

Radiation-Free Double-Pigtail Stent Insertion Under Local Anaesthesia For Managing Acute Calcular Ureteral Obstruction During The Last Trimester Of Pregnancy.

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Abstract:

Objective: To evaluate the feasibility, efficacy, and clinical outcome of the radiation-free endo-insertion of double-pigtail ureteral stents under local anaesthesia for managing acute calcular ureteral obstruction during the last trimester of pregnancy. **Patients and methods:** Radiation-free endo-insertion of double-pigtail ureteral stent under local anaesthesia was used as an emergency management for managing acute ureteral obstruction, not responding to conservative measures, in twenty nine pregnant women during the last trimester. The nature of ureteral obstruction was lower ureteral stone in 19/29 (65.5%) patients, mid ureteral stone in 1/29 (3.4%) patients, and upper ureteral stone in 9/29 (31.0%) patients. **Results:** The procedure was feasible in 26/29 (89.7%) patients and failed in 3/29 (10.3%) patients due to stone impaction. Clinical improvement occurred in all successful cases. However, the stent had to be removed due to persistent marked irritative dysuria in 2/26 (7.7%) cases within ten days of its insertion. Details of the clinical outcome and adverse effects will be presented. No major complications were recorded. **Conclusion:** Radiation-free endo-insertion of double-pigtail ureteral stent under local anaesthesia is a feasible, safe, minimally invasive, and effective procedure for managing acute calcular ureteral obstruction, not responding to conservative measures, during the last trimester of pregnancy.

Keywords: ureteral stents, ureteral obstruction, pregnancy.

Introduction:

Acute ureteral colic is not an uncommon medical emergency during pregnancy. It is the most common non-obstetric cause of abdominal pain in hospitalized pregnant women [5]. Most of the cases are due to small ureteral calculi which spontaneously on conservative medical management in 50-80% of cases [1,2,5]. However, further intervention is needed in about one third of patients whenever conservative measures fail to control persistent pain or if complications occur like marked obstruction or acute pyelonephritis [1,2,5]. Several options

are available for managing these clinical situations including insertion of precut - aneous nephrostomy [3], retrograde double-J or double-pigtail ureteral stents [11], and ureteroscopic manipulations [9]. Pregnancy is still the only absolute contraindication for extra-corporeal shock wave lithotripsy (ESWL) [10].

Double-pigtail stent (DPS) insertion is a minimally invasive option which has the advantage of being feasible under local anaesthesia without fluoroscopy avoiding the hazards of general anaesthesia and radiation during pregnancy.

Aim of work:

To evaluate the feasibility and efficacy and adverse effects of the insertion of double-pigtail ureteral stents for managing acute calcular ureteral obstruction during the last trimester of pregnancy.

Patients and methods:

Between April 2000 and October 2001, a total of 29 pregnant women with acute calcular ureteral obstruction not responding to conservative medical measures, were managed by radiation-free fixation of DJS under local anaesthesia in two different centers, El Sahel Teaching Hospital, Cairo, Egypt; and Mouwasat Hospital, Dammam, Saudi Arabia.

The mean age was 27.6 years old (range 22-39). The mean gestational age was 30.3 weeks (range 26-38). The inclusion criteria included pregnant women during the last trimester [≥ 24 weeks] with recurrent or persistent severe ureteral colics, marked proximal back-pressure, or acute pyelonephritis which fail to respond to appropriate medical management with analgesics, antispasmodics, and/or antibiotics. Preoperative urological work-up included detailed medical history and clinical examination, urinalysis (and culture/sensitivity when required), BUN, serum creatinine, plain x-ray urinary tract (PUT), and abdomino-pelvic sonography. Intravenous urography (IVU) was used whenever necessary but with fewer exposures than standard IVU. This was necessary in 3/29 (10.3%) cases. All cases were done as a day-case except for three cases who were already inpatients for managing acute pyelonephritis with intravenous antibiotics.

In all cases, local anaesthesia using a whole 20 gm package of lidocaine hydrochloride 2% gel (Xylocaine® Jelly 2%, AstraZeneca)

was applied to the urethral, trigonal, and bladder mucosa. The urethral application of the anaesthetic jelly is repeated every minute for three times keeping the anaesthetic nozzle inside the urethral meatus to assure and allow effective anaesthetic contact to the urethral mucosa. The rest of the anaesthetic package is then pushed intravesically to act as a topical anaesthetic for the trigonal and bladder mucosa. At least five minutes are then allowed to pass before starting the endoscopic manipulations. This time is needed for the local anaesthetic to be effectively acting on the transitional epithelium. In 4/29 (13.8%) cases, mild sedation with intravenous 50 mg pethidine hydrochloride or intravenous 5-10 mg of diazepam was used for irritable anxious patients.

We use a technique of radiation-free DPS insertion to avoid the radiological hazards to the mother and fetus. The ureteral stents used were 6-7 Fr caliber polyurethane DPS. Through the cystoscope, a 0.035" guidewire is passed and a 7 Fr open-tip ureteral catheter is then passed over it bypassing the stone site where a characteristic post-obstructive urine dribbling will be quite evident when the catheter tip is in the dilated proximal system after taking out the guide wire. A urine sample is taken for microscopic and bacteriologic examination and the catheter is, then, passed gently more proximally until it sticks with the renal tissue where a measure of the suitable DPS length can be defined by the ureteral catheter distance marks. Then, the guidewire is passed again through the ureteral catheter which is then removed and the DPS is launched-up on the guidewire observing the free coiling of its intravesical end under direct vision. This technique minimizes the needs for using fluoroscopy to fix DPS. However,

In case of doubt about guidewire positioning, fluoroscopy must be used which was necessary in only 2/29 (6.9%) cases of this study. It is of utmost importance not to exert any extra-force to push the guidewire up when feeling stone impaction. The guidewire must pass up gently feeling a characteristic obstructing stone sensation when it bypasses the stone site. In case of stone impaction or failure of retrograde passage of the guidewire, the procedure was aborted without further trials of ureteral dilatations or ureteroscopic manipulations.

A preoperative antibiotic prophylactic dose of one gram cefoperazone is given intravenously one hour before the endoscopic manipulations with no routine postoperative antibiotics unless clinically indicated. Post-operatively, no routine bladder drainage was used and patients were instructed to observe for stone passage through controlled voiding in a container before discarding the urine.

Follow-up urine analysis and renal sonography are done weekly. Follow-up plain films of the urinary tract were kept to the minimum and used only prior to DJS extraction to assure stone clearance or whenever clinically indicated to follow-up stone progress in known cases with radio-opaque stones. Endo-extraction of the DPS was then done under local anaesthesia in case of spontaneous stone passage before delivery, otherwise definitive stone management is to be conducted after delivery.

Results:

Table [1] summarizes the overall patient's, procedural, and clinical outcome data. The calculi obstruction was lower ureteral in 19/29 (65.5%) cases, mid-ureteral in 1/29 (3.4%) case, and upper ureteral in 9/29 (31.0%) cases. The mean stone length was 7.7 mm for

the largest diameter (range 4-24 mm). The stones were radio-opaque in 17/29 (58.6%) cases, faintly opaque in 5/29 (17.2%) cases, and radiolucent in 7/29 (24.1%) cases. The procedure was feasible under local anaesthesia alone in 22/29 (75.9%) cases, and additional sedation (pethidine or diazepam) was required in 4/29 (13.8%) cases.

The DJS was fixed successfully in 26/29 (89.7%) cases, and failed in 3/29 (10.3%) cases due to stone impaction and failure of retrograde passage of the guide wire into the renal pelvis (one upper ureteral and two lower ureteral calculi); where the procedure was aborted and PCN was done. In two of these cases (the 2 lower stones), the ureteral stones passed spontaneously before delivery after 17 and 35 days. The last (upper ureteral one) migrated to the lower ureter and was extracted ureteroscopically 3 weeks after delivery.

Fluoroscopy was used only in 2/29 (6.9%) upper ureteral stones cases. Otherwise, we relied on the characteristic urine dribbling pattern when the open-tip 7 Fr ureteral bypass the obstruction site into the proximal dilated system.

Out of the 26 successfully-placed DPS, 20/26 (76.9%) cases passed their ureteral calculi spontaneously (18 before delivery and two within three weeks after delivery). The remaining 6/26 (23.0%) cases were managed by ESWL for 4 upper ureteral stones and ureteroscopic extraction of two lower ureteral stones. The mean DPS period was 36.7 days (range 7-58 days).

The adverse effects included irritative lower urinary tract symptoms in 5/26 (19.2%) cases, attacks of mild self-limited macroscopic haematuria in 3/26 (11.3%) cases, mild lower urinary tract infection in 3/26 (11.3%) cases, and mild catheter encrustations in

2/26 (7.7%) cases. No major complications were recorded. The DJS was removed prematurely in 2/26 (7.7%) cases due to severe irritative lower urinary tract symptoms not responding to conservative measures, In

both cases the DJS were removed after 7 and 9 days and in both cases the lower ureteral stones passed spontaneously within 10 days of conservative watchful management and PCN was not needed.

Table [1] Patients , Procedural, and Clinical Outcome Data.

Age	Mean, 27.6 years.	Range, 22-39 years.
Anaesthesia:		
- Local	25/29 (86.2%) patients.	
- Local + Sedation (I.V. Pethidine or Diazepam)	12/32 (37.5%) patients.	
Operative Time	Mean, 21.4 minutes.	Range, 13-32 min.
Hospital Stay:	Mean, 7.5 hours.	Range7-11.5 hours.
Success Rates:		
- Successful DPS fixation	26/29 (89.7%) patients.	
- Spontaneous Stone Passage:	20/26 (76.9%) patients.	
Failure Rates:		
- Failed DPS due to Stone Impaction	3/29 (10.3%) patients.	
Complications:		
- Urgency Necessitating DPS Removal	2/26 (7.7%) patients.	
- Urgency (medically controllable)	5/26 (19.2%) patients.	
- Macrohaematuria (mild, self-limited)	3/26 (11.3%) patients.	
- Urinary Tract Infection	3/26 (11.3%) patients.	
- Mild DPS Encrustation	2/26 (7.7%) patients.	

DPS; double-pigtail stent

Discussion:

The conservative management of acute calcular ureteral obstruction in pregnant women is the primary treatment of choice and is successful in 50-80% of cases using appropriate analgesics, antispasmodics, and/or antibiotics [1,2,5]. In case of failure of medical treatment to control recurrent or persistent episodes of ureteral colics, marked back-pressure, acute pyelone - phritis; further minimally invasive

primary treatment options are available as retrograde endo-fixation of ureteral stents, PCN, or even definitive ureteroscopic manipulations [3,9,11]. The generally accepted strategy is to start with the PCN or DPS during pregnancy postponing further definitive stone management after delivery in case of stone persistence [1,2,5]. PCN carries the advantages of being done sonograp - hically-guided under local infiltration

anaesthesia without radiation risk to the mother or the fetus [3]. However, it causes significant morbidity to the pregnant lady if it has to be fixed for long time. It also carries a the risk of spontaneous avulsion, incrustations and introducing UTI. Endo-fixation of DPS is another primary alternative in this regards [4,11]. It is quite feasible under local anaesthesia, with no extra-corporal connections. It is very effective in managing obstructive ureteral sequelae. However, as in PCN, it is liable for incrustations, causing UTI. It also has the disadvantage of potential radiologic hazards to the mother and the fetus if fluoroscopic monitoring is to be used. Irritative dysuria is also common [6]. Other alternatives include ureteroscopic manipulations with many reports of being a safe, effective, and even feasible under local anaesthesia [3,8,9,11-13]. Although all the above mentioned minimally invasive options are reported to be used at all the three trimesters of pregnancy, we limited this work to the last trimester where hazards to the mother and fetus are documented to be much less [1-3,5,9,11,13]. In case of using PCN or DPS during early pregnancy catheters must be changed every 6-8 weeks to avoid problems of stent encrustations [1,3]. In this study, the mean period of DPS was 36.7 days (range 7-58).

In this work, DPS was successful in managing the calcular ureteral obstruction in 26/29 (89.6%) cases. Furthermore, post-delivery definitive stone treatment was needed in 6/26 (23.1%) cases, with spontaneous passage of the stone in 20/26 (76.9%) cases (18 before delivery and 2 after delivery). All cases, except 3 previously admitted cases, were done as day-cases with a short mean hospital stay time of 7.5 hours (range 4-11.5). The procedure was well tolerated by all patients. The

attacks of renal colics ceased in all the 19/26 cases of recurrent or persistent renal colic. Also, all the 7/26 cases of acute pyelonephritis responded well to appropriate antibiotics with no further complications. No cases of post-procedural preterm labor were recorded in this study.

Irritative dysuria occurred in 7/26 (26.9%) cases which was severe in two cases that necessitated DPS extraction, and medically controllable in 5/26 (19.2%) cases. All the 3/26 (11.3%) cases of lower UTI's were mild and responded well to medical treatment. No significant stent encrustations of stent plugging were recorded apart from 2/26 (7.7%) cases of mild clinically insignificant stent encrustations noted upon stent endo-extraction. The 3/26 (11.3%) Cases of macrohaematuria attacks were self-limited and needed no hospital admission or blood transfusions. Overall, the adverse effects were minors, easily controllable, with no major complications reported.

Conclusion:

The retrograde endo-fixation of DPS, is a safe and effective option for managing acute calcular ureteral obstruction in pregnant women during the last trimester. It is minimally invasive, cost effective, and of low morbidity and complication rates. It is the least invasive among other minimally invasive interventional options available for managing acute calcular ureteral obstruction during pregnancy. We believe that it should be the first choice if conservative medical measures failed or complications occurred.

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تثبيت دعامة الحالب بالمنظار تحت التخدير الموضعي بدون أشعة سينية لعلاج الإنسداد الحاد للحالب بالحصيات البولية أثناء الثلث الأخير للحمل

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هدف البحث: تقييم إمكانية وفعالية و المردود الإكلينيكي لتثبيت دعامة الحالب معقوفة الطرفين بالمنظار تحت التخدير الموضعي بدون أشعة سينية لعلاج الإنسداد الحاد للحالب بالحصيات البولية أثناء الثلث الأخير للحمل.

المرضى و أسلوب البحث: تضمنت الدراسة تثبيت دعامة حالب معقوفة الطرفين بالمنظار تحت التخدير الموضعي بدون أشعة سينية لعلاج الإنسداد الحاد للحالب بالحصيات البولية و الغير مستجيب للعلاج التحفظي في 29 سيدة حامل خلال الثلث الأخير للحمل. و قد كان موضع الإنسداد بالثلث السفلي للحالب في 29/19 (65.5%) مريضة و بالثلث الأوسط للحالب في 29/1 (3.4%) مريضة و بالثلث العلوي للحالب في 29/9 (31%) مريضة. وقد تم إجراء ذلك بأسلوب جراحي لايعتمد الأشعة السينية لتثبيت دعامة الحالب و تحت التخدير الموضعي لتفادي الآثار السلبية للأشعة السينية و التخدير العام علي كلاً من الأم الحامل و الجنين.

النتائج: أمكن تثبيت الدعامة بنجاح في 29/26 (89.7%) مريضة و لم يمكن في 29/3 (10.3%) مريضة بسبب الإنسداد التام بالحصاة. وقد تحسنت إكلينيكيًا جميع الحالات التي تم تثبيت الدعامة لها بنجاح. إلا أنه تم رفع الدعامة خلال عشرة أيام من تركيبها بسبب حدوث أعراض تعثر بولي تهيجية لم تستجيب للعلاج التحفظي في 26/2 (7.7%) مريضة. ويتضمن البحث تفاصيل النتائج الإكلينيكية والمضاعفات.

الاستنتاج: أسلوب تثبيت دعامة الحالب معقوفة الطرفين بالمنظار تحت التخدير الموضعي بدون أشعة سينية هو إجراء جراحي ممكن وآمن وقليل التدخل وفعال لعلاج الإنسداد الحاد للحالب بالحصيات البولية أثناء الثلث الأخير للحمل.