majority of the patients were

above 30 years of age. 102 (68%) of total subjects were males with a male to female ratio of 4:1 (Table 1).

Table 1. Age and sex distribution

Age group-Years	Female	Male	Total
10-19	2	3	5
20-29	4	6	10
30-39	8	18	26
40-49	11	19	30
50-59	9	26	35
60-69	12	23	35
70-79	2	7	9
Total	48	102	150

Indications for ureterorenoscopy

Indications were broadly categorized into two groups, diagnostic and therapeutic. Majority of the patients (56.66%) had ureteral calculi and underwent URS and additional procedures as a part of stone management. The Table 2 below gives a summary of indications for URS.

Table 2. Indications for ureterorenoscopy

Indication		Male	Female	Total
Diagnostic	Imaging abnormality	30	23	53
	Bleeding from UO	2		2
	Biopsy of tumour	1		1
	Assess previous intervention		1	1
Therapeutic	Ureteral calculi	67	18	85
	Stricture	1	2	3
	External compression		2	2
	Iatrogenic ureteral injury		1	1
	URS guided DJ stenting		1	1
	Removal of DJ stent	1		1
	Total	102	48	150

Out of 53 imaging abnormalities there had been 12 stone cases and eight ureteral strictures diagnosed subsequently.

Stone data

97 patients had total of 110 ureteric stones. Eleven patients had multiple stones (five patients had bilateral stones and 6 patients had multiple stone on same side). Majority of the calculi were in upper ureter (55/110) and 62% (66/106) of the stones had a diameter of 11 to 15 mm while stone size was not available for 4 stones. 149 procedures have been carried out in this cohort of 97 stone patients as summarized in the Table 3.

Table 3. Stone data

			Total
Stone site	Upper ureter	55	110
	Mid ureter	10	
	Lower ureter	45	
Stone size	Equal or <5mm	8	106
	6-10 mm	32	
	11-15 mm	66	
	Not given	4	4
Intervention alone or in combination	IPL	77	149
	Dormia Extraction	10	
	DJ stenting	62	

Complications of ureterorenoscopy

Modified Clavien classification of surgical complications was used to grade the complications.

The total complication rate was 39% with fifty nine complications occurring in 49 patients. The rate of intraoperative complications was 24% (36/150) and early postoperative complication rate was 15% (23/150). 5 patients had more than one complication.

In 101 patients out of 150, no significant complication was recorded after 1 week of intervention.

Clavien grading of complications

Grade	Complication	No	%
I	Mucosal injury	12	8
I	Fever	20	13.33
I	Mechanical failure (stone not accessible)	1	0.66
II	UTI	3	2
Ila	Proximal stone migration	19	12.66
IIIb	Perforation	3	2
V	Death following myocardial infarction on postoperative day 2	1	0.66
Total		59	

Discussion

Ureterorenoscopy (URS) is a well-established endourological procedure which is in use for several decades. URS is used as a diagnostic as well as a therapeutic procedure in managing upper urinary tract diseases such as stones, strictures and malignant lesions. The rate of significant complications associated with URS is declining with technical advancement and wide use of the instrument (4). As a result ureteroscopy is being used as a first line treatment option for ureteral stones (5). The commonest therapeutic indication in our series is in the management of ureteral calculi.

The rate of overall intraoperative complications occurring following ureteroscopy has been reported between 9% and 25% (6). In this series of 150 patients, it has reached the upper limit (24%) where we used a larger caliber ureteroscope (9Fr). Majority of the perioperative complications are of Clavien 1-2 (93%). One of the initial studies done on the perioperative complications after ureteroscopy in India has revealed that 98% of the complications are of Clavien 1-3 (7). In this study 15 ureteral injuries were encountered and majority was mucosal lacerations (12). All ureteral injuries were managed with double J stent placement during URS procedure itself. Complete evulsion of ureter is a very rare but devastating complication of URS (8) and we didn't experience any. Twenty three complications out of 59 were related to fever and or sepsis (15.33%). This is despite proper management of preoperative culture positive UTI and proper usage of perioperative antibiotic prophylaxis. In a study by Catalin Pricop and others has shown a high incidence of fever (22.83%) following URS indicating infectious complications (9).

Proximal stone migration was encountered in a significant number of patients representing 19 incidents out of the 59 complications and it has been shown that stone cone is a useful object in reducing retropulsion of stones and increase in stone free rates (10).

Ureteral perforation is classified as Clavien 3b and occurred in 3 patients (2% of complications) in our study compared to a large study by Geavlete and coworkers where only 65% ureteral perforations are encountered. In our series one patient died on second postoperative day from acute myocardial infarction.

Conclusion

Although URS is a well-established endourological procedure it has its own complications. Most of the complications are Clavien 1-2. Common complications

include various forms of ureteral injury and post-operative fever and or sepsis. Most of the ureteral injuries could be managed with simple DJ stent placement. Even major ureteral injuries could be managed with DJ stents. Fever or sepsis occurs despite antibiotic prophylaxis.

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