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Original Article

Ureteroscopy During Pregnancy with Follow-the-Wire Technique

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ABSTRACT

Purpose: To present our experience with ureteroscopy during pregnancy using the technique of following the wire ureteroscopically with no need for fluoroscopy. **Patients and Methods:** The study included 26 pregnant patients suffering from renal colic not responding to medication between March 2002 and January 2009. Most patients (15) presented during the second trimester, 3 patients during the first trimester and 8 during the last. A 7.5-8 F semi-rigid ureteroscope was introduced without ureteral dilation by advancing the guide-wire (GW) through the ureteroscope into the ureteric orifice and following it stepwise up to the site of obstruction; then the GW was advanced past the obstruction under vision to the kidney. The ureteroscope was removed and re-introduced. Lithotripsy using the Lithoclast was performed and a tipless dormia basked was used for stone extraction. A stent with string was placed for 5-7 days. **Results:** Ureteroscopy was successfully performed in all patients without ureteral dilation. Stones (6-9 mm in diameter) were detected in 18 patients. Eleven patients had distal stones while 7 had proximal stones. Fluoroscopy was not required. There were no complications related to the procedure. Requirement for analgesia was reduced due to placement of stents. Stent-related complaints were tolerable. All patients completed full-term pregnancy. **Conclusion:** Ureteral obstruction during pregnancy can be safely managed ureteroscopically using the follow-the-wire technique. It obviates the need for ionizing radiation. In experienced hands the technique is safe and reproducible. Application of this technique in non-pregnant patients will reduce exposure to radiation.

Key Words: Ureteroscopy, pregnancy, stones

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INTRODUCTION

Debate still exists as to the proper management of urolithiasis during pregnancy. Diagnosis and treatment may carry a risk for the mother or the fetus. Conservative measures should be tried first;, if this fails, definitive treatment is required[1-5]. Proper placement of the guide-wire (GW) is the key for successful ureteroscopy. In this study ureteroscopy was performed as definitive treatment during pregnancy using the follow-the-wire technique without the need for fluoroscopy to avoid radiation hazards.

PATIENTS AND METHODS

This study was performed at the Urology Department of El-Minia University

Table 1: Results of ureteroscopy for renal colic during pregnancy (26 patients, 28 procedures).

Parameter	No. of Patients
Stone location in the ureter	
- proximal	7
- distal	11
Lithotripsy/extraction	
- lithotripsy	16
- extraction	2
Stenting	
- few days	18
- until delivery	8
Obstruction	
- right	15
- left	9
- bilateral	2
Trimester	
- first	3
- second	15
- third	8
Complications	
- dysuria	2
- hematuria	2
- urinary tract infection	1
Endoscopic finding	
- stones	18
- edema	2
- no definite finding	6

in the period March 2002 to January 2009. Twenty-six patients suffering from persistent renal colic not responding to conservative measures were treated ureteroscopically. Mean patient age was 24 (range 21 – 39) years. Pre-operative evaluation included urine analysis and urine culture, ultrasonography and evaluation by an obstetrician pre- and post-operatively.

Three patients presented during the first, 15 during the second and 8 during the last trimester. Ultrasonography revealed renal pelvis dilation in all cases. Regional (epidural) anesthesia was performed in all patients.

Ureteroscopy was performed with a 7.5 – 8 F semirigid ureteroscope without dilation in all the cases. Cystoscopy was performed first and the ureteric orifice was identified, then the ureteroscope was introduced by advancing the GW through the ureteroscope into the ureteric orifice and following it with the ureteroscope stepwise up to the site of obstruction. The GW was advanced past the obstruction under vision to the kidney.

The ureteroscope was then removed and the GW secured to the surgical drapes. Lithotripsy using the Lithoclast was performed and a nitinol tipless dormia basked 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 up over the GW to the renal pelvis, the GW was removed to ensure free drainage of urine, then a stent with string was placed for 5-7 days.

The level and cause of obstruction were recorded in addition to the duration of the operation, complications, hospital stay and outcome of pregnancy.

Ultrasound was performed at follow-up 6 months after delivery.

RESULTS

Ureteroscopy was successfully performed in all patients without ureteral dilation. There was no difficulty to reach the proximal ureter even in late pregnancy. Ureteral stones (6 – 9 mm in diameter) were detected in 18 patients. Eleven patients had distal stones while 7 had proximal stones (Table 1).

Lithotripsy was performed using the Lithoclast to produce small fragments which were then retrieved using a nitinol tipless dormia basket or three-prong grasper. Fluoroscopy was not required in any of the patients.

For patients with stones a double pigtail stent with string was placed at the end of the

procedure for 5 – 7 days. In two patients with bilateral marked hydronephrosis ureteroscopy was done bilaterally and did not detect any stone. A stent was placed on both sides and left until delivery.

In patients with no definite cause of obstruction or just edema at the level of obstruction we preferred to leave a silicone (long-term) double pigtail stent until after delivery. The obstruction was on the right side in 15, on the left side in 9 and bilateral in 2 patients. The mean operative time was 26 (range 21 – 69) minutes. All patients were treated on a daycare basis. All patients completed their pregnancy and gave birth to a full-term baby. Post-operative complications were mainly related to stents, including dysuria/urgency in 2 patients (one of them had bilateral stents).

Hematuria was related to movement in 2 patients, urinary tract infection (UTI) occurred in 1 patient. Follow-up ultrasonography after delivery revealed no pelvic dilatation in all but one patient with ureteropelvic junction (UPJ) obstruction. Two patients were lost to follow-up.

DISCUSSION

Renal colic during pregnancy presents a challenge. Conservative measures for treatment are always preferred. For non-responders temporary measures for treatment such as ureteral stenting or percutaneous nephrostomy (PCN) are used. With the advent of small diameter ureteroscopes and lithotripsy machines a definitive rather than temporizing approach should be considered[2-4,6]

During pregnancy evaluation of ureteral obstruction by radiography should be avoided or minimized, 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. Several reports including our study used ultrasound as the principal 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, including ureteral stents and PCN have several drawbacks. Ureteral stents are more liable to encrustation and if placed in the first trimester may need to be changed during pregnancy, they cause significant lower urinary tract symptoms and also necessitate definitive treatment after delivery. PCN tubes are uncomfortable, liable to infection and can be dislodged, thus requiring replacement, and PCN is no definitive treatment[2-4,5,10]

Several studies confirmed the safety and efficacy of performing ureteroscopy during pregnancy using small diameter ureteroscopes. Pregnancy does not cause additional anatomic problems during ureteroscopy. Avoidance of ureteral dilation and use of ultrasonography during the manoeuvre are helpful for succes[2-6,9].

With the use of small diameter endoscopes (6-8 F) all aspects of the renal collecting system can be accessed safely[3-5,11]. Similarly in this study dilation was not required and we did not encounter any difficulty reaching the renal pelvis even in late pregnancy.

Proper placement of the GW is the key to successful ureteroscopy. Studies concerned with ureteroscopy during pregnancy limited the use of fluoroscopy to cases with inability to advance the GW up the ureter and were concerned with the technical difficulties of the tortuous lower ureter due to uterine compression[4,8,11]. In this study using the follow-the-wire technique we did not encounter any problem in advancing the GW past the obstruction because this was performed under vision, thereby avoiding the use of ionizing radiation before, during or after the procedure.

Different modalities have been used for intracorporeal lithotripsy during pregnancy including laser, ultrasonic and pneumatic devices. Concerns were raised about the sound intensities generated by these machines and their fetal complications.

Laser was favorable in this regard with the least intensity to avoid the potential risk of affecting fetal hearing[4,9,12-14]. In this study we used pneumatic lithotripsy for desintegration using single or low frequency to avoid stone migration and did not find complications related to its use.

For patients with ureteral stones a stent with string was placed for 5–7 days to avoid early post-operative colic and removed soon to avoid complications of prolonged stenting. In patients with no stone but narrowing of the ureter we preferred to use a silicone stent to be removed after delivery, especially because most patients were in late pregnancy. Complications related to stents were less common or comparable to the rates reported in other series, which could be attributed to the use of recently developed durable silicone stents and advising the patients to maintain a high fluid intake[3,5,6,9,11]

Most of the complications in our study were related to stents and were comparable to those in non-pregnant females. This is supported by a recent review including 108 patients who underwent ureteroscopy during pregnancy, confirming that the risk in pregnancy does not appear to differ from the risk in non-pregnant patients. The risk of undergoing ureteroscopy in pregnancy is comparable to that in non-pregnant females. The review also stated that the reduced rate of complications in most studies could be attributed to the fact that most urologists willing to do ureteroscopy during pregnancy are experienced enough to do so[5].

Flexible ureteroscopy and holmium YAG laser are preferred for proximal and intrarenal stones. By this technique the entire collecting system can be accessed, but it requires the frequent use of fluoroscopy to check the position of the ureteroscope, thus limiting its value in pregnant females[4,15].

For pregnant women with renal colic not responding to conservative measures small diameter rigid ureteroscopy is a definitive treatment with minimal risk to the mother and the fetus. It has the advantage of being both diagnostic and therapeutic. But care should be taken in such group of patients.

In conclusion, ureteral obstruction during pregnancy can be safely managed ureteroscopically using the follow-the-wire technique. It obviates the need for ionizing radiation and its hazards during pregnancy. In experienced hands the technique is safe and reproducible. Application of this technique in non-pregnant women will reduce exposure to radiation and limit the potential need for more expensive GWs required to pass across the obstruction.

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Editorial Comment:

Ureteroscopy is possible and most effective during pregnancy but we do not believe that it should be used as a diagnostic tool because the procedure may precipitate labour and this would be catastrophic if the patient did not have a stone.
Besides, the technique of following the wire for ureteroscopy is only possible if the guide-wire can be successfully advanced into the kidney. It has been well documented that a guide-wire may be advanced up the ureter and actually be situated sub-mucosally and if ureteroscopy is performed the mucosa of the ureter would be stripped of its blood supply. Indeed this can easily occur at the site of the stone. The judicious use of X-rays and ultrasound should still be considered as the recommended standard of care in patients with renal colic during pregnancy.

Dr. Arthur Smith,
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Author's Reply:

We do not perform ureteroscopy just for a diagnostic purpose. We only use it when ultrasonography reveals an obstruction and the patient does not respond to medication and can no longer tolerate the pain. In this case, if no stone is found, we place a stent to relieve obstruction and pain. We definitely agree that the judicious use of X-rays and ultrasonography is the recommended standard of care in patients with renal colic during pregnancy.
We fully agree that follow-the-wire ureteroscopy is only possible, if the guide-wire can be successfully advanced into the kidney. But it is noteworthy that we follow the wire stepwise up to the level of obstruction and then ureteroscopically above the level of obstruction by the stone to ensure being inside the lumen, thus avoiding passing submucosally which definitely would endanger the ureter.

Dr. Ehab Tawfiek