Role of Ureteroscopy in the Management of Ureteric stone

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Advent and evolution of ureteroscopes has revolutionised the management of urinary stone disease. This study was aimed to establish the role of Ureteroscopic management in Ureteric calculi. Sixty two patient (44 males and 18 females) who presented with ureteric calculi were included in study. Patients with ureteric calculi were managed by Ureteroscopy and stone retrieval with dormia basket or stone fragmentation by Electrokinetic lithotripsy (EKL) and electrohydrolic lithotripsy (EHL). Twenty-two cases presented with complete obstruction in which JJ stenting was performed in emergency. 25.81% patients had stone in upper, 12.9% in middle and 61.29% in lower ureter. Complete stone clearance was achieved in 79.03% cases at primary ureteroscopy while 11.9% needed secondary ureteroscopy and stone passed spontaneously after stenting in 6.45 cases. Two (3.23%) cases had ESWL due to migration of stone fragments to kidney. Urinary tract infection (3.23%) and bleeding (3.23%) were only notable complications. We recommend that ureteroscopy should be the first line of treatment in the management of ureteric calculi.

Key Words: Ureter, ureteroscopy, ureteral calculi

Ureteroscopy first described by Young & McKay in 1929[1,2], has been revolutionised in terms of its design, advancement in fibroptic visualisation, flexibility & decrease in size. Improvement in calculus fragmentation ability, various baskets, stents and wires has broadened the ureteroscopic diagnostic & therapeutic capabilities. Our prospective study is aimed to highlight the use of ureteroscopy in the management of ureteric stones.

Material & Method:

From January 2001 to December 2003, 62 patients with ureteric stones underwent 72 ureteroscopic procedures for stone management at our institution. Prospective data was collected by a specially designed database including stone presentation, their location, mechanism of extraction, type of fragmentation, type of ureteroscope used and stent placement. All patients were reviewed with regard to symptomatic outcome and complications. Complications were determined on postoperative day 0, 1, 6, one month & 3 months. Stone free rates were determined at 3 months by IVU, or non-contrast CT.

All ureteroscopies (Olympus 7.5 Fr) were carried out under general anaesthetic. Twenty-four patients had stones in the right ureter, thirty seven left & one had bilateral stones. Stone size ranged from 5 mm to 15 mm.

Cysto-urethroscopy was performed under general anesthesia in lithotomy position. Guide wire was passed up the ureter followed by the ureteroscopy. Procedure was performed under fluoroscopic imaging using C arm X-ray unit. Stone was fragmented with either EHL or EKL using Lithotron EL 25.

EKL was used in all except 7 cases to fragment the stones. Of these seven three patients had EHL fragmentation, while the remaining four stones were extracted with dormia basket under direct vision.

Results:

Sixty two patients of which 44 were males & 18 female with mean age 43.8 years (range 20-84) were included in study. Mode of presentation of these patients was loin pain (57), frank haematuria (3), acute renal failure (2), urinary tract infection (2) (Fig.1). Sixteen patients presented with stone in upper third, 8 in middle third and 38 in the lower third of ureter (Fig 2).

In our series 22 out of 62 patients presented with ureteral obstruction which required emergency insertion of JJ stent. Two patients presented with acute renal failure, one had bilateral obstructing ureteric calculi and the other had a solitary obstructed kidney. Ureteroscopy was delayed for 4 weeks awaiting improvement in renal function after insertion of JJ stent.

Complete stone clearance was achieved in 49 patients (79.03%). While 4(6.45%) patients spontaneously passed the residual stone fragments at the 1st month of follow up after primary ureteroscopic fragmentation. The remaining 7(11.29%) patients (including 2 patients with abandoned procedure following bleeding secondary to EHL during primary ureteroscopy) required secondary ureteroscopy after 4 weeks with complete stone clearance. Whereas 2 (3.23%) other patients needed ESWL, as stone fragments migrated into the renal calyces during primary ureteroscopic fragmentation of upper 1/3 ureteric stone. The average length of hospital stay was 2.3 days.

Procedure was abandoned in two cases due to bleeding with EHL. In these patients JJ stent was inserted followed by ureteroscopy 4 weeks latter to achieve complete clearance. Urinary tract infection was only notable complication (3.23%) which was treated with antibiotics. No mortality or morbidity in the form of ureteral perforation or ureteral stricture was observed.

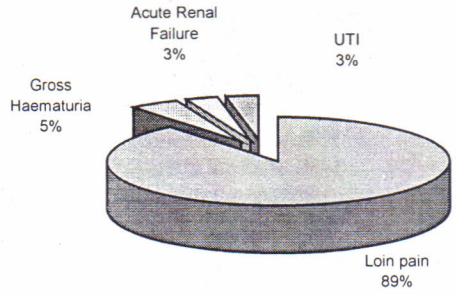

Fig 1: Clinical presentation of the patients

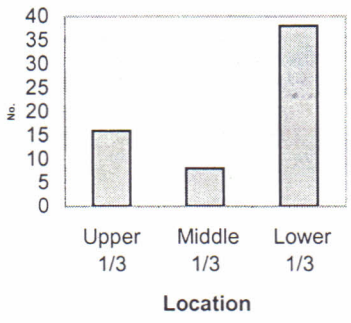

Fig. 2: Location of stones in ureter.

Discussion

Modern management of ureteral stones has been profoundly influenced by the parallel developments of ureteroscopy & ESWL. While ESWL can effectively treat proximal & distal ureteral stones with reported stone free rate in excess of 90 %[2, 3], yet 51% of these cases mainly with stone in distal third of ureter need re-treatment. ESWL is still considered the Gold standard and 1st line of treatment for proximal ureteral stones, the advent of smaller calibre flexible and semi-rigid ureteroscopes allowing access to the proximal ureter with stone free rate exceeding 95% makes ureteroscopy a valid alternative for stones in the entire ureter[3]. Ureteroscopy can yield 100% stone free rates usually as a single, definitive procedure[3] proving itself first line treatment in distal as well as proximal ureteric stone depending upon the experience of the operator[3,4]. Endoscopic stone extraction has considerable advantages for the patients in terms of low morbidity being minimally invasive, less discomfort, short hospital stay and early return to normal daily life. Though ureteroscopy has proved to be an effective therapy in the treatment of ureteral calculi, it has also got a greater potential for complications, ranging from the creation of false passage, sepsis, ureteral perforation, stricture formation or even ureteral avulsion. A number of factors can make ureteral access difficult, such as an enlarged prostate, urethral stricture, previous pelvic surgery, prominent cystocoele or congenital conditions such as ureteroceles or ureteral duplications. The incidence of complication is reduced by the rise of learning curve of operator[3].

Sometimes insertion of ureteric stent in cases of tight ureteric orifice causes passive dilatation of the ureter thus making subsequent ureteroscopy and stone retrieval easy thus preventing further damage to the ureter[4].

In our series complete success at primary ureteroscopy was achieved in 79.03% patients which is better than the success achieved by Willaims et al, Bishop et al and Blue et al which was 96%, 80% and 86% respectively[5-7]. Better results in our study are due to use of smaller calibre ureteroscopes. Seven of our cases had secondary ureteroscopy with in 4 weeks with 100% stone clearance, similar results were achieved by Rajive et al[3]. Two cases were successfully treated with ESWL where stone fragments migrated into the renal calyces. Four patients passed their stones spontaneously after stenting to relieve acutely obstructed kidney at first month follow up. Only two patients (3.23%) developed fever due to UTI which was treated successfully with antibiotics while Timothy G Schuster et al reported UTI in 4/43 cases[8].

In review of Mayo clinic experience complications were reported in 20% of patients, including fever, failed removal of stone & ureteral injury[7]. Ureteral strictures were noted in 1.4 % patients. Kramolowsky has reported 17% ureteral perforation[9]. In this series the perforation was attributed to a variety of causes including the use of sequential dilators on the ureteric orifice, large rigid ureteroscopes(11.5 or 13F), an excessive cough of the patient under epidural anaesthesia & ultrasonic probe. Stricture rates in other series have ranged from 0 to 4.5[3]. In our series there were no ureteral perforation, bleeding was a problem in 2 cases due to EHL use and the procedure had to be abandoned. Patients were stented and 4 weeks latter complete clearance was achieved with secondary ureteroscopy. There were no long term complications such as ureteral stricture.

While upper ureteral stones are considered suitable for ESWL either in situ or after push back to kidney[10], our experience showed that endoscopic techniques particularly with smaller calibre rigid and flexible ureteroscope are appropriate for extraction of ureteric calculi in upper ureter. Complete clearance was possible 22/24 (91.67%) cases while Bishop et al reported success rate of 9/19 (48%) patients in the upper 2/3[6]. Again this difference is probably due to the use of small calibre ureteroscope.

Conclusions:

It seems clear that with the development of smaller sized rigid & flexible ureteroscope and development of wide range of intracorporeal lithotripsy devices. It is now possible to remove ureteric calculi along the entire length of ureter during primary ureteroscopy. Our experience shows efficacy of ureteroscopy as primary line of treatment for ureteric stone management regardless of their position. We strongly recommend the use of ureteroscopy

as first line of treatment for ureteric stone management where facilities and expertise are available.

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