A conventional procedure for treating hematospermia is to insert a ureteroscope or seminal vesiculoscope into the prostatic urethra to treat a urethral stone, and then dilate the ejaculatory duct opening using the scope or the catheter. However, the ejaculatory duct stenosis may occur after the simple ureteroscopy. We compared the outcomes of treating hematospermia using holmium laser incision through a ureteroscope and using simple ureteroscopy. Retrospective method was used to analyze 67 intractable hematospermia cases. Varying degrees of ejaculatory duct stenosis or obstruction were observed in all the patients. Postoperative follow-up was conducted for 6 months up to 3 years. Two patients who underwent the simple ureteroscopy experienced hematospermia recurrence in 6 and 8 months, respectively. No recurrence was found in all the patients who underwent the holmium laser incision. We have found that the holmium laser incision through a ureteroscope shows a better outcome than the simple ureteroscopy.

Using ureteroscopy and seminal vesiculoscopy to treat hematospermia and ejaculatory duct stenosis has been reported in many cases.1-3 A case also reported using a resectoscope to make incisions on the seminal colliculus and expose the opening of the ejaculatory duct, and then open a window on the ejaculatory duct.4 In our experience, obstruction might be the root cause of intractable hematospermia. The ejaculatory duct stenosis may occur after the simple ureteroscopy.5 More invasive resectoscopy may have lower recurrence rate, but it may pose a higher risk of damaging the rectal sphincter or even the rectum.6 Wang et al.2 reported that in 162 intractable or refractory hematospermia cases, seven cases relapsed after 3 months and four cases remained unalleviated. We reported here that in 43 patients, we used the holmium laser incision through a ureteroscope to treat the intractable hematospermia and compared the outcome with that of 24 patients who were treated earlier using the simple ureteroscopy.

TECHNIQUE OUTLINE

From December 2003 to April 2013, a total of 67 intractable hematospermia patients received treatment in the Institute of Urology Surgery, Southwest Hospital of Third Military Medical University, Chongqing, China. This study was approved by the Ethic Committee of Southwest Hospital, The Third Military Medical University. All the patients had experienced hemopermia for at least 3 months and failed conservative therapy consisting at least 4 weeks of antibiotics.1 In the earlier stage of this study, we treated 24 patients (aged 22 to 51 years, median 34 years) using the simple ureteroscopy, and in the later stage of this study, we treated 43 patients (aged 19 to 69 years, median 37 years) using the holmium laser incision through a ureteroscope. The patients’ symptom course ranged in duration from 3 to 230 months (mean duration 51.6 ± 47.8 months). All the patients underwent semen analysis and transrectal ultrasonography. Some patients underwent pelvic computed tomography (CT) or magnetic resonance image (MRI). Twenty-four patients had experienced the simple ureteroscopy, and 43 patients had the holmium laser incision through a ureteroscope. Positive ultrasonography findings were observed in most patients, mainly including increased seminal vesicle size and abundant blood flow (Figure 1).

The major devices included Olympus ureteroscope (8-F/9.8-F, 6.4/8.0-F × 430 mm, Olympus, Tokyo, Japan), urologic guidewire (ZEBRA®, Boston Scientific, St. Paul, MN, USA) and holmium: yttrium aluminum garnet laser (Power suite 100W, Lumenis, CA, USA).

After spinal or epidural anesthesia and with the patient in a lithotomy position, an 8-F or 9.8-F Olympus ureteroscope was inserted into the urethra and advanced to the verumontanum lumen. At the central zone of the verumontanum (Figure 2a), the ureteroscope was inserted through the hole made by the guidewire (Figure 2b), and then the ureteroscope was advanced into the verumontanum lumen. After a gentle lavage, both ejaculatory duct openings were identified (Figure 2c). Usually, the opening was covered by translucent membrane-like materials (Figure 2d). A hole on the membrane was made using the guidewire again, and then the ureteroscope was advanced through the hole into the ejaculatory duct. If the duct opening was not clearly identified, a 4-F ureteral catheter was used to puncture the membrane-like materials. If the mucous membrane was seen, not adipose tissue, the ureteroscope made to the ejaculatory duct successfully. If adipose tissue was seen, the ureteroscope was withdrawn to the verumontanum lumen, and a 4-F ureteral catheter was used to probing the openings. The ureteroscope then was further advanced into the seminal vesicle. Abundant...
Both ejaculatory duct openings were wide open after inserting the ureteroscope. (d) The opening was still very narrow (Figure 3a). The opening was cut using the laser about 0.8–1.0 cm in diameter (Figure 3b). The seminal vesicle was examined and washed. The stones were removed if found. Then the ureteroscope was inserted into the right side of the ejaculatory duct. Stricture to different degrees was also found in this side (Figure 3c), therefore the aforementioned cut was repeated (Figure 3d). Finally, the scope was withdrawn to the verumontanum lumen and both openings were examined under the scope. Both openings were wide open and unobstructed (Figure 3e). A cut was made by the laser at the 12 o’clock position on the verumontanum lumen. The diameter was 0.8–1.0 cm (Figure 3f). The operation finished after an 18-F three-chamber balloon catheter was placed in the bladder.

All the patients were instructed to pay attention to sex hygiene and only have ejaculation 4 weeks after the operation. All patients were told that the blood might still be seen in the first ejaculations. The follow-up started 6 months after the surgery. The progonoses were monitored, and the data were recorded for further statistical analysis.

A ureteroscope was successfully advanced into the seminal vesicle in 64 cases out of the 67 patients. The average operation time was 16.3 min ranging from 9 to 30 min. In three cases, the scope was not inserted into the vesicle successfully. The average follow-up time was 23.7 months (ranging from 6 to 36 months).

Significant inflammatory mucosal edema, congestion, and inflammatory hemorrhages were seen in one vesicle in 52.2% (35/67) of the patients and in both vesicles in 43.3% (29/67) of the patients. Stricture or obstruction at the level of the verumontanum orifice or stenosis of the ejaculatory duct was also found in those patients. Calculi were present in one or both seminal vesicles and in the verumontanum lumen in 26.9% (18/67) of the patients. In three patients, mucosal lesions were suspected but an inflammation was diagnosed by a pathological exam. In six patients (two both sides and four single side), adipose tissue was found during the procedure. In three single side patients, a 4-F catheter was used to successfully find the ejaculatory duct orifice. In double side and one single side patients, the ejaculatory duct orifice was not found. This might be caused by the severe orifice stricture, and it was possible that the ureteroscope was in the adipose tissue of the verumontanum, causing the structure deformation and leading to the operation failure. During the follow-up, among the simple ureteroscopy patients, one had recurrence after 6 months and one after 8 months. Follow-up exam found the stenosis of the ejaculatory duct opening. The holmium laser incision through a ureteroscope was conducted, and the hematospermia symptom disappeared after the operation. No recurrence was found in all the patients who underwent the holmium laser incision procedure after subsequent ejaculation 3–5 times during the follow-up period. In three cases, epididymitis was reported, and the patients were treated and recovered after using an anti-inflammation regimen for 1 week. No complications, such as retrograde ejaculation, urinary incontinence or rectal injury were observed in all 67 patients after the operation.

COMMENTS

Hematospermia is a very common clinic symptom in male patients. In most cases, the hematospermia is caused by seminal vesiculitis and can be cured using anti-inflammatory medicines or other conservative treatment. But in some cases, which are called intractable hematospermia, all kinds of conservative treatment would fail, posing a challenge to doctors. Traditional diagnostic methods include semen analysis, transrectal ultrasonography, CT, MRI or ejaculatory duct

Figure 1: Transrectal ultrasonography. (a) Seminal vesicles of both sides were enlarged, and the echo showed less homogeneous (arrow). (b) Abundant blood supply was seen in both vesicles (arrow).

Figure 2: Representative images showing the operation procedures. (a) Ejaculatory duct orifice was seen in the middle of the verumontanum (arrow). (b) The ureteroscope was inserted through the hole made by the guidewire. (c) Both ejaculatory duct openings were identified. (d) Usually, the opening was covered by translucent membrane-like materials (arrow). (e) Honeycomb-like structures in a typical seminal vesicle. (f) Sand-like or gravel-like stones were observed in the verumontanum lumen (arrow).

Figure 3: Representative images showing the stages of treating hematospermia using the holmium laser incision through a ureteroscope. (a) The left side ejaculatory duct orifice was still narrow after inserting the ureteroscope. (b) The opening was cut using the laser, the diameter of the ejaculatory duct was about 0.8–1.0 cm. (c) The right side ejaculatory duct orifice was also narrow after inserting the ureteroscope. (d) The opening was also cut using the laser. (e) The ureteroscope was withdrawn to the verumontanum lumen. Both openings of the ejaculatory duct were wide open and unobstructed. (f) A cut was made using the laser on the verumontanum lumen at the 12 o’clock position, with a diameter of 0.8–1.0 cm.
Transrectal ultrasonography can clearly show the position relationship among seminal vesicles, ejaculatory ducts and prostates, and it is valuable to diagnosing both seminal vesicle diseases like cyst, stone, etc., and intractable hematospermia even with about 50% false positive rate. Although MRI can be used to further diagnose seminal vesicle diseases, medical imaging examination alone can only provide indirect evidence because of the false positive rate. Transurethral resection of ejaculatory duct (TURED) was once regarded as a very effective method of treating the ejaculatory duct stenosis. However, transurethral resection covers a large area, and the depth and scope are hard to control when resecting the seminal colliculus, requiring highly skilled surgeons and posing a high failure rate. Besides, this procedure damages the normal anatomy of the seminal colliculus and ejaculatory duct, causing severe complications such as retrograde ejaculation, urinary incontinence or rectal injury.

On the other hand, using rigid ureteroscope through normal anatomical pathway to diagnose and treat intractable hematospermia has irreplaceable advantages over traditional medical imaging and other examination methods. Yang et al. first reported using seminal vesiculoscopy to treat the seminal vesicle diseases in a large sample research. They have concluded that the seminal vesicoluscopy is safe and applicable in diagnosing and treating the seminal vesicle diseases. Han et al. reported that in 70 patients underwent transurethral seminal vesiculoscopy, 10% had recurrence. Fu et al. reported that in 43 patients underwent transurethral vesiculoscopy, 13.9% cases had alleviated symptoms and 4.7% cases had no relief at all.

Although the ureteroscopy and seminal vesiculoscopy achieved 80~90% efficiency in treating hematospermia patients, there are still many patients who experienced either no relief or recurrence. In our experience, we have found that almost all the patients had stenosis of the opening of the ejaculatory duct or verumontanum lumen. The stenosis might cause repeated hematospermia or obstructive azoospermia. Earlier inflammation might also cause the stenosis, which in turn aggravates the inflammation by preventing the complete drainage of the inflammatory exudate. In severe cases, stones may be produced, exacerbating the stenosis or obstruction and causing recurrent inflammation. In the simple ureteroscopy, the opening of the ejaculatory duct was expanded using the ureteroscope, and the obstruction could not be completely removed, therefore causing refractory hematospermia. During the follow-up, we found that in those early patients who underwent simple ureteroscopy, two patients had hematospermia recurrence and had to undergo an operation again. Exam confirmed a narrow opening of the ejaculatory duct and verumontanum lumen. The hematospermia disappeared after the holmium laser incision of opening of ejaculatory duct and verumontanum lumen through the ureteroscope. Therefore, in the later treatment, we routinely adopted the laser incision through the ureteroscope. The procedure increased the duct opening to about 2 times wider. No recurrence was reported in the 6 months to 3 years follow-up.

The common complications might occur include ascending infection leading to epididymitis caused by the too strong lavage pressure, urinary incontinence caused by ejaculator seminis damage, and rectal damage. Therefore, the operation should be performed by experienced surgeons. The lavage pressure should be well-controlled, and a clear visual field should be maintained. Operations must be gentle in order to avoid rectal damage, vesicle perforation, and excessive bleeding, which may cause blurred visual field. Epididymitis was observed in one case. The patient was treated using antibiotics and recovered in 1 week. No retrograde ejaculation, urinary incontinence or rectal injury were observed in all 67 patients after the operation.

Using the holmium incision through a ureteroscope to treat the intractable hematospermia possesses the following advantages: (1) expanded openings of the ejaculatory duct and seminal colliculus can facilitate the semen discharge, thus preventing the recurrence of stenosis; (2) the incision is relatively small, preserving the normal anatomical structure of the seminal colliculus and ejaculatory duct; (3) it is less invasive than the TURED, no damage to either sphincter or rectum; and (4) the procedure is under direct vision comparing to the TURED. Although our outcomes are very encouraging, due to limited sample size, before the holmium laser incision through a ureteroscope procedure can be safely applied in clinic practice, further study and larger sample size are needed.