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Original Research Article

A retrospective study on maternal and perinatal outcome in pregnancy requiring DJ stent and PCN during pregnancy

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ABSTRACT

Background: Gestational hydronephrosis (GH) is result of dilatation effect of the progesterone and mechanical compression of the gravid uterus. Management during pregnancy is challenging as routine radiological investigations and surgical treatments cannot be applied due to the potential harm to the fetus. Intervention is indicated in women who fail to respond to conservative management. Acute hydronephrosis and renal colic are common etiologies for loin pain, and can lead to severe form of urinary tract infection affecting perinatal outcome. Ureteric stenting and percutaneous nephrostomy (PCN) during pregnancy are safe, requiring no intra-operative imaging, and inserted under local anaesthesia. It provides good symptom relief, low complication rate, efficient and safe modality for women with refractory symptoms.

Methods: A retrospective study of pregnant women admitted under obstetric units with acute hydronephrosis requiring DJ stenting and/or PCN. Aim was to evaluate the course and pregnancy outcomes in a tertiary center of Southern India over a period of five years.

Results: Descriptive statistical analysis was done in 12 women with acute hydronephrosis in pregnancy. 66.7% were nulliparous and mean gestational age at admission was 31 weeks. Diagnosis was done by USG. One-fourth had pyelonephritis and calculus being the main pathology (n=9;75%).Women requiring DJ stent and PCN were 41.6% and 58.4% respectively. 41.7% had preterm labour. 66.7% delivered vaginally, birth weight was more than 2.5kg in 50%.

Conclusions: Maternal and neonatal outcome mainly depends on the early diagnosis. In this study we emphasize on the importance of multidisciplinary team approach in the management of women with acute hydronephrosis. DJ stent and PCN are efficient and safe modalities in women with refractory symptoms.

Keywords: DJ stent, Hydroureteronephrosis, PCN, Perinatal outcome, Pregnancy, Preterm

INTRODUCTION

Hydronephrosis and dilatation of the upper urinary tract is a common phenomenon during pregnancy. 90% are physiological and most of them are uneventful.[1] The common symptoms experienced by patients are flank pain and hematuria due to stone and sloughed renal papillae. Dilatation of the pelvicalyceal system and upper ureteric tract is more pronounced in right kidney, in primigravida and after mid-pregnancy.[2-4] Hydronephrosis in pregnancy is a result of the dilatation effect of the progesterone and mechanical compression of the

enlarging uterus.[1,5] The predisposition of the right kidney is due to the dextrorotation of the uterus and the relative protection of the left ureter by the sigmoid colon. Most of the management options of the gestational hydronephrosis are based on the coexisting stone disease, pyelonephritis, and renal disease. Managing symptomatic hydronephrosis during pregnancy is challenging, as routine radiological investigations and surgical treatments, used in non-pregnant women, cannot be applied easily due to the potential harm to the fetus. Conservative management are generally recommended in symptomatic women with hydronephrosis of pregnancy and intervention is only indicated in those who fail to respond to conservative management.

The objectives of this study were to analyze course and outcome of acute hydrouretronephrosis in pregnancy. To study management of acute hydronephrosis by ureteric stenting and percutaneous nephrostomy during pregnancy.

METHODS

This study was conducted between January 2011 to December 2015 in a tertiary care center in South India, Tamil Nadu, IndiaThe hospital numbers of patients undergoing intervention for acute hydroureteronephrosis in pregnancy were retrieved with search words used were DJ stent, percutaneous nephrostomy during pregnancy (PCN). Data was collected and entered in SPSS 23 and analyzed. The study was approved by institutional review board IRB Min No (Retro) 10992 Dated 22.11.2017.

This one is pure retrospective study of pregnant women admitted under obstetric units or in labor ward with acute hydronephrosis requiring DJ stenting and/or PCN. And also women who had DJ stent and or PCN during pregnancy and who delivered in our institute are included in this study.

Aim was to evaluate the course and pregnancy outcomes in a tertiary center of Southern India over a period of five years.

RESULTS

Twelve patients were diagnosed with Hydronephrosis in pregnancy during our study period.

The demographic and pregnancy details of the patients are mentioned in Table 1.

Ten (83.3%) women were symptomatic at the time of presentation, with complaints of fever and pain. Most of them presented in the second trimester.

Ultrasonography was the primary mode of imaging. Four women had bilateral hydronephrosis, while rest had unilateral, with equal numbers having involvement of left and right side. One-fourth of our women had pyelonephritis and calculus being the main pathology (n=9; 75%), for hydronephrosis. The size of calculi ranged from 0.7cm to 2.3cm (mean=1.5cm).

Table 1: Patient characteristics.

Characteristics	Value
Age	25-35 (Mean = 30 years)
Gestational age	21-40 (Mean = 30.5 weeks)
Parity	
Primigravida	8 (66.7%)
Multigravida	4 (33.3%)
Number of fetus	
Singleton	11 (91.7%)
Multiple	1
Symptomatology	
Asymptomatic	2 (16.7%)
Symptomatic	10 (83.3%)
Time of presentation	
II trimester	9 (75%)
III trimester	3 (25%)

Table 2: Diagnosis and interventions.

USG findings	Value
Left HUN	4
Right HUN	4
Bilateral HUN	4
Stone size	0.7-2.3 cm (mean=1.5cm)
Pyelonephritis	3 (25%)
UTI	11 (91.6%)
Procedure done	
DJ stent	5 (41.6%)
PCN	7 (58.4%)
Pathology identified	
Calculus	9 (75%)
Papillary necrosis	1 (8.3%)
Diagnosis not reached	2 (16.7%)

Table 3: Obstetric outcome.

Gestational age at delivery	Value
Term (>37weeks' Gestation)	7 (58.3%)
Preterm (<36 +6 weeks' Gestation)	5 (41.7%)
Mode of delivery	
Vaginal birth	8 (66.7%)
Caesarean section	4 (33.3%)
Birth weight	
<2.5kg	6
>2.5kg	6

84.6% of them had culture proven urinary tract infection (UTI) and were treated with antibiotics.

Five (41.6%) patients underwent DJ stenting (one patient was not stented in our hospital) the rest of seven (58.4%) had PCN. The DJ stents were placed over a glide wire

with cystoscopy without the use of X-ray radiation and the stent placement was confirmed with ultra-sonography.[6] Percutaneous nephrostomy was performed using ultrasonography for guidance.[7]

All these patients who presented with hydro-nephrosis during pregnancy were managed with minimally invasive interventions and went on to have successful deliveries.

Though almost half of our women (41.7%) had preterm delivery, however only one delivered at 32 weeks while rest were late preterms. Only a third of our cohort (33.3%) underwent LSCS for obstetric indications. 50% of the babies born in our cohort had birth weight less than 2.5kg, but three-fourth of them were more than 2 kg. Neonatal outcomes were equivocal.

Post-pregnancy complications and follow up

Among the 9 patients diagnosed with calculi, three underwent ureteroscopy (URS) after successful child birth; one was treated with shock wave lithotripsy.

One patient who underwent DJ stenting elsewhere had encrustation of the DJ stent requiring endoscopic removal after successful delivery. Similarly, another patient who had DJ stent placed for probable calculus was forgotten requiring endoscopic retrieval as well. One patient who underwent PCN placement followed by ante grade DJ stenting, had a retained PCN tip required removal with a URS. One patient underwent PCN placement for solitary functioning kidney, was suspected to have PUJ obstruction, and subsequently underwent DJ stenting after the delivery with successful outcome.

Two patients who presented with symptomatic non-functioning kidneys were treated with PCNs. One of them was diagnosed to have urinary tuberculosis and was started on anti-tuberculous therapy but was lost to follow up. The second patient was found to have a staghorn calculus in the contralateral functioning kidney. She underwent percutaneous nephro-lithotripsy after delivery and was advised a nephrectomy for the non-functioning kidney.

Renal failure was present in three. Of these, two had chronic renal failure and one recovered from acute kidney injury following post-natal intervention.

DISCUSSION

The dilatation of the upper urinary collecting system is a common finding during pregnancy affecting over 90% of pregnant women.[8,9] It develops as early as 6 to 10 weeks of gestation, however, the degree of obstruction can be quite variable for asymptomatic patient.[9] These changes are explained by increased renal blood flow (up to 75% by term) and the smooth muscle relaxant effects of progesterone as well as mechanical obstruction from the enlarging fetus and uterus. Mechanical compression of ureters is the predominant factor.[10] Acute hydronephrosis is one of the common etiologies of severe loin pain in pregnancy which when left untreated can lead to severe form of urinary tract infection affecting both mother and fetus.[3] Pain from renal colic is the most common non-obstetrical reason for hospital admission during pregnancy. 28% of pregnant women having obstructing stones were initially misdiagnosed as having other pathologies, such as appendicitis and placental abruption.[11] However, the clinical presentation might not always be reliable in predicting stone disease in pregnant women with flank pain.[12] Double J stent insertion under local anesthesia is the treatment of choice to resolve the symptoms and to prevent obstruction-related complications.[13]

Ultrasonography and doppler is a safe and suitable tool for evaluation of hydronephrosis. Though exposure to X-ray during pregnancy is harmful to the fetus, however without a radiographic study, determining definite etiology for symptomatic hydronephrosis during pregnancy becomes difficult.[14] Magnetic resonance urography (MRU) and magnetic resonance excretory urography (MREU) are recent more accurate radiological means to diagnose pathologic ureteric obstruction during pregnancy but not available in all centers and is expensive. Consequently, ultrasound becomes the first-line investigation to evaluate flank pain in pregnant women. While the advantages of ultrasound are its non-invasiveness, lack of ionizing radiation and ready availability, it has a limited sensitivity, and is further limited for accuracy in detecting stones, visualizing the ureter, and differentiating between different causes of renal obstruction.

As renal colic in pregnant patients can be complicated by severe upper urinary tract infection and premature labor, un-recognized pyonephrosis is potentially life-threatening for both the mother and fetus.[14] The recommended approach in management of hydronephrosis in pregnancy is conservative management. More invasive methods such as insertion of DJ ureteric stent or Percutaneous nephrostomy are reserved for patients not responding to conservative measures or those with complications such as spontaneous extravasation of urine, uro-sepsis and azotemia.[7,15-17] Ureteroscopic removal of stone is only indicated in selected cases.[18,19] Most patients will recover with analgesics, antibiotics and hydration, as the initial treatment is conservative. However early intervention is required after analgesia has been ineffective.[20] Drainage of the obstructed and infected system is indicated in patients who have symptoms refractory to conservative measures, i.e. ongoing sepsis despite antibiotics (>48hours) and the worsening of any of renal function, pain, obstruction or hydronephrosis.[21]

Limitations of this study were, it is a small study and is retrospective. Data was obtained retrospectively from medical records and there are minimal chances of data being under reported. However, the advantage is that bias is very little as we are reporting the occurred outcomes.

CONCLUSION

Conservative protocol is also effective in the management of acute symptomatic hydronephrosis of pregnancy and if used carefully, it will help to prevent the need for more invasive uroradiological interventions. 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. DJ stent insertion is an efficient and safe modality for the rare patient with refractory symptoms.

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