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ORIGINAL ARTICLE

Double-J ureteric stenting in pregnancy: A single-centre experience from Iraq

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ABBREVIATION

US, ultrasonography

Abstract Objectives: To evaluate the safety and effectiveness of ureteric stenting with a JJ stent in pregnant women, to relieve renal obstruction and intractable flank pain.

Patients and methods: All pregnant patients presenting with intractable flank pain, with or without complications, to a tertiary national teaching hospital in Kurdistan/Iraq, and necessitating ureteric stenting with a JJ stent, were prospectively assessed for this study between March 2008 and March 2010.

Results: In all, 30 pregnant patients presented with intractable flank pain necessitating JJ ureteric stenting during the 25 months. Intractable flank pain (23 patients, 77%) was the most common indication for ureteric stenting, followed by flank pain with clinical sepsis (six, 20%). All pregnant women had hydronephrosis on ultrasonography (US), and 12 (40%) had evidence of coexisting renal stones on US. All ureteric stents were inserted successfully. The mean (range) indwelling time was 47.4 (3–224) days. Radiologically, 14 (47%) and 15 (50%) had complete resolution of the hydronephrosis on follow-up US in late pregnancy and in the early postnatal

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period, respectively. Two-thirds of patients had a clinical improvement immediately (15, 50%) and soon after (five, 17%) surgery. Stent encrustation (three, 10%), stent migration (three, 10%) and stent irritation (five, 17%) were reported as complications. The post-natal evaluation confirmed that half the patients had urinary calculus disease.

Conclusion: Ureteric stenting during pregnancy can be safe, with no intraoperative imaging and even under local anaesthesia. It provides good symptom relief and has a low complication rate. We therefore advocate it as a first-line treatment in pregnant women with therapy-resistant flank pain.

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Introduction

Pregnant women can have some degree of hydronephrosis, as a result of the physiological changes in pregnancy. It is not uncommon to have pregnant women with intractable flank pain resulting from renal obstruction and who thus require hospital admission, and the condition is more complicated if associated with stone disease.

The incidence of symptomatic urinary calculi in pregnancy is 1/244 to 1/3300 [1–4], and it is estimated that the incidence of urinary calculus disease in pregnant women is similar to that in nonpregnant women of the same age [5].

Managing flank pain during pregnancy can be challenging. Standard radiographic investigations and surgical treatments, as used in nonpregnant women, cannot be applied easily due to concerns about ionising radiation and the potential harm to the fetus.

Thus we present data from a single institution in Iraq, assessing the safety and effectiveness of ureteric stenting with a JJ stent in pregnant women to relieve renal obstruction and intractable flank pain.

Patients and methods

Data were prospectively collected from the Department of Urology of a tertiary national teaching hospital in Iraq, from March 2008 to March 2010. All pregnant patients presenting with intractable flank pain, with or without complications in the form of kidney infection and deterioration of renal function, and necessitating JJ ureteric stenting, were enrolled in the study. Intractable flank pain was defined as flank pain that could not be relieved by conservative management comprising bed rest, hydration and the use of paracetamol.

Patients were assessed with a complete medical history and comprehensive physical examination. A mid-stream urine sample was collected for microscopy, culture and sensitivity testing. Blood tests included a complete blood count and a renal function assessment. Trans-abdominal ultrasonography (US) provided evidence of hydronephrosis and, where possible, urinary calculus disease.

The ureter was stented either under local, spinal or general anaesthesia, using pregnancy-approved antibiotic prophylaxis. The procedure was conducted using a 22-F rigid cystoscope. A 4.7-F 26-cm JJ ureteric stent (Flexater® ureteric stent, Gallini Medical Devices, Italy) was inserted retrogradely over a guidewire. The positioning of the ureteric stent was assumed to be correct after a smooth insertion, observation of stent markings and the adequate distal coiling of the stent inside the bladder. Immediate US was used for proximal coil positioning. No fluoroscopy was used during the procedure.

The patient's clinical signs and symptoms were closely monitored after the procedure. Patients were discharged when the flank pain subsided, or when the sepsis and the acute renal failure were resolved. Antibiotic prophylaxis was maintained in all stented patients to minimise bacteriuria and stent colonisation throughout the remaining course of pregnancy. A follow-up with renal function tests and US was arranged weekly in the first month, then monthly throughout pregnancy.

After delivery, patients had a plain abdominal film, US and/or IVU to assess the continued presence of renal obstruction and/or stone disease, and consequently the need for further treatment.

Results

In all, 30 patients were enrolled into the study during the 25-month period. Their baseline values are shown in Table 1. Intractable flank pain (23 patients, 77%) was the most common indication for ureteric stenting, followed by flank pain with clinical sepsis (six, 20%). Only one case (3.3%) presented with anuria and acute renal failure due to bilateral ureteric obstruction.

All pregnant women had hydronephrosis on US, and 12 (40%) had evidence of coexisting renal stones on US. All ureteric stents were inserted successfully. Local anaesthesia (27, 90%) was the predominant form of anaesthesia. No percutaneous nephrostomy was needed.

The mean (range) indwelling time was 47.4 (3–224) days. Radiologically, 14 (47%) and 15 (50%) of the women had complete resolution of the hydronephrosis on follow-up US in late pregnancy and the early postnatal

Table 1 The baseline demographic data of the 30 patients.

Variable	Mean (range) or n (%)
Age (years)	27.2 (18–38)
<i>Trimester on presentation</i>	
First	5(17)
Second	15(50)
Third	10(53)
<i>Parity</i>	
Primiparous	11(37)
Multiparous	19(63)
Positive history of urinary calculus	11(37)
<i>Preoperative US findings</i>	
Presence of hydronephrosis	30(100)
Left	11(37)
Right	14(47)
Bilateral	5(17)
Presence of stones in kidneys	12(40)
Left	6(20)
Right	3(10)
Bilateral	3(10)
<i>Indications for ureteric stenting</i>	
Intractable flank pain	23(77)
Flank pain with clinical sepsis	6(20)
Acute renal failure	1(3)
<i>Presumed aetiologies</i>	
Urinary calculus	12(40)
Physiological	18(60)

period, respectively. Two-thirds of patients had a clinical improvement in pain relief immediately (15, 50%) and soon after (five, 17%) surgery. Three patients (10%) reported no difference with ureteric stenting, and seven (23%) had a worsening of symptoms, with either an increased analgesic requirement or the development of new symptoms related to stent placement, i.e. frequency, urgency and haematuria. Three patients (10%) had a stent migration and required subsequent revision of the ureteric stent. Stent encrustation was found in three (10%) patients on stent removal, and stent irritation (five, 17%) causing haematuria and LUTS were likewise reported as complications (Table 2).

The postnatal evaluation confirmed that half the patients had urinary calculus disease (Table 2). ESWL (in eight of the 15) was used as the main treatment, while percutaneous nephrolithotripsy (two), ureteroscopy (one) and open ureterolithotomy (one) were also used as definitive treatments.

Discussion

Physiological hydronephrosis and hydroureter begin in the first trimester of pregnancy. By the third trimester, up to 90% of pregnant women can have upper urinary tract dilatation [6]. It is known that these physiological changes are the result of mechanical obstruction of the ureters by an enlarged uterus at the pelvic brim, as well as the muscle-relaxing effect of an increased progester-

one level, leading to ureteric dilatation [7]. Urinary stasis, as a result, might have a role in urinary calculus formation and renal colic in these women.

Although pain from renal colic is the most common non-obstetric reason for hospital admission during pregnancy [8], the timely diagnosis and subsequent management in pregnant women can be challenging. It was reported that 28% of pregnant women having obstructing stones were initially misdiagnosed as having other pathologies, such as appendicitis and placental abruption [2]. While flank pain (23, 77%) was the most common presenting symptom in this series, flank pain with sepsis (six, 20%) also features as an important presentation [2].

However, the clinical presentation might not always be reliable in predicting stone disease in pregnant women with flank pain [9]. The role of radiographic investigations in various trimesters of pregnancy has been the subject of a long-standing and ongoing debate, in view of the potential exposure to ionising radiation of the developing fetus. The potential sequelae of foetal radiation exposure are teratogenesis, mutagenesis and carcinogenesis [7]. Limited IVU has been used in the past during later pregnancy, presuming the teratogenic effect was related to the high radiation sensitivity of the embryo in the first trimester. However, mutagenic and carcinogenic effects in second and third trimesters cannot be neglected. As there is no well-defined safe radiation dose, it is deemed safer not to use radiographic investigations in pregnant women [7].

Consequently, US becomes the first-line investigation to evaluate flank pain in pregnant women. While the advantages of US are its non-invasiveness, lack of ionising radiation and ready availability, it has a limited sensitivity [9], and is further limited for accurately detecting stones, visualising the ureter, and differentiating between different causes of renal obstruction [7]. Nevertheless, the accuracy of US in detecting stones can be improved significantly (up to 71.9%) by closely observing the features of upper tract obstruction and interpreting them correctly, such as a hydroureter extending below the pelvic brim, the asymmetric absence of ureteric jets, or an elevated resistive index [9].

As renal colic in pregnant patients can be complicated by severe upper-tract infection and premature labour [10], unrecognised pyonephrosis is potentially life-threatening for both the mother and fetus. Given that most patients will recover with analgesia, antibiotics and hydration, the initial treatment should be conservative. However, some authors advocate early intervention after the analgesia has been shown to be ineffective [11]. Drainage of the obstructed and infected system is indicated in patients who have symptoms refractory to conservative measures, i.e. ongoing sepsis despite antibiotics (> 48 h) and the worsening of any of renal function, pain, obstruction or hydronephrosis [12].

Table 2 The complications of ureteric stenting with a JJ stent, and the results of postnatal investigations.

Variable	n (%)
<i>Complication</i>	
Stent migration	3 (10)
Stent encrustation	3 (10)
Bothersome LUTS	3 (10)
Gross haematuria	2 (7)
<i>Post-natal investigations</i>	
No stone	12 (40)
Renal stones	6 (20)
Ureteric stones	5 (17)
Both ureteric stone and renal stones	4 (13)
Not known	3 (10)

It was reported that JJ ureteric stenting can be difficult in the third trimester due to the tortuosity of the ureter [13]. However, others did not confirm this [9–12,14–16]. All patients in our series had successful stenting.

The overall complication rate of JJ ureteric stenting, i.e. stent migration, stent encrustation, stent irritation and haematuria, was similar to that in other series of pregnant women [14]. This might show that placing JJ ureteric stents is a highly successful, safe and effective treatment option and should be considered for pregnant women with intractable flank pain.

Although percutaneous nephrostomy and JJ ureteric stenting are equally effective in relieving upper tract obstruction, JJ ureteric stenting is commonly regarded as the less invasive of the two, and has the additional advantage that pregnant women, mostly in the second and third trimesters, can undergo the procedure safely and comfortably in the supine lithotomy position.

Further, especially if drainage is needed for many of the remaining weeks of the pregnancy, a nephrostomy is very uncomfortable for the patient and risks infection and displacement over time.

While ureteric stenting acts as an emergency intervention for intractable renal obstruction, some centres advocate the use of ureteroscopy under general anaesthesia in pregnant women with obstructive ureteric calculi. High success rates can be achieved by ureteroscopy, with no reported complications, making ureteroscopy invaluable in both diagnosis and treatment [17,18]. However, if an infection proximal to the obstruction cannot be excluded, ureteroscopy would actually be contraindicated due to the irrigation pressures needed and the mechanical manipulation, both of which can trigger urosepsis. Also, the infrastructure and expertise must be available, which might not always be the case. In pregnant women it is preferable to err on the side of caution, and fast and smooth minimally invasive JJ ureteric stent drainage remains our preferred and recommended first-line strategy.

In conclusion, ureteric stenting during pregnancy can be safe, requiring no intraoperative imaging, and in

most cases can be inserted under local anaesthesia. It provides good symptom relief and has a low complication rate. We therefore advocate it as the first-line treatment in pregnant women with therapy-resistant flank pain.

Conflict of interest

None.

Funding

None.

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