

A Review of Day Care Ureteroscopy of a Teaching Hospital in Malaysia

K Y Chan, MRCSEd, M Z Zulkifli, MS, M J Nazri, MS, M O Rashid, MS

Division of Urology, Department of Surgery, Hospital Universiti Kebangsaan Malaysia, 56000, Kuala Lumpur

Summary

This is a retrospective review of 200 day-care ureteroscopies performed between April 1998 and October 2002. The aim was to determine the feasibility and safety of this procedure. The mean age was 38.8 years and 75% of them were male. Eighty-three percent were ASA 1 and the remainders were ASA 2. The side of procedure were 48.5% right, 2.5% left and 6% both sides. Fentanyl and propofol were used during induction. Calculi were found in 82.5% of cases. Rigid and flexible scope were used in 91.5% and 10.5% of cases. There were 33% upper, 23% mid and 44% distal ureteric stones. The mean stone size was 9.37 X 6.93mm. Seventy-four percent required a ureteric stent insertion. The mean operative time was 58.3 minutes. Four percent of patients experienced pain post-operatively relieved by NSAID injection. Repeat ureteroscopy performed in 30% of patients. There were zero admission rates. This study suggests day-care ureteroscopy is effective, safe and well tolerated by patients.

Key Words: Day care, Ureteroscopy, Malaysia, Ureteric calculi, Ureterolithiasis, Stone, Ureter

Introduction

Day care surgery is still in its infancy in Malaysia with less than 5% of all surgical procedures being carried out as day care. Ministry of Health in Malaysia started its first day care pilot study in 1987 with intention to cut costs and reduce the overcrowding in hospital. In our hospital the day care service started in February 1998, with urological cases consist of 28.1% of overall cases¹.

Ureteroscopy was previously performed as elective procedures. In many developed countries, especially in United States, this procedure is performed as day care surgery. There is limited data in supporting day care ureteroscopy in developing countries, like Malaysia. Therefore, local study to assess for the feasibility and safety of its use in Malaysia is relevant.

The aims in the study were to review the demographic pattern, co-morbidities, ASA classification of patients, anesthetic induction agents, prophylatic antibiotic

usage, intra-operative instruments, operative findings and duration of surgery. Furthermore, the study also reviewed the percentage of stenting after procedure, analgesia usage, admission rate, stone free rate, intra and post-operative complications.

Materials and Methods

This is a retrospective review of 200 day care ureteroscopies performed between April 1998 and October 2002. Out of 210 procedures performed during that period, 10 cases were excluded from the study because of incomplete data. A profoma was used to collect data from the patients' record. The data was then stored and analyzed using SPSS (Statistical Packages of Social Science) version 11.

In this hospital, the patients selected for the day care ureteroscopy are based on the following day care criteria:

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Corresponding Author: Chan Kin Yoong, Department of Surgery, Hospital Universiti Kebangsaan Malaysia, 56000, Kuala Lumpur

1. All patients with ureteric stones irrespective of stone size and location of stone in ureter.
2. Patients aged between 6 months to 70 years.
3. ASA classification of not more than 2.
4. Hospital to home distance of less than 1 hour drive.
5. Patient able to understand pre and post-operative instruction.
6. Family member to accompany patient to and back from hospital.

Results

A total of 200 ureteroscopies were performed in 136 number of patients. The mean age was 38.8 ± 9.3 years. The patients' age ranged between 18 and 63 years. The male to female sex ratio was 3:1 with male preponderance. The ethnic distributions was 59% Malay, 29% Chinese, 10% Indian and 2% others.

Eighty-one percent of patients were classified as ASA 1 and remaining 19% were ASA 2. The co-morbidities were identified among the patients with ASA 2. Within this group of patients, 13.5% had hypertension, 4% had hypertension together with diabetic, and 1.5% had diabetic alone.

The chief complaints for our ureteric stone patients were loin pain (96%), hematuria (2.5%), and incidental finding (1.5%). The side of ureteroscopies performed were 48.5% right, 45.5% left and 6% both sides.

Fentanyl and propofol was used in all cases effectively for anesthesia induction. Patients remain "clear headed" after the procedure without any residual sedative effect caused by the anesthetic agents. The overall percentage of prophylactic antibiotic used was 84% cefoperazone, 1% ampicillin with sulbactam, 1% ampicillin with gentamicin, and the rest of 14% of patients were not documented to have had any antibiotic covered.

The stone was found in 82.5% of cases. The remaining 17.5% patients had no stone detected by scope and retrograde pyelography (RPG) with the possibility of stone already passed down. There were 1.5% of patients with narrow or tortuous ureter.

The percentages of instruments used for the overall cases were 80% Swiss lithoclast, 2.5% Holmium Laser, 91.5% rigid scope (7.5F or 9.5 F) and 10.5% flexible scope (7.5F). In those patients with stones, 93% had single ureteric stone, 5% two stones, and 2% multiple stones. The location of ureteric stone was 33% upper, 23% mid and 44% distal. The size of stone had mean length of 9.4mm and width of 6.9mm.

Seventy-four percent of cases had ureteric stent inserted after the procedure. Those patients in whom ureteric stent was not inserted was either because no stone was found operatively or only minimal manipulation on the stone performed. The overall mean operative time was 58.3 minutes. All the day care ureteroscopies were performed by trained urologists.

The extravasation of contrast from ureter was found in 2.5% of cases suggestive of ureteric perforation. These patients were discharged on the same day with stents inserted. All of them were well during the outpatient follow-up. When compared between the ureteric perforated and non-perforated groups for any differences of risk factor associated to them, there was significantly higher mean ASA of 1.18 for the perforated group as indicated in Table I. However, there were no significant difference noted for the other factors like duration of operative time, age and size of stone.

There was no analgesia routinely given during post-operative period. However, 4% of patients experienced pain post-operatively. The pain was controlled with non-steroidal analgesia injection before they were discharged well on the same day. Only in this group of patients oral analgesia was prescribed to take at home when needed. The percentage difference of stented patients with pain (4.8%) and non-stented with pain (3.7%) was statistically not significant ($p > 0.05$). There were no major complications noted in this study and the admission rate was zero.

Thirty percent of patients required repeated day care ureteroscopies because of residual stone or recurrence of stone during the study period. The maximum number of ureteroscopies repeated on a single patient was four times in this study. Eventually, all the patients were cleared of ureteric stones.

Table I: Risk factors associated with ureteric perforation

Risk factors	Mean value		
	Ureteric perforation	Non-perforation	P value
Operative time (min)	58.48 ± 28.61	51.00 ± 32.48	0.857
Age (years)	38.90 ± 9.36	34.4 ± 4.56	0.126
ASA	1.18 ± 0.38	1.00 ± 0.00	0.010
Size of stone	9.45 ± 4.53	6.25 ± 2.50	0.875

Discussion

The demographic pattern of patients was similar to other previous studies. The mean age of 43 and 51 were found in Harmon and Ernard studies respectively, which is slightly higher than our study^{2,3}. This may be due to preference were given to younger age group during patient selection in this hospital or earlier ureteric stone formation in them because of difference in local diet intake. The males had higher numbers of ureteric stone may be explained by lower fluid intake, hot local climate with excessive sweating during busy working hours. This finding is comparable to Ernard and Hofbauer studies that showed 76% and 73% male patients respectively^{3,4}.

The ethnic group distribution in this study was proportional to the local populations that stay around the hospital. The percentage of racial distribution around the hospital in descending order was Malay, Chinese, Indian and others. Therefore, there was no racial preponderance for ureteric stone formation in our study, although Malay consists of more than half of the day care ureteroscopy patients's load in our hospital.

All patients had to fulfill the day care patient selection criteria before they were listed for the procedure. The anesthetic clinic service is available in our hospital for reviewing patients with medical illness before the surgery. This can avoid unnecessary cancellation on the day of surgery. The medical illnesses that were classified as ASA 2 in this study were diabetics and hypertension. These illnesses are easily controlled by medication and they are safe to be included for day care ureteroscopy.

The commonest symptom that leads to the diagnosis of ureteric stone is loin pain and hematuria is only appear in a smaller number of patients in this study. Hence, this suggest any patients come with loin pain, the

doctor should consider investigate for ureteric stone. The number of right side ureteric stone is similar to the left side. This result is comparable to Harmon study of 48.4% right, 50% right and 1.6% bilateral².

Fentanyl and propofol is the standard induction agent used for day care ureteroscopy and sevoflurane gas is used intra-operatively. Patient was well awake immediately after the surgery and able to go home without having any residual sedative effect. The prophylactic antibiotic used was cefoperazone because it is the third generation cephalosporin with broad-spectrum coverage of gram positive and gram negative bacteria.

Ureteric stones were not found in 17.5% of cases and this may suggest the stones had passed out before the procedure. Some patients who were pre-operatively diagnosed as having a ureteric stone, but were instead noted to have narrowing, stricture, or residual dilatation of ureter caused by previous stone.

The instruments more commonly used were rigid ureteroscope, lithoclast and basket. They were able to remove most of the stones adequately. Flexible scope is used sometimes to assess the lower pole of renal pelvis at the same time. The Holmium laser is only available for a short period of time for evaluation purpose in this hospital. Hence, the number of laser used was small and cannot evaluate its effectiveness. The Bagley study showed flexible ureteroscopy with holmium laser is very effective for proximal ureteric stone⁵. The Holmium laser was significantly faster than electrohydraulic lithotripsy for ureteric stone bigger than 15mm as stated in Teichman study⁶.

The stone was single in majority of patients, and those multiple stones were usually found in repeat ureteroscopy with previous attempt of fragmentation. The location of ureteric stone in this study was comparable to Teichman study with more stone was

found in upper and distal ureter and less in mid ureter. The stone in distal ureter was easily removed completely. Hosking demonstrated distal ureteric stone was easily removed with ureteroscopy under intravenous sedation⁷. Some stones in upper ureter noted flow into renal pelvis during fragmentation and therefore required repeat ureteroscopy. The stone size of this study was similar to 8.1mm and 8.5mm in Earnard and Hofbauer studies respectively^{3,4}.

The operative time is comparable to published data^{4,8,9}. In our hospital, routine stenting after procedure was performed and removal of stent was planned a month later. Most of the patients did not experience pain at early post-operative period. The pain felt between stented and non-stented groups was statistically not significant. Hence, stenting did not affect the day care service. All of our patients were able to tolerate the stent prior to its removal. Chen and Borboroglu reported the bladder irritative symptom could be avoided and it was safe without stenting^{10,11}. The patients with bladder irritative symptom that require medication in our hospital was still relatively small.

The only intra-operative complication noted in the study was ureteric perforation demonstrated by extravasation of contrast. The complication rate of the procedure is comparable to 1.5% and 2.6% in Harmon and Hofbauer studies^{2,4}. The ureteric perforation was treated by stent insertion. Schuster noted there was associated increase risk of ureteric perforation with increase operative time⁸. However, the increase operative time noted among the ureteric perforated group in our study was statistically not significant.

The percentage of patients experience pain post-operatively was lower as compare to 11% in Taylor's

study¹². This difference could be due to cultural difference of not expressing pain openly and easily among the local patients. The tolerability of pain may also be higher as compare to other region. The admission rate of 2% and 14% in was higher in Cheong and Taylor studies as compare to this study^{12,13}. The main reason of admission in day care ureteroscopy was post-operatively pain that was as indicated in other studies.

Some patients required repeat ureteroscopies and finally all of them were free of stones after subsequent follow up. The stone free rate was 91% and 98% in Cheong and Taylor studies^{11,12}. This was because other modalities of treatments were offered to patients after initial ureteroscopies were failed. In our center, the patients were willing to accept repeat ureteroscopies and result showed the ureteroscopies were able to clear the residual stones despite the initial attempts failed.

Conclusion

The study suggests day-care ureteroscopy in this hospital was effective and safe, in view of careful patient selection, smooth induction, adequate instruments, trained urologists, acceptable duration of operative time, good stone clearance rate, no serious complications, relatively pain free with zero admission rate.

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