Surgical Technique

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MANAGEMENT OF COMPLETE URETERAL OBSTRUCTIONS WITH A TRANSLUMINAL PUNCTURE TECHNIQUE

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ABSTRACT

Introduction: The traditional delayed treatment of iatrogenic complete ureteral obstruction is open surgery. An easy endourological technique, transluminal re-canalization of the ureter by guide-wire puncture under fluoro-endoscopic control, which has been performed on 4 patients, is described.

Surgical technique: With the guidance of C-arm fluoroscopy, by moving the C-arm to different planes, the tip of the ureteroscope is directed to the correct plane to meet the obliterated proximal end of the ureter and under direct vision, transluminal puncture is performed using the stiff end of a 0.035-inch guide wire. Once the stiff end of the guide-wire is in the lumen of the proximal ureter, an ureteral catheter is introduced over the guide wire, the guide wire is then removed and reinserted through the ureteral catheter with its soft end leading and a double J catheter is inserted. Ureteral stricture, if later encountered, is treated with balloon dilatation.

Results: Continuity of the ureter was restored in all 4 patients. The double J stents were removed 6 weeks later and a retrograde pyelography revealed resolution of the hydronephrosis without extravasation of urine.

Conclusion: Although a very satisfactory result was achieved in our cases, more cases are needed to show if it can be an alternative to conventional surgical repair. However, we believe that this minimally invasive technique can be used for short obliterated ureteral segments and neither delays nor does it preclude further management using open surgery.

Key words: ureteral obstruction; urinary fistula; ureteroscopy; surgical procedures, minimally invasive
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INTRODUCTION

Ureteral injury during gynecologic surgery is an infrequent but serious complication, with an estimated incidence from 0.5 to 4 percent of all procedures (1). The traditional delayed treatment for complete ureteral injuries is open surgery preceded by several weeks to months of nephrostomy drainage.

We report an easy technique, transluminal re-canalization of the ureter by guide-wire puncture under fluoro-endoscopic control, used to treat 4 patients with postoperative ureteral damage leading to complete ureteral obliterations and an ureterovaginal fistula.

MATERIALS AND METHODS

Total ureteral obstruction was revealed by intravenous pyelography (IVP) in 3 patients, 35 to 45 years old, who had admitted to the outpatient clinic with flank pain and also in another 41 years old patient

with concomitant ureterovaginal fistula who presented with urinary incontinence. A proximal ureteral obstruction in one patient and distal ureteral obstructions in 3 patients were due to pyelolithotomy and total abdominal hysterectomy, respectively, which they had underwent 20 days to 3 months ago. The patient with total ureteral obstruction and also an ureterovaginal fistula noted urine leakage from her vagina with a need of approximately 30 pads per day to remain dry. Methylene blue instilled into the bladder showed no dye in the vagina and ureterovaginal fistula was confirmed by spiral-computed tomography. IVP revealed grade 3 hydronephrosis and non-visualization of the distal ureteral segment in all of the patients with distal ureteral obstruction and non-visualization of the ureter below the ureteropelvic junction in the patient with the proximal ureteral obstruction. All of the patients were initially treated with percutaneous nephrostomy catheter drainage followed by re-canalization of the ureter by guide-wire puncture under fluoro-endoscopic control. Appropriate antibiotics according to the patients' urine cultures were initiated preoperatively to all of them and were continued for 5 days after the operation.

Surgical Technique

1. The patient is positioned in the lithotomy position. Retrograde ureterography and an antegrade pyelography are performed simultaneously revealing the distance between the 2 ureteral ends (Figures-1 and 2).
2. Ureteroscopy is performed until the site of obstruction. With the guidance of C-arm fluoroscopy, by moving the C-arm to different planes, the tip of the ureteroscope is directed to the correct plane to meet the obliterated proximal end of the ureter (Figure-1) and under direct vision, transluminal puncture is performed using the stiff end of a 0.035-inch guide wire (Figure-3).
3. Once the stiff end of the guide-wire is in the lumen of the proximal ureter, an ureteral catheter is introduced over the guide wire, the guide wire is then removed and reinserted through the ureteral catheter with its soft end leading.

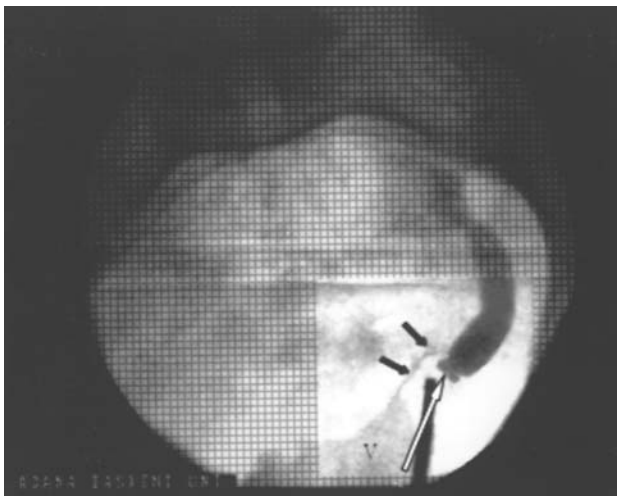

Figure 1 – *Antegrade ureterography of the patient with distal ureteral obstruction and concomitant ureterovaginal fistula showing the ureterovaginal fistula tract (black arrows) and complete ureteral obliteration. 'V' is showing the contrast filled vagina. Ureteroscope is in the distal ureter and with the guidance of C-arm fluoroscopy, is positioned in the correct plane toward the proximal ureter (white arrow).*

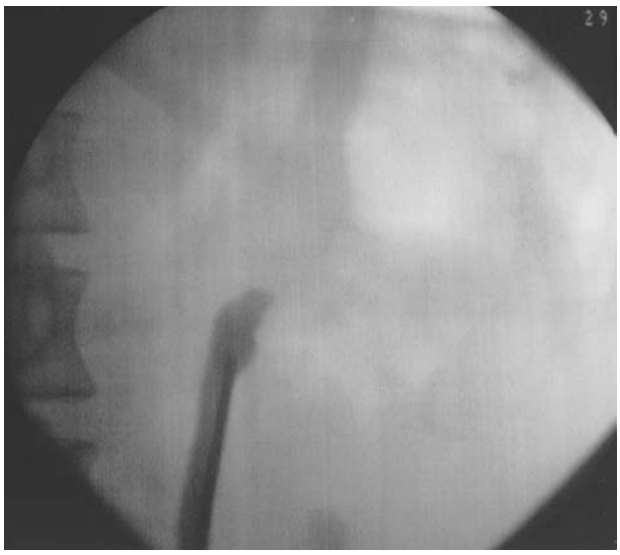

Figure 2 – *Ureteroscopy is performed until the obstruction site and retrograde ureterography is performed through the ureteroscope showing total obstruction.*

4. Leaving the guide wire in place, retrograde pyelography is carried out through a double lumen catheter or through the side port of the ureteroscope (Figure-4).

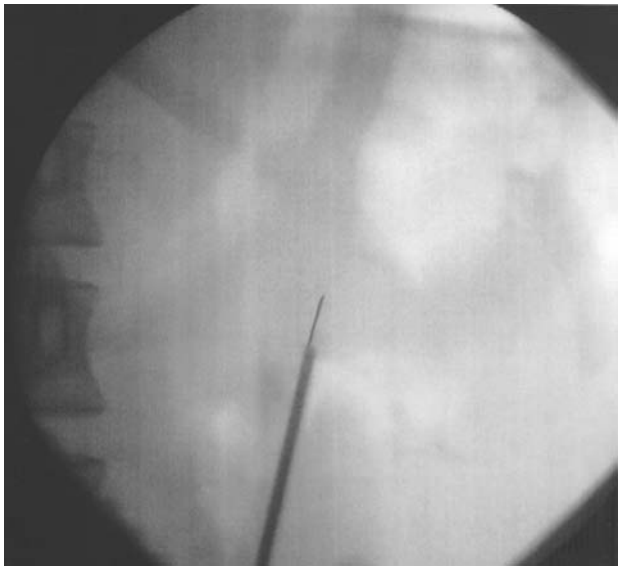

Figure 3 – *Transluminal puncture under ultrasound guidance is performed using the stiff end of the guide-wire.*

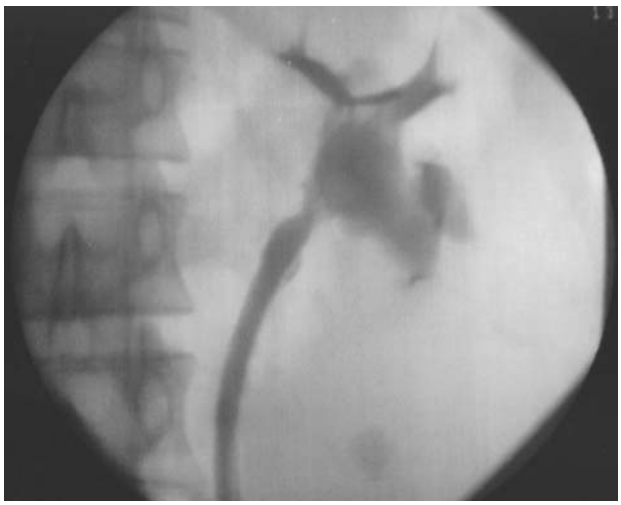

Figure 4 – *Retrograde ureterography showing opacification of the proximal part of the collecting system with a narrow segment at the site of previous obstruction.*

5. If necessary balloon dilation is performed (Figures-5 and 6).
6. A double J catheter is inserted.

In the patient with a concomitant ureterovaginal fistula, retrograde pyelography showed complete obliteration of the ureter approximately 4 cm from the ureteral orifice and an antegrade pyelography performed simultaneously revealed an approximately 5 mm distance between the two ureteral ends together with an ureterovaginal fistula tract originating from the distal dilated ureter. In the other 2 patients with total distal ureteral obstructions, the distance between the 2 ureteral ends was approximately 4 mm and they underwent the same procedure.

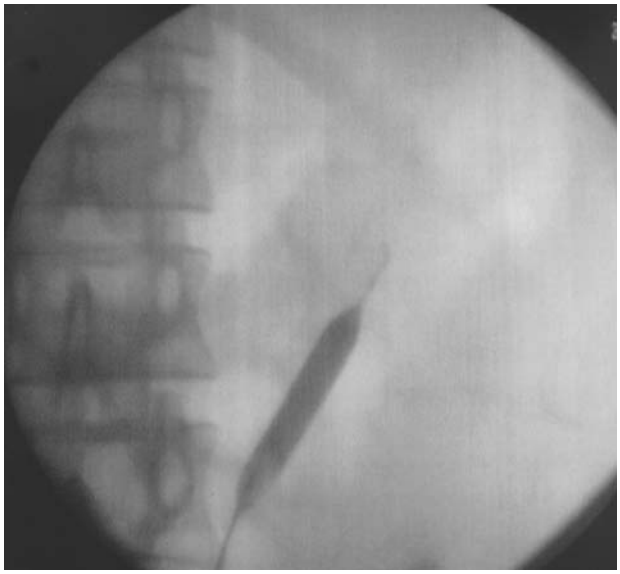

Figure 5 – *Balloon dilatation is performed.*

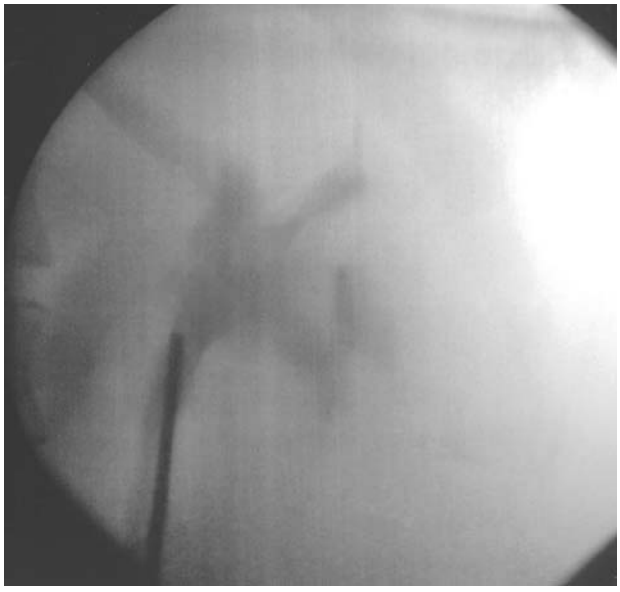

Figure 6 – *Retrograde pyelography after balloon dilation.*

To the patient with a total proximal ureteral obstruction just below the ureteropelvic junction, the procedure was performed with ultrasound guidance instead of antegrade pyelograpy due to spontaneous dislocation of the percutaneous nephrostomy catheter prior to surgery. The retrograde pyelography carried out after the procedure, revealed the ureteropelvic junction to be slightly narrow and balloon dilation was performed to the ureteropelvic junction.

RESULTS

Continuity of the ureter was restored in all 4 patients. In the patient with a concomitant ureterovaginal fistula, the vaginal leakage ceased on the day of the operation allowing removal of the percutaneous nephrostomy catheter. The patients tolerated their stents reasonably well preventing early removal. The double J stents were removed six weeks later and a retrograde pyelography revealed resolution of the hydronephrosis without urine extravasation. Follow-up urine cultures were sterile in all of the patients. In 2 patients (50%) with distal ureteral obstruction, IVP performed in the 3rd postoperative month showed mild stenosis at the previous obstruction site. Although Mag-3 diuretic renal scintigraphy showed no urinary obstruction, these patients were managed with balloon dilatation due to intervals of flank pain. Follow-up IVP 1 year postoperatively was normal in all of the patients (Figure-7).

Figure 7 – *IVP of the patient with distal ureteral obstruction and ureterovaginal fistula, performed 1 year postoperatively revealed normal left distal ureter and resolution of the hydronephrosis.*

COMMENTS

Management of an ureteral injury is usually complicated by a delay in diagnosis. After the diagnosis is confirmed, immediate corrective surgery, temporary nephrostomy catheter insertion with delayed corrective surgery, or observation and delayed repair for persistent fistula are the conventional treatment options. The technical difficulties associated with reoperation in an anatomically distorted field has led search for endourological techniques. Percutaneous nephrostomy and/or antegrade ureteral stent insertion have previously been reported to be effective. Persky and associates reported iatrogenic ureteral injuries in which percutaneous nephrostomy was utilized to demonstrate the site of injury, to relieve the symptoms or to control wetness by urinary diversion (2). Lang and associates have reported 5 successfully treated ureteral injuries managed with percutaneous ureteral catheterization alone in which 4 were accompanied with fistulas (3). Retrograde passage of ureteral stents may not always be successful due to angulation, stenosis or complete obstruction. Ureteroscopy has been used to overcome angulation and stenosis allowing visual assessment of the injured area and passage of a guide-wire or catheter if the ureteral lumen is identified (4). However, ureteroscopy alone fails when complete obliteration of the ureteral lumen exists. We have used a technique similar to a needle puncture procedure previously utilized in the management of urethral obliterations in order to discard the need for open surgery (5).

Although a very satisfactory result was achieved in our cases, more cases are needed to show if it can be an alternative to conventional surgical repair. However, we believe that this minimally inva-

sive technique can be used for short obliterated distal ureteral segments and neither delays nor does it preclude further management using open surgery.

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