

Treatment of large fibroepithelial polyps in the proximal ureter with antegrade plus retrograde endoscopic laser polypectomy

Yang Cao, MD, Qi Chen, MD*, Hai Zhong, MD, Han-Qing Xuan, MD, Lei Xia, MD, Wei Xue, MD

Abstract

The diagnosis and treatment of large fibroepithelial polyps in the proximal ureter have been the clinical challenges. This study retrospectively summarized the clinical diagnosis and treatment of fibroepithelial polyps >5 cm in length in the proximal ureter of 6 patients who received treatment in the Affiliated Renji Hospital of Shanghai Jiaotong University School of Medicine between December 2010 and February 2017. The length of fibroepithelial polyps ranged from 5.8 to 8.2 cm. There were 4 males and 2 females with the mean age of 32.6 ± 9.8 years. Unilateral polyps were found in all patients (right: $n=4$; left: $n=2$). Hydronephrosis of different extents was noted in these patients, 4 complained of back pain and 2 were diagnosed with hydronephrosis by ultrasonography. 1 patient had macroscopic hematuria. All these patients received antegrade plus retrograde endoscopic laser polypectomy after admission. Symptoms were significantly improved after surgery, and ultrasonography showed hydronephrosis was attenuated to different extents 2 weeks later. Three months later, computed tomography urography revealed favorable recovery in 5 patients and deterioration of hydronephrosis due to ureteropelvic stenosis in 1 patient.

Keywords: endoscopic laser polypectomy, polyps, ureter

1. Introduction

Ureteral fibroepithelial polyps are rare benign tumors of the ureter and have a low incidence. Generally, they are regarded as congenital lesions with slow growth or lesions secondary to the chronic stimulation of urinary tract epithelium (such as infection, inflammation or obstruction).^[1,2] Imaging examinations are difficult to differentiate them from transitional cell carcinoma. However, preoperative radiographic diagnosis may be challenging, as ureteral fibroepithelial polyps usually present as a filling defect, which may be attributed to blood clots, radiolucent calculi, neoplasms, or a crossing vessel.^[3] Larger polyps may extend into the bladder cavity and may be difficult to distinguish from bladder tumors.^[4] Currently, they are occasionally diagnosed by the pathological examination after nephrectomy and/or ureterectomy in some cases. The small ureteral fibroepithelial polyps can be managed by endoscopic laser resection, but there is great difficulty in the treatment of ureteral fibroepithelial

polyps longer than 5 cm by endoscopic laser resection. In our department, antegrade plus retrograde endoscopic laser polypectomy was employed in the treatment of 6 patients diagnosed with ureteral fibroepithelial polyps between 2010 and 2017 (length: 5.8–8.2 cm), achieving favorable outcomes according to the postoperative complications and imaging findings.

2. Materials and methods

2.1. Patients

This study has been approved by the Ethics Committee of Renji Hospital. Six patients were diagnosed with ureteral fibroepithelial polyps in the Affiliated Renji Hospital of Shanghai Jiaotong University School of Medicine between December 2010 and February 2017.

2.2. Preoperative preparations and examinations

Two patients received preoperative IVP (Fig. 1A) and 4 underwent preoperative CTU (Fig. 1B) besides routine preoperative examinations. Imaging examinations showed hydronephrosis in all these patients with probable space occupying lesions in the renal pelvis and proximal ureter. Preoperative examination of shedding cells showed negative results in 6 patients, and 3 received preoperative fluorescence in situ hybridization (FISH; a method used for the differentiation between benign and malignant lesions) which also displayed negative results.

2.3. Surgical methods and observations

All these patients received staged antegrade plus retrograde endoscopic laser polypectomy. In stage I surgery, patients lied in a lithotomy position, and a 6/7.5Fr rigid ureteroscopy (Wolf, Germany) was performed for biopsy. After sample collection, patients lay in a prone position, and ultrasound-guided kidney puncture was performed, followed by indwelling of a nephrostomy

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Department of Urology, Renji Hospital, Shanghai Jiaotong University School of Medicine, Shanghai, China.

* Correspondence: Qi Chen, Department of Urology, Renji Hospital, Shanghai Jiaotong University School of Medicine, Shanghai 200127, China (e-mail: chenqirji@163.com).

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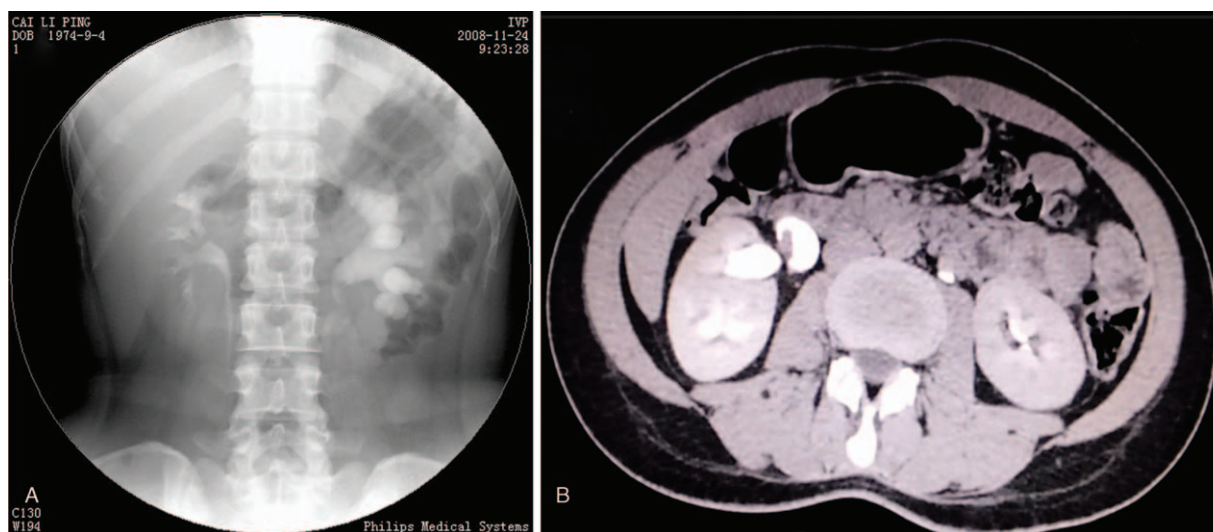


Figure 1. Preoperative examinations. (A) Preoperative intravenous pyelography; (B) preoperative CTU. CTU=computed tomography urography.

tube. Two weeks later, stage II surgery was performed. Patients lied in a 45° lithotomy position (Fig. 2) with unaffected side forward at 45°. The hip of affected side was slightly abducted and flexed at 90° similar to the knee. The hip of unaffected side was abducted at 45°, the knee was flexed at 30°, and the holder of unaffected side was lower than that of affected side. The original channel was gradually opened to F18, except for 1 patient with F24 due to the shortage of

F24 sheath at that time, and the nephroscope sheath was indwelled. A 15/18 Fr nephroscope with a working length of 225 mm (wolf 8968.421, Wolf, Germany) was adopted. The assistant inserted F6/7.5 rigid ureteroscope to the ureter retrogradely. The grasping plier was used to clamp the terminal of the polyp and slightly pull it outward to expose the base of the polyp in the renal pelvis (Fig. 3B). The laser fiber (energy: 0.8, frequency: 15) was inserted antegradely via the nephroscope. Indwelling F4.7 double J tube was allowed for 4 weeks after surgery. All patients had urethral catheter after surgery, and the catheters were removed on discharge. The patients were followed-up every 3 months to third years in the outpatient department. The first follow-up evaluation was performed 2 months after the operation, after which patients were seen every 3 months during the first year and every 6 months thereafter. At each visit, urinalysis, shedding cells, measurement of serum creatinine, and CTU were performed. All patients were followed-up for CT scan, blood routine test, liver function, renal function, electrolyte, and coagulation function 1 month after discharge.



Figure 2. 45° lithotomy position.

3. Results

3.1. General characteristics

Of 6 patients, there were 4 males and 2 females with the mean age of 32.6 ± 9.8 years. Unilateral polyps were observed in all these patients (left: $n=4$; right: $n=2$). Hydronephrosis of different extents was noted in all the patients, 4 complained of back pain, and hydronephrosis was found by ultrasonography in 2 patients. Macroscopic hematuria was found in 1 patient. Of 6 patients, 2 had a history of renal calculus and 3 had a history of ureteral calculus. In these 5 patients, 2 received prior ureteroscopic lithotripsy (URSL). In addition, 1 patient has 2 attacks of nonobstructive pyelonephritis. The general characteristics of these patients are shown in Table 1.

3.2. Efficacy and complications

Neoplasm was noted at the proximal ureter in these patients, and it also extended to the renal pelvis and distal ureter in 3 cases.

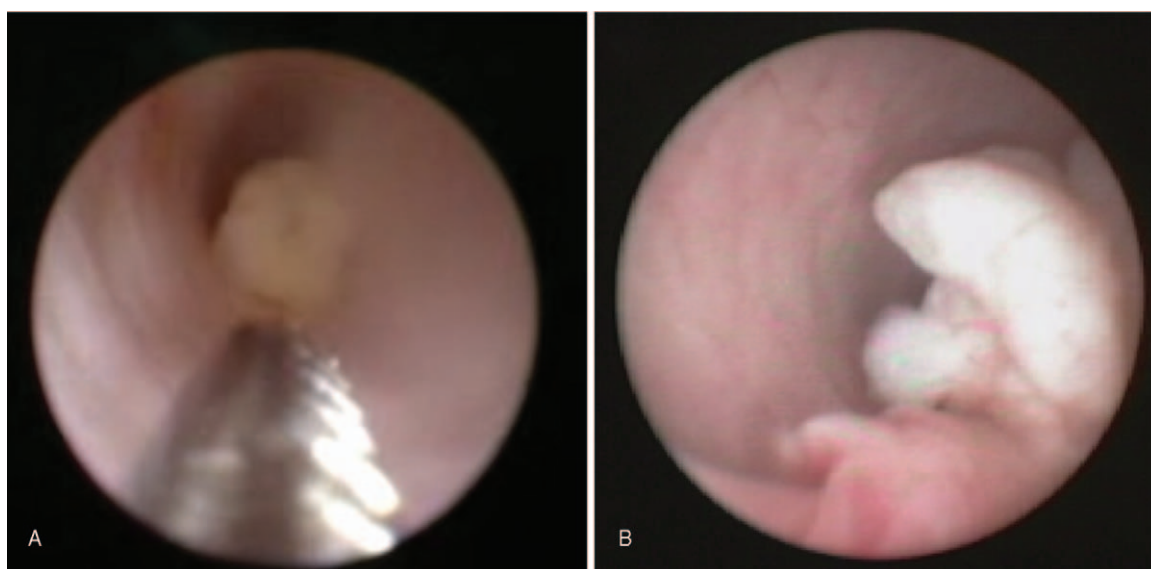


Figure 3. (A) Biopsy under a ureteroscopy; (B) exposure of the base of the fibroepithelial polyp under a nephroscope.

Biopsy was done by GE staining for further pathological examination (Fig. 3A). Surgery was performed smoothly in these patients, and serious bleeding was not observed after stage I surgery. The mean time of stage II surgery was 22.6 ± 8.8 minutes. Holmium laser was used in 4 patients, thulium laser in 1, and dual frequency laser in 1 for the resection of ureteral fibroepithelial polyps (Fig. 4A). In 1 patient with a large polyp, the polyp was separated into 2 parts in the renal pelvis, which were then removed with the retraction of the nephroscope sheath. In remaining patients, F18 sheath was inserted antegradely and the en bloc polyp was removed (Fig. 4B). There was no postoperative fever in these patients and the mean hospital stay was 3.0 ± 1.7 days. Double -J stent was removed successfully 4 weeks later. Three months after surgery, routine re-examination by computed tomography urography showed pelvi-ureteric junction (PUJ) stenosis and deterioration of hydronephrosis in 1 patient after holmium laser resection, but hydronephrosis and recurrence were not noted in remaining 5 patients. The patient with stenosis was 37 years and a polyp was found in the upper segment of right ureter and sized 5.8 cm in length. Surgery was done with holmium laser (power: 0.5; frequency: 20; operation time: 25 min). Stage II

right pyeloplasty for PUJ obstruction was recommended, but the patient refused to receive this surgery. Currently, this patient received conservative therapy with indwelling F7 double-J tube.

3.3. Pathological examination

Macroscopically, lesions were polyp like, and their length ranged from 5.8 to 8.2 cm. Postoperative pathological examination confirmed the ureteral fibroepithelial polyps (Fig. 5).

4. Discussion

Ureteral fibroepithelial polyps in the renal pelvis are extremely rare. They are the most common benign tumors of the urinary tract derived from mesoderm, and no more than 40 cases have been reported so far.^[1,5-7] Pathologically, fibroepithelial polyps are composed of fibrous tissues derived from mesoderm at the center and normal transitional epithelial cells as a cover. Generally, polyps have smooth surface and clear boundary and are usually cylindrical.^[6,7] Currently, the etiology and pathogenesis of fibroepithelial polyps are still poorly understood. Genetic factors, irritability, repeated infection, obstruction, and trauma are assumed as the probable causes of fibroepithelial polyps.^[1,6-8] Ureteral fibroepithelial polyps are frequently found in young adults (median age: 40 years), and patients usually complain of intermittent back pain (79%) and macroscopic hematuria (50%).^[5-7] Polyps of the renal pelvis are more common in females (79%) and at the right side (70%), but males have a higher incidence of ureteral polyps which are often found at the left proximal ureter (70%).^[5,6]

Imaging examination alone is usually difficult to diagnose benign fibroepithelial polyps in the renal pelvis. In the past 20 years, great progress has been made in the endoscopic technique, which makes the diagnosis of fibroepithelial polyps a little bit easy. Some characteristics are also helpful for the differential diagnosis of fibroepithelial polyps besides preoperative examination of shedding cells, computed tomography urography and intravenous pyelography. Ureteral fibroepithelial polyps are more common in young adults and frequently found in the renal

Table 1

General characteristics of patients in this study.

Characteristics	Values
Gender (male/female)	4/2
Age	32.6 ± 9.6 years
BMI	24.1 ± 3.2 kg/m ²
Location (left/right)	4/2
Imaging examination (n)	
CTU	5
IVP	1
Degree of hydronephrosis	
No	0
Mild	1
Moderate	4
Severe	1

BMI=body mass index, CTU=computed tomography urography, IVP=intravenous pyelography.

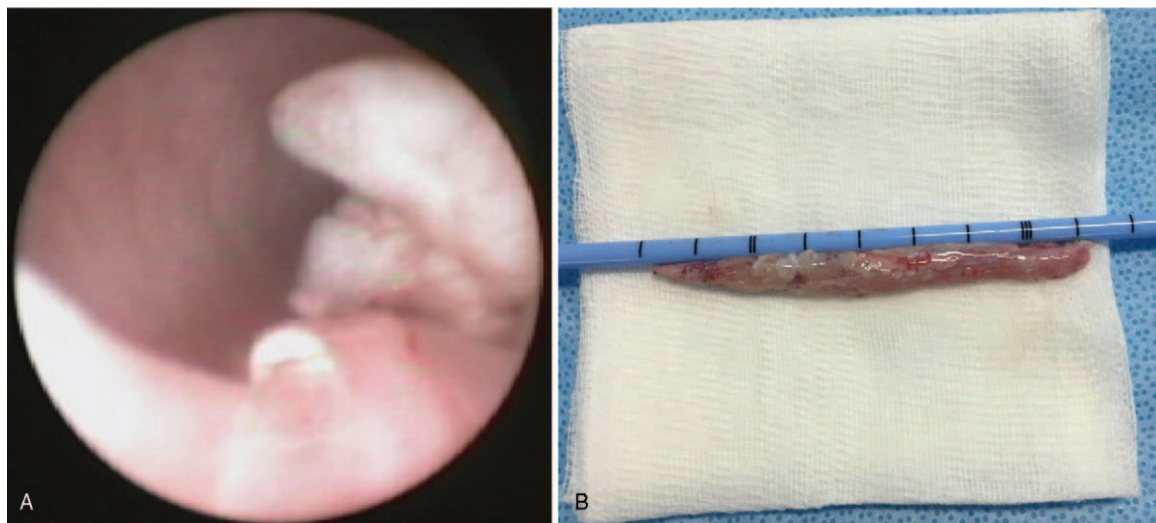


Figure 4. (A) Laser resection of the base of the polyp; (B) a complete sample of ureteral fibroepithelial polyp.

pelvis and the site of ureteral junction, but transitional cell carcinoma (TCC) is more common in the distal ureter and bladder and in old adults. Preoperative ureteroscopy is indispensable for the diagnosis and/or confirmed diagnosis of fibroepithelial polyps. Under rigid ureteroscopy, a polyp is a space-occupying lesion with a pedicle, smooth surface and favorable mobility, which are significantly different from the characteristics of TCC (cauliflower-like shape and multiplicity). It has been reported that biopsy is needed for fibroepithelial polyps, and surgery should be performed only after the diagnosis has been confirmed by pathological examination.^[1] However, several investigators propose that biopsy is not required if the features are typical under an endoscope; endoscopy may not affect the following radical surgical treatment if atypical features are observed and pathological examination suggests malignant tumor.^[9]

Currently, endoscopic laser polypectomy is still a treatment of choice for ureteral fibroepithelial polyps. Of course, the surgical methods for the ureteral fibroepithelial polyps in the renal pelvis are selected depending on the size and location of the lesions and

the clinical experience of surgeons. For small lesions, retrograde ureteroscopic polypectomy or electrocautery may be employed. Some studies have shown that surgery with thulium laser has a lower probability to cause ureteral stenosis and hydronephrosis after surgery as compared to holmium laser, but recurrence rate is comparable between 2 surgeries.^[9,10] Ludwig et al^[11] advised follow-up imaging by computed tomographic intravenous urography after 3 months and ultrasonography after 1 year to detect late complications.

For large ureteral fibroepithelial polyps (especially those in the proximal ureter), there might some difficulties for the traditional endoscopic retrograde laser polypectomy due to the large volume and favorable mobility: the large ureteral polyp in the renal pelvis may extend to the middle or lower ureter of affected side, and retrograde ureteroscopy is difficult to identify the base of the polyp; the base of the ureteral fibroepithelial polyp is wide and difficult to completely expose, even it has been identified; bleeding is unavoidable under laser ureteroscopy, and the field view is blur under the simple ureteroscopy due to the poor reflow, which increases the accidental injury to surrounding tissues; the operation time is relatively long, increasing the risk for postoperative infection. However, ureteroscopy and endoscopic resection may be difficult in patients with long or large polypoid lesions, due to poor visualization of the base of the stalk and limited working space, which makes it difficult to differentiate the ureteral wall from the polyp, leading to incomplete resection or ureteral perforation.

Following difficulties will be encountered during stage I percutaneous nephrolithotomy (PCN): After puncture, the view is unclear due to bleeding, which makes the identification of the base of the polyp difficult; although puncture is performed under the guidance of ultrasound, it may not exclude the puncture induced damage to the polyp, leading to the deterioration of bleeding and residual polyp tissues; the ureteral fibroepithelial polyp has smooth surface and favorable mobility and may hinder the view under the water flow, which makes the exposure of the base of the ureteral polyp difficult. Thus, a surgical method is not feasible for the resection of fibroepithelial polyp in the proximal ureter.

In 6 patients of our study, antegrade plus retrograde endoscopic laser polypectomy was employed for the treatment of fibroepithelial polyp, which avoids the difficulties above mentioned: PCN puncture alone is performed in stage I surgery, which reduces the risks for

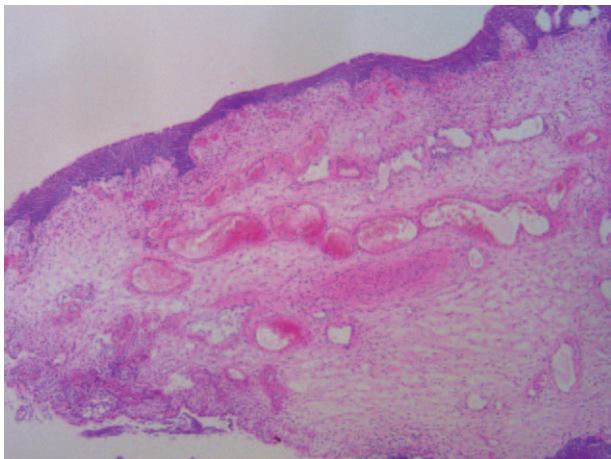


Figure 5. Pathological examination of the ureteral fibroepithelial polyp (H&E staining).

infection and bleeding as well as the time of operation in stage II surgery; For the stage II laser polypectomy, patients lied in a 45° lithotomy position. Retrograde rigid ureteroscope was used to catch the stem of the polyp and pull it outward, which may completely expose the base of the polyp; fibroepithelial polyp is a benign tumor, and the depth and width of resection should be controlled. Resection should be confined to the mucosa and submucosa, and excess resection may increase the risk for postoperative ureteral stenosis.^[9] In stage II surgery, the base of the polyp may be fixed with the grasping plier under the retrograde ureteroscopy, which assures the clear vision and the rapid resection of the polyp and also avoids the damage to the ureter and the deep resection.

Some studies have shown that thulium laser resection has a low possibility to cause luminal stenosis and hydronephrosis as compared to holmium laser resection, but the recurrence rate of ureteral fibroepithelial polyp is comparable between them.^[9,10] Some investigators propose that this may be explained as follows: As compared to holmium laser, the tissues can absorb more energy produced by thulium laser, which achieves better efficacy of resection and better hemostasis^[12]; the patient may sense the trembling of the optical fiber during holmium laser resection because the trembling of the optical fiber is inevitable, and it may cause uneven depth in the resection; thulium laser produces less heat as compared to holmium laser, and heat induced damage may cause scar formation and recurrence of stenosis after laser resection.^[13] In our study, hydronephrosis deteriorated after holmium laser resection, which supports above proposal.

Our findings indicate that antegrade plus retrograde endoscopic thulium laser polypectomy is feasible for the treatment of fibroepithelial polyps longer than 5cm in the proximal ureter according to the therapeutic efficacy and postoperative findings. The patient with stenosis received holmium laser resection, which suggests that stenosis might be a complication of holmium laser resection. However, this was a retrospective study with a small sample size and the duration of follow-up was short, which were the major limitations of this study. Thus, more studies are needed to confirm our findings

Author contributions

Conceptualization: Yang Cao, Qi Chen.

Data curation: Yang Cao, Hai Zhong, Han-Qing Xuan.

Formal analysis: Yang Cao.

Investigation: Yang Cao, Hai Zhong, Han-Qing Xuan, Wei Xue.

Methodology: Yang Cao, Qi Chen.

Resources: Lei Xia.

Software: Wei Xue.

Supervision: Qi Chen.

Writing – original draft: Yang Cao.

Writing – review & editing: Qi Chen.

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