Urètreoscopic: twenty years of experience at the Hospital General de México

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- ABSTRACT

Introduction: Ureteroscopy has been widely used as a diagnostic method and as treatment of supravesical urinary tract disease.

Objective: To carry out a review of management experience of ureteral lithiasis patients by means of rigid ureteroscopy from 1988-2008 in the Urology Department of the Hospital General de México.

Methods: An observational, comparative, retrospective study was carried out that included 1088 patients diagnosed with ureteral lithiasis that underwent ureteroscopy at the Urology Department of the Hospital General de México from January 1, 1988 to December 31, 2008.

Results: A total of 1088 case records were analyzed of patients diagnosed with ureteral lithiasis that underwent ureteroscopy. Of that total 691 (63.5%) were men and 397 (36.5%) were women. There were 555 (51%) right ureteroscopies, 467 (42.93%) left ureteroscopies, and 66 (6.07%) bilateral procedures. Patient age ranged from 7-82 years. Location was divided into three ureteral segments: 925 patients (85%) had stones in the lower segment, 108 (10%) had stones in the middle segment, 49 (4.5%) in the upper segment, and 6 patients (0.5%) had stones in multiple locations. In regard to stone size, 327 patients (30%) had stones under 5 mm, 436 patients (40%) had stones from 5.1-10 mm, 217 (20%)

- RESUMEN

Introducción: La ureteroscopia se ha difundido amplia-mente como método diagnóstico y de tratamiento para las enfermedades del tracto urinario supra-vesical.

Objetivo: Realizar una revisión de la experiencia del manejo de pacientes con litiasis ureteral con el uso de la ureteroscopia rígida de 1988 a 2008 en el Servicio de Urología del Hospital General de México.

Métodos: Estudio retrospectivo, comparativo y observacional, en el que se incluyeron 1088 pacientes con diagnóstico de litiasis ureteral, a los cuales se les realizó ureteroscopia en el Servicio de Urología del Hospital General de México del 1 de enero de 1988 al 31 de diciembre de 2008.

Resultados: Se analizaron 1088 expedientes de pacientes con diagnóstico de litiasis ureteral sometidos a Ureterscopia, de los cuales 691 (63.5%) fueron hombres y 397 (36.5%) mujeres; 555 (51%) fueron derechos, 467 (42.93%) izquierdos y 66 (6.07%) bilaterales. La edad de los pacientes osciló entre siete a 82 años. La localización se dividió según los segmentos del uréter, siendo 925 (85%) de los litos en el tercio inferior, 108 (10%) en tercio medio, 49 (4.5%) en tercio superior, así como 6 (0.5%) con múltiple localización. Con respecto al tamaño de los litos 327 (30%) fueron de menos de 5 mm, 436 (40%) de entre 5.1 mm y 10 mm, 217 (20%) de 11 mm a 15 mm, 76 (7%) de 16 mm a 20 mm y 32 (3.5%) de más de 20 mm. Se utilizaron diversos equipos para la fragmentación; siendo en 747
had stones from 11-15 mm, 76 (7%) from 16-20 mm, and 32 patients (3.5%) had stones larger than 20 mm. Different equipment was used for fragmentation: 747 (68.7%) procedures were performed with pneumatic lithotripsy, 58 (5.3%) with electrohydraulic lithotripsy, 21 (1.9%) with ultrasound lithotripsy, and 262 (24.1%) only with laser. Double-J ureteral catheter was placed in 914 patients (84%) after procedure. No catheter was placed in the remaining 174 patients (16%). There was an 87% (947) success rate in patients. Procedure failure in the remaining 141 patients (13%) was due to stone migration that was managed with extracorporeal lithotripsy in 76 patients (7%), and double-J ureteral catheter was placed in the 65 patients (6%) in whom advancement was impossible. Complications presented in 38 patients (3.49%): false route in 17 patients (1.56%), ureteral perforation in 12 patients (1.1%), ureteral stricture in 5 patients (0.45%), acute abdomen in 2 patients (0.18%), hemorrhage in 1 patient (0.09%), and ureteral avulsion in 1 patient (0.09%). These complications were managed with double-J ureteral catheter placement. Exploratory laparotomy and ureteral implant were carried out in the patient that presented with ureteral avulsion.

Conclusions: Semi-rigid ureteroscopy is a safe, fast, and effective procedure for managing ureteral lithiasis in the different segments. Success rates and complication rates in the present study were similar to those reported in the international literature.

Keywords: Ureteroscopy, urinary lithiasis, treatment, complications, Mexico.

INTRODUCTION

The coming together of three highly important factors led to the birth of Urology in the second half of the nineteenth century. First was the creation of the cystoscope, emblematic of our specialty. The second was lithotripsy, the procedure that fragments urinary calculi, a disease that can almost be called “endemic” in European societies from the Middle Ages until the beginning of the twentieth century. And third, was the imperative need to create a surgical subspecialty such as urology, different from general surgery, since it is nearly impossible for a general surgeon to master each and every aspect of surgery. 1-2

In 1853, Dr. Antoine Jean Desormeaux designed the “L’endoscope” that was presented at the Academy of Medicine in Paris. It was made for the purpose of examining the urethra, vagina, intestines, and wounds. 3-5

Called the Father of Endoscopy by many, Desormeaux presented his endoscope that consisted of a single visualizing tube that derived its light from alcohol that, using a turpentine lamp, was reflected by a concave lens. It could detect urethritis and fistulous tracts. Desmoreaux was the first to use water as a distension medium, improving the visualization of urethrovesical structures.3-5

In 1890 Dr. Alexander Brenner built a cystoscope that had an accessory for catheterizing ureters. It was a modification of the Nitze cystoscope. At first it could only catheterize ureters in women. But in 1893 Dr. James Brown (1854-1895), at the Johns Hopkins
Hospital in Baltimore, successfully catheterized ureters in men using the Brenner cystoscope.

Ureteroscopy has been widely used as a diagnostic method and treatment for supravesical urinary tract diseases. The first descriptions of endoscopic inspection in the ureter come from the work of two great urologists; in 1912 Hugh H. Young introduced the rigid cystoscope inside the dilated ureter in a patient with posterior urethral valves. In 1964 Víctor F. Marshall introduced a 3 mm fibroscope in the interior of the distal ureter, visualized a ureteral stone and described the limitations of the instrument that did not let him extract the stone. Since then, technical advances have facilitated the development of ureteroscopes, both rigid and flexible, as well as the instrumentation necessary for carrying out procedures in the upper urinary tract. The Hopkins lens-bar system, developed in 1960, increased light transmission through rigid endoscopes and made the development of lower caliber ureteroscopes with operating access and for irrigation. The first endoscope designed specifically for ureteroscopy was built by Richard Wolf Medical Instruments. Pérez-Castro and Martínez-Piñeiro who worked with Karl Storz Endoscopy en 1980, reported on the development of a longer 39 cm ureteroscope that could reach the pelvis.5-11 Fiber optic endoscopes have evolved and they currently have a deflexionable tip and instrumentation access openings that keep a 2-3 mm diameter, allowing for easy passage to the interior of the upper urinary tract.3,12-14

In the last 25 years different energy fragmentations by contact have been developed, such as ultrasound, electrohydraulic, laser, and pneumatic energy, used in bladder, ureteral, or kidney intracorporeal lithotripsy.6-10,15

**OBJECTIVE**

To carry out a review of management experience of ureteral lithiasis patients with the use of rigid ureteroscopy from 1988-2008 at the Urology Service of the Hospital General de México.

**METHODS**

An observational, retrospective study was carried out that included 1088 patients diagnosed with ureteral lithiasis who underwent ureteroscopy at the Urology Service of the Hospital General de México within the time frame of January 1, 1988 and December 30 2008. Analyzed variables were age, sex, stone laterality, size, and location, type of anesthesia and lithotripsy equipment used, and use of double-J ureteral catheter, as well as complications.

Results were analyzed and were considered successful if the patient remained stone-free after procedure.

**RESULTS**

A total of 1088 case records were reviewed of patients with ureteral lithiasis diagnosis who underwent ureteroscopy. There were 397 women (36.5%) and 691 men 691 (63.5%) (Image 1); 555 patients (51%) had stones on the right side, 467 (42.93%) on the left, and 66 patients (6.07%) had bilateral stones (Image 2). Patient age ranged from 7-82 years and mean age was 37.5 years. Stone location was divided into three segments of the ureter; 925 patients (85%) had stones in the lower third segment, 108 (10%) in the middle third segment, and 49 (4.5%) in the upper third segment. Six patients (0.5%) had stones in multiple locations (Image 3). In regard to stone size, 327 patients (30%) had stones under 5 mm, 436 (40%) from 5.1-10 mm, 217 (20%) from 11-15 mm, 76 (7%) from 16-20 mm and 32 (3.5%) had stones larger than 20 mm (Image 4). Peridural block was used in 1047 patients (96.2%), balanced general anesthesia was used in 21 (2%), and sedation was used in 20 patients (1.8%). Different equipment was used for fragmentation; 747 procedures (68.7%) were carried out with pneumatic lithotripsy, 58 (5.3%) with electrohydraulic lithotripsy, 21 (1.9%) with ultrasound lithotripsy, and 262 (24.1%) only with lapaxy (Image 5). Double-J catheter was placed in 914 patients (84%) after procedure. It was not used in 174 (16%). There were 947
successful cases (87%) and 141 failed cases (13%). Of the failed cases 76 (7%), were due to stone migration and were managed with extracorporeal lithotripsy. There was impossibility to advance in 65 failed cases (6%) and double-J catheter was placed in those patients (Table 1). Complications presented in 38 cases (3.49%): false route in 17 (1.56%), ureteral perforation in 12 (1.1%), ureteral stricture in 5 (0.45%), acute abdomen in 2 (0.18%), hemorrhage in 1 (0.09%), and ureteral avulsion in 1 (0.09%). Complications were managed with double-J ureteral catheter and exploratory laparotomy and ureteral reimplant were carried out in the case of ureteral avulsion (Table 2).

**DISCUSSION**

Ureterolithiasis management has changed drastically over the last 10 years due to medical management and advances in the design of ureteroscopes and their accessories. However, ureteroscopy is the safest and most effective management for ureteral calculi. 15-17
Unfortunately, the majority of urological centers do not have all the latest technology at their disposal. The semirigid ureteroscope with ballistic energy offers the best cost-effective results. 18

The introduction of ureteroscopy has made open surgery unnecessary in many cases. In addition it had improved stone-free rate from 71- 87% and has reduced complications.19-22

In the present study lithiasis was more common on the right side and in men, which is similar to results of other studies. 18,20

The success rate was 87% and was comparable with the 87% reported by Rajiv et al, the 89% reported by Serrano et al, and the 92.4% reported by Osorio et al. Extracorporeal lithotripsy had to be performed after ureteroscopy in 7% of cases, which was similar to that shown in other series such as the 9% reported by Blute et al and the 7.24% reported by Serrano et al. Open surgery was carried out in 0.27% of cases which was less than that reported in other series that showed 1-3%.20,21

Complication rates of 3-14% have been reported. In the present series complication rate was 3.49%; Wilnall et al reported 7%, Fuganti 4.4%, Osorio 4.2%, and Yuossef 14%.16,18-20,21

Ureteral catheter placement after ureteroscopy is recommendable since it reduces postoperative pain and prevents possible ureteral stricture due to stone impact site and the possibility of the passage of stone fragments. In the present study 84% of patients had ureteral catheter placement after surgery, however, there are reports from 17%, as in the series by Blute et al and the series by Serrano et al, to placement in 100% of patients, as published by Hoffbauer and Osorio.17,20,21

Alapont et al demonstrated a relation to stone size, along with increased perforation risk with impacted stones. 23

### Conclusions

Many ureteral calculi can be managed through watchful waiting, which is noninvasive and low-cost. Stones under 5 mm are expelled spontaneously in 98% of cases. However, in the majority of stones larger than 7 mm in diameter, there is a low rate of spontaneous expulsion. Ureteroscopy is a safe and minimally invasive procedure.

Over the past decades great advances have been made in upper urinary tract lithiasis management. The recent miniaturization of ureteroscopes and the introduction of Holmium laser have brought about increased stone-free rate and reduced complication rate.

Routine catheter placement in postoperative ureteroscopy patients is unnecessary with non-complicated in situ lithotripsy, and so it should be used selectively.

Semirigid ureteroscopy is a fast, safe, and effective procedure for managing ureteral lithiasis in the different segments. The success rate and complication rate of the present series were similar to those reported in the international literature.

### Bibliography


### Table 1. Procedure success.

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<td>Impossibility to advance</td>
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### Table 2. Procedure complications.

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