

# Ureteral drainage by Double-J-catheters during pregnancy

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## Summary

**Purpose:** To access the safety and effectiveness of Double-J-stents in treating symptomatic hydronephrosis during pregnancy.

**Material and Methods:** From 1994 to 1999, 21 women were hospitalized in the Urology Clinic at the University Hospital of Crete. Fourteen patients presented acute pyelonephritis, six painful hydronephrosis and one spontaneous renal rupture. In four cases the hydronephrosis was caused by calculus in the upper 3<sup>rd</sup> quadrant of the ureters.

In 13 out of 14 cases of urinary febrile infection and one with spontaneous renal rupture, the dilatation resulted from direct compression of the ureters by the gravid uterus. Using ultrasound guidance, 21 ureteral stents were successfully placed under local anesthesia.

**Results:** In 14 out of 21 patients with urinary infection, we observed remission of fever during the first 24 hours after the placement of the ureteral stents. In the patient with spontaneous renal rupture the remission of symptoms was observed a few hours after the ureteral drainage. Complications were reported in six cases, such as, voiding symptoms and discomfort.

**Conclusion:** Double-J-ureteral stenting is an effective, simple and safe method in treating symptomatic hydronephrosis during pregnancy.

**Key words:** Hydronephrosis; Pregnancy; Urolithiasis; Urinary tract infection; Double-J-catheter.

## Introduction

Physiological hydroureteronephrosis occurs in about 80-90% of gravid women, starting at 6-10 weeks of gestation and resolving within a month of delivery.

This condition is asymptomatic, causes no renal damage and it usually occurs on the right side as a result of dextrorotation of the uterus at mid-term pregnancy [1-3].

In early pregnancy progesterone affects the urinary smooth muscle causing dilatation and reducing peristalsis of the ureter. In later pregnancy compression of the ureter from the enlarging uterus contributes to the physiological hydroureteronephrosis. In certain cases this functional renal change in pregnancy may progress to painful hydroureteronephrosis due to worsening of normal dilatation or due to urolithiasis and/or pyelonephritis.

The severe flank pain or renal infection may induce growth retardation in the fetus, or preterm labour, sepsis, and preeclampsia in pregnant women. Spontaneous renal rupture is a potentially fatal complication of unchecked gestational obstructive uropathy, thought to be caused by increased hydrostatic pressure leading to extravasation from the overstressed calyceal-renal capsular junctions [4]. Painful hydronephrosis in pregnancy is conventionally treated by having the patient lie on the left side in order to relieve ureteral pressure induced by the dextrorotated uterus, as well as administration of antibiotics and analgesics. When these measures fail, ureteral stenting or application of percutaneous drainage (nephrostomy) are

effective for pain relief and preventing evolution of hydronephrosis to spontaneous renal rupture [5-7].

We describe the outcome in 21 cases of symptomatic hydronephrosis and placement of indwelling ureteral stents in pregnant women who were unresponsive to conservative treatment.

## Materials and Methods

Between 1994 and 1999, 21 pregnant women were hospitalized in the urology clinic at the University Hospital of Crete, with persisting acute renal colic or urinary infection and fever. Fourteen patients presented urinary infection and fever (acute pyelonephritis), six painful hydronephroses and one painful hydronephrosis accompanied by spontaneous renal rupture. Of the 14 patients suffering from acute pyelonephritis, in 13 cases the urinary stasis was caused by compression of the ureter (9 in the right side and 4 in the left side) by the gravid uterus and in one case it resulted from intrinsic blockage by calculus of the upper 3<sup>rd</sup> quadrant in the right ureter. Of the six patients suffering from painful hydronephrosis, in three cases the dilatation of the collecting urinary system was caused by intrinsic blockage (calculus) of the upper 3<sup>rd</sup> quadrant in the right ureter and in three cases it resulted from compression of the ureter by the gravid uterus. In one pregnant woman with spontaneous renal rupture, the painful hydronephrosis resulted from compression of the ureter by the gravid uterus. All patients were primiparous, with age ranging from 21 to 36 years (average 28.08) and gestation time ranging from 18 to 22 weeks.

At the presenting time, 14 complained of fever and chills accompanied by flank pain, six cases were characterized by severe renoureteral colic with voiding symptoms and one case experienced flank pain reflecting in the abdominal area.

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All patients underwent extensive diagnostic evaluation of renal and other vital functions, as well as urinalysis, urine culture, blood tests, bilateral renal and bladder ultrasound examinations and a thorough obstetric examination to evaluate the fetal condition. When ultrasonography was non-diagnostic and a plain abdominal film was necessary, fetal exposure was minimized by radiating only the involved side, shielding the maternal pelvis. Abdominal ultrasound was performed to determine renal and calyceal diameters. The grading system was based on maximal calyceal and not on renal pelvic diameters.

Thirteen cases were III grade and eight cases were II grade. Using ultrasound guidance indwelling ureteral stents were placed under local anesthesia (1% lidocaine jelly through the urethra) in all patients with acute symptomatic hydronephrosis unresponsive to conservative management.

## Results

Conservative treatment (analgesia, hydration and bed rest) was commenced initially in all patients. Appropriate antibiotics were used in 14 patients with positive urine culture or clinical findings suggestive of urinary tract infection. When these measures failed to reduce the main symptoms, it was decided that placement of a double-J-catheter under local anesthesia was necessary. The duration of procedures ranged from 5 to 10 minutes. In all cases a 6F double-J-catheter was used without difficulty in the placement. In all patients suffering from renal infection, the remission of fever was observed during the first 24 hours after the ureteral stent placement. Dilatation of the urinary tract system was reduced in 14 of 21 patients but did not revert to normal conditions.

In three out of four patients with calculus of the upper 3<sup>rd</sup> quadrant of the ureter, a remission of the hydronephrosis was observed and the stones were passed spontaneously during the next 3-5 days after the placement of the ureteral catheter. In the fourth lithiasic patient, the stone was displaced into the pelvis and extracorporeal shock wave lithotripsy (EWSL) was successfully executed two weeks after delivery.

The stone synthesis was calcium oxalate in all patients and the size ranged from 3 to 5 mm. In the patient with painful hydronephrosis accompanied by spontaneous renal rupture, remission of the main symptoms was observed six hours after the placement of the ureteral stent. No serious complications were encountered during the management of our patients, while four patients complained of mild bladder irritation and two patients presented flank pain during voiding. All pregnancies progressed uneventfully and all women delivered after a mean of 36 weeks of gestation.

The stents were removed four weeks after delivery when urinalysis and abdominal ultrasonography showed normal results.

## Discussion

Gestational upper urinary tract dilatation is a normal phenomenon that occurs in 80-90% of pregnancies and disappears within a few weeks (4-6) after birth [8]. The

causes of these physiological dilatations are probably due to both anatomical and hormonal mechanisms [9]. The initial conservative treatment by positioning the body on the least affected side, analgesia, appropriate antibiotic therapy (in case of positive urine culture) and b-blockers, have not at all times had the expected positive results [10]. Urolithiasis is an uncommon disorder during pregnancy and may be the cause of the collecting system dilatation, with potentially disastrous implications for the mother and the fetus. Urinary calculi occur in 0.03 to 0.06% of pregnancies. This incidence is similar to that in non-pregnant women [11]. Because urolithiasis can be confused with other abdominopelvic disorders during pregnancy, serious consideration must be given to this diagnosis in all pregnant women suffering from abdominal or flank pain, hematuria, or unresolved bacteriuria or both. When antibiotic therapy is unsuccessful in treating urinary infection or pyelonephritis, in a patient with a susceptible organism, urolithiasis should be suspected. Ultrasonography has proved to be invaluable to our team. Because most calculi are located in the ureter during pregnancy, roentgenographic imaging studies are necessary to diagnose many symptomatic gestational urinary tract calculi. Plain abdominal radiographs and a limited excretory urogram are useful and safe examinations if the diagnosis remains uncertain after ultrasonography [12].

A symptomatic, unresponsive to conservative treatment hydronephrosis, requires immediate operative intervention, regardless of etiology. It is important to establish a temporary urinary drainage, with the use of ureteric stents, or percutaneous nephrostomies [13]. Using ureteral stents, further complications may be registered such as difficulty in placement, perforation of the ureter, incrustation of the stent, ascending pyelonephritis and emigration of the ureteral stent [8, 14]. In our study of the above-mentioned women, a few patients complained of mild bladder irritation or hematuria, but after examination, stent removal was not necessary. The percentages of complications in this study are no different from several other large studies seen in the international literature. Definitive therapy for urinary tract malformations or urolithiasis can safely be postponed to the postpartum period.

## Conclusion

From our experience we believe that double-J-ureteral stenting is an effective, simple, safe and even economical method in treating acute hydronephrosis of pregnancy where conservative management has failed. These characteristics suggest its routine application in obstetric practice and its use in patients with renal colic, urolithiasis or spontaneous renal rupture.

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## World Association of Perinatal Medicine

# World Congress of Perinatal Medicine

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