

Ureteroscopy During Pregnancy Using the Follow-the-Wire Technique

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Submitted November 1, 2009 - Accepted for Publication November 25, 2009

ABSTRACT

INTRODUCTION: The purpose of the study was to evaluate the use of ureteroscopy for the treatment for urolithiasis during pregnancy. The follow-the-wire technique was used.

METHODS: The participants were 26 pregnant women with persistent renal colic that did not respond to medications. Patients were seen between March 2002 and January 2009. The mean patient age was 24 years (range, 21-39 years). Three patients presented during the first trimester, 15 patients during the second trimester, and 8 patients during the last trimester. Ureteroscopy was performed using a 7.5-F semirigid ureteroscope. Cystoscopy was performed first and the ureteric orifice was identified. The guidewire was advanced through the ureteroscope into the ureteric orifice. The ureteroscope followed the guidewire until the site of obstruction was located. The guidewire was advanced under visualization, past the obstruction and to the kidney. The ureteroscope was removed and reintroduced. Lithoclast was used for stone disintegration and a Nitinol™ tipless dormia was used for stone extraction. A stent with string was placed.

RESULTS: The mean operative time was 26 minutes (range, 21-69 minutes). There was no difficulty in passing the proximal ureter, even in late pregnancy. Fluoroscopy was not required. Ureteral stones ranging from 6-9 mm in size were detected in 18 (69%) of the patients. Eleven patients had distal stones; 7 had proximal stones. Lithotripsy was performed for 16 patients; stones were directly extracted from 2 patients. There were no complications related to the procedures. Stents were left in place 5-7 days for patients with stones. For the 8 patients without stones, the surgeons left a silicone long-term double pigtail stent until after the delivery. Postoperative complications were mainly related to the stents and included dysuria or urgency (n = 2), hematuria related to movement (n = 2), and urinary tract infection (n = 1). All patients completed full-term pregnancies.

CONCLUSION: Ureteral obstruction during pregnancy can be safely managed by using the follow-the-wire ureteroscopy technique. It obviates need for ionizing radiation. In experienced hands, the technique is safe and reproducible.

KEYWORDS: Ureteroscopy; Pregnancy; Stones

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CITATION: *UroToday Int J.* 2009 Dec;2(6). doi:10.3834/uij.1944-5784.2009.12.17

INTRODUCTION

Debate still exists as to the proper management of urolithiasis during pregnancy. Renal colic can induce preterm labor and the cause must be diagnosed. However, diagnosis and treatment might carry a risk for the mother or the fetus. Radiologic evaluation has the risk of radiation exposure to the fetus. Conservative treatment measures should be tried first. If they fail, treatment using ureteroscopy may be required [1-5].

The author believes that proper placement of a guidewire is the key for successful ureteroscopy. The purpose of the present study was to evaluate the use of ureteroscopy for the treatment for urolithiasis during pregnancy. The follow-the-wire technique was used. This avoided the need for fluoroscopy.

METHODS

Participants

The study was performed in the urology department at El Minia University between March 2002 and January 2009. The participants were 26 patients with persistent renal colic that did not respond to conservative measures. The mean patient age was 24 years (range, 21-39 years).

Three patients presented during the first trimester, 15 patients during the second trimester, and 8 patients during the last trimester. Ultrasonography revealed renal pelvis dilation in all cases. The obstruction was on the right side in 15 patients, left side in 9 patients, and bilateral in 2 patients.

Procedures

Preoperative evaluation included urine analysis and urine culture, ultrasonography, and evaluation by an obstetrician. Regional (epidural) anesthesia was used for all patients.

Ureteroscopy was performed without dilation using a 7.5-8 F semirigid ureteroscope in all cases. Cystoscopy was performed first and the ureteric orifice was identified. The guidewire was advanced through the ureteroscope into the ureteric orifice. The ureteroscope followed the guidewire until the site of obstruction was located. The guidewire was advanced under visualization, past the obstruction and to the kidney. The ureteroscope was then removed and the guidewire secured to the patient's drape.

Lithoclast was used for stone disintegration and a Nitinol™ tipless dormia (NDC, Fremont, CA, USA) was used for stone extraction. A stone cone was used to avoid proximal stone migration in 5 patients with proximal stones. After clearing the ureter, an open-end catheter was advanced over the

guidewire to the renal pelvis. The wire was removed to ensure free drainage of urine. A stent with a string was placed. Ultrasonography was used to confirm stent placement.

Data Analysis

The level and cause of obstruction were recorded. Additional variables included the duration of the operation, complications, hospital stay, and outcome of pregnancy. Ultrasound was performed at patient follow-up visits for 6 months after delivery.

RESULTS

The patients were treated as same-day outpatients. Ureteroscopy was successfully performed in all patients without ureteral dilation. The mean operative time was 26 minutes (range, 21-69 minutes). There was no difficulty in passing the proximal ureter, even in late pregnancy. Fluoroscopy was not required for any of the patients.

Ureteral stones ranging from 6-9 mm in size were detected in 18 (69%) of the 26 patients. Eleven patients had distal stones; 7 had proximal stones. Lithotripsy was performed for 16 of the patients using the lithoclast until the stones were reduced to a small size. The stones were then retrieved using a Nitinol™ tipless dormia basket or three-prong grasper. Stones were directly extracted from the 2 patients that did not require lithotripsy. The ureteral stent was left in place for 5-7 days for all patients with stones.

In 2 patients with bilateral marked hydronephrosis, ureteroscopy was done bilaterally. Edema was found at the level of obstruction, but no stone was detected. The remaining 6 patients had no definitive cause of obstruction. For these 8 patients without stones, the surgeons preferred to leave a silicone long-term double pigtail stent until after the delivery.

Postoperative complications were mainly related to the stents. The complications included dysuria or urgency in 2 patients, 1 of whom had bilateral stents. Hematuria related to movement occurred in 2 patients, and 1 patient developed a urinary tract infection.

All patients completed their pregnancies and gave birth to full-term babies. Follow-up ultrasonographies after delivery revealed no pelvic dilatation, with the exception of 1 patient with ureteropelvic junction obstruction. Two patients were lost to follow-up.

DISCUSSION

Renal colic during pregnancy represents a challenge. Conservative measures for treatment are always preferred.

Temporary measures such as ureteral stenting or percutaneous nephrostomy have been used for patients that do not respond to the initial management approach.

With the advent of small-diameter ureteroscopes and lithotripsy machines, a definitive rather than temporary approach should be considered [2-4,6]. Evaluation of ureteral obstruction by x-ray should be avoided or kept to minimum during pregnancy, especially in the first trimester. Its value is hindered by poor bowel preparation and fetal bones [7]. Ultrasound examination may reveal calculi in the proximal or distal ureter. Authors of several reports, including the present study, used ultrasound as the principle method of evaluation [5,7,8]. Ultrasonography is also useful during ureteroscopy to check the position of the stent [3,4,9].

Temporary measures for treatment such as ureteral stents and percutaneous nephrostomy tube placement come with several drawbacks. Ureteral stents are more liable to encrustations and may need to be exchanged during pregnancy if placed in the first trimester. The stents may cause significant lower urinary tract symptoms and definitive treatment will be needed after delivery. Percutaneous nephrostomy tubes are temporary, uncomfortable, liable to cause infection, and can be dislodged and require replacement [2-4,5,10].

Several previous studies also showed the safety and efficacy of performing ureteroscopy during pregnancy using small-diameter ureteroscopes. Pregnancy does not cause additional anatomic problems for the procedure. Avoidance of ureteral dilation and use of ultrasonography during the maneuver are helpful for success [2-6,9]. All aspects of the renal collecting system can be accessed safely with the use of small diameter (6-8 F) endoscopes [3-5,11]. In the present study, dilation was not required and the surgeons did not encounter any difficulty accessing the renal pelvis even in late pregnancy. Proper placement of the guidewire may be the key for successful ureteroscopy.

Previous studies using ureteroscopy during pregnancy limited the use of fluoroscopy to select cases. Fluoroscopy was used if the surgeon was unable to advance the guidewire up the ureter or if the surgeon was concerned about the technical difficulties of the tortuous lower ureter because of uterine compression [4,8,11]. In the present study, the surgeons did not encounter any problem in advancing the guidewire past the obstruction because the procedure was performed under vision. Therefore, they did not need ionizing radiation before, during, or after the procedure.

Laser, ultrasonic, and pneumatic modalities have been used for intracorporeal lithotripsy during pregnancy. Concerns have been reported about the sound intensities generated by these machines and their fetal complications. Laser is favorable in this regard because its lower intensity reduces the potential risk to fetal hearing [4,9,12-14]. In the present study, the surgeons used pneumatic lithotripsy for disintegration of the stones. They used a single or low frequency to avoid stone migration and did not find related complications.

For patients with ureteral stones, a stent with a string was placed for 5-7 days to avoid early postoperative colic. The stent was removed as soon as possible to avoid complications. In patients with no stones or when ureteral narrowing was encountered, the surgeons preferred to use a silicone durable stent to be removed after delivery. It should be noted that most of the latter cases were in the late stage of pregnancy.

Complications related to stents were less than or comparable to other series, which could be attributed to use of recently developed durable silicone stents and patient compliance with adequate fluid intake [3,5,6,9,11]. Most of the complications in the present study were related to the stents and were comparable to those in females who are not pregnant. These findings are consistent with reports in a recent review of 108 patients with ureteroscopy during pregnancy [5]. The authors of the review article stated that the reduced rate of complications in most of the studies could be attributed in part to the fact that most urologists willing to do ureteroscopy during pregnancy are experienced.

Flexible ureteroscopy with the holmium YAG laser are preferred for proximal and intrarenal stones. It can access the entire collecting system, but its use frequently requires fluoroscopy to check its position and is of limited value for pregnant females [4,15].

CONCLUSION

For pregnant women with renal colic not responding to conservative measures, the small-diameter rigid ureteroscope provides a definitive treatment with minimal risk to the mother and fetus. Used with care in this population, it has the advantage of being both diagnostic and therapeutic. Using the follow-the-wire ureteroscopy technique eliminates the need for ionizing radiation and its hazards. In experienced hands, the technique is safe and reproducible.

Conflict of Interest: none declared

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