



A Prospective Study of Urological Problems in Pregnancy

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ABSTRACT

Introduction: Pregnancy and delivery is a time of major anatomical and physiological changes to the urinary tract which may result in an alteration in urinary tract function, most commonly manifested by the development of urinary symptoms. Pregnant patients are typically challenging to treat from a urological standpoint, as pregnancy will often induce, exacerbate or complicate urological complaints. Objective of this study is to analyze various urological problems occurring in pregnancy and the various modalities of their management with regard to the special considerations for the gravid patient and the alterations in the anatomy and physiology of the genitourinary tract in pregnancy. **Materials and Methods:** Antenatal patients in Govt. Kilpauk Medical College Hospital and Govt. Royapettah Hospital with urological problems from December 2015 to February 2017. Antenatal patients have been evaluated for urological problems based on symptoms, clinical findings, laboratory and radiological investigations. Patients having evidence of urological diseases were included in the study. The incidence of urological problems and various modalities and efficacy of treatment have been evaluated. Previously diagnosed urological disease before pregnancy were excluded. Antenatal patients referred to the urology out patient department were evaluated for their urological conditions. **Results:** The total number of antenatal cases referred for urological problems in a 15 month period in this study was 63 cases. The mean and median ages of the patients were 24 years. The mean and median gestational ages of the patients were 24 weeks. Majority (57%) of the referrals were for incidental findings in laboratory or imaging investigations. The most common organism isolated in culture was *E. coli* irrespective of primary diagnosis.

79% of calculus disease presented with symptoms and 21% were asymptotically detected calculi. Two cases of PUJ obstruction presented with loin pain. One case of pyelonephritis on right side presented with fever and right loin tenderness. One case of clear cell renal cell carcinoma was diagnosed with stage of pT2 N0 M0. No adverse obstetric events were seen during this study. **Conclusion:** Pregnant patients pose a unique clinical scenario to the urologist in terms of specific presentations, diagnostic modalities and management options. The goal of management should not only include relief from the urological condition but also the continued well being of the fetus and safe obstetric management of the patient.

INTRODUCTION

Pregnancy and delivery is a time of major anatomical and physiological changes to the urinary tract which may result in an alteration in urinary tract function, most commonly manifested by the development of urinary symptoms. These changes may be further influenced by alteration in renal function and inter current pathology in pregnancy. Pregnant patients are typically challenging to treat from a urological standpoint, as pregnancy will often induce, exacerbate or complicate urological complaints. Pregnancy is associated with physiological hydronephrosis and relative stasis of urine in the collecting system. This predisposes these patients to complications of infection such as pyelonephritis and renal failure. Even a condition as benign as asymptomatic bacteriuria could rapidly progress to febrile UTI or pyelonephritis leading to obstetric complications like pre term delivery, abortion, growth retardation and be a cause of great morbidity to the mother and foetus. Urolithiasis in pregnancy has a complex management protocol and is attended by anatomic and physiologic limitations in management as a result of the physiologic changes of pregnancy.

Urolithiasis may be complicated by infection and renal compromise causing morbidity to the mother and foetus. It is essential to understand and treat the urological problems in pregnancy with attention to the unique anatomic and physiologic factors influencing them as a result of the gravid status of the patient. Objective of this study is to analyze various urological problems occurring in pregnancy and the various modalities of their management with regard to the special considerations for the gravid patient and the alterations in the anatomy and physiology of the genitourinary tract in pregnancy.

MATERIALS AND METHODS

Antenatal patients in Govt. Kilpauk Medical College Hospital and Govt. Royapettah Hospital with urological problems from December 2014 to February 2016. Antenatal patients have been evaluated for urological problems based on symptoms, clinical findings, laboratory and radiological investigations. Patients having evidence of urological diseases were included in the study. The incidence of urological problems and various modalities and efficacy of treatment have been evaluated. Previously diagnosed urological disease before pregnancy were excluded. Antenatal patients referred to the urology out patient department were evaluated for their urological conditions. The reason for referral was analysed. Patients were classified as symptomatic or asymptomatic. They were evaluated with urinalysis and blood investigations such as renal function tests, hemogram, serum calcium and uric acid estimations. Ultrasound of the KUB region was done in all patients and size of kidneys, bladder wall thickness, collecting system dilatation, presence of calculus, size of calculus were measured. Treatment was instituted based on protocol and results tabulated.

Patients with hydronephrosis on USG were subjected to resistive index (RI) and differential RI measurements in order to differentiate pathological hydronephrosis from physiological hydronephrosis of pregnancy. RI > 0.7 and Differential RI > 0.06 were taken as indicators of obstruction. Transvaginal ultrasound was used in cases of hydronephrosis with no clear evidence of obstruction in abdominal scans as a means of identifying lower ureteric obstructions. The ureteral jet was attempted to be visualised by means of colour doppler in cases as an indirect evidence of complete obstruction.

Patients presenting with asymptomatic bacteriuria as shown by urine culture done as a part of routine antenatal evaluation were treated with antibiotics as per sensitivity patterns and were confirmed to be successfully treated by repeat cultures after completion of course of antibiotic therapy.

Patients with calculus disease were classified on the basis of symptomatology, presence of UTI, presence of pelvicalyceal system dilatation, size and location of calculus and treatment was given. Only calculi more than 4 mm in size were taken for the study.

The standard method of diagnosis of calculus was based on ultrasound examination of the KUB region. Asymptomatic renal calculi with no hydronephrosis were managed conservatively. Symptomatic calculi and calculi causing obstruction were managed with double J stenting or percutaneous nephrostomy based on the location and size of the calculus. The stent or the PCN were changed at regular intervals of 6 weeks until delivery and the stone was definitively managed post partum.

Symptomatic UTIs were diagnosed on the basis of urine culture and treated with sensitive antibiotics after admission of the patient. Resolution of UTI was confirmed with repeat culture after the completion of antibiotic course. Patients having recurrent UTI were put on prophylactic suppressive antibiotic, Cephalosporin 250 mg od till delivery.

Pyelonephritis in pregnancy was treated as an emergency and admission with intravenous antibiotics was instituted. Patients were confirmed culture negative after 1 week and started on suppressive antibiotics.

Pelviureteric junction obstruction (PUJO) patients diagnosed in pregnancy were observed if asymptomatic, but if they presented with symptoms, PCN was done as a temporizing measure and regular PCN changes were done till delivery. Pyeloplasty was done 6 weeks after delivery.

Patient presenting with renal mass in ultrasound was subjected to MRI of the abdomen and staging of the mass was done. Patient was managed with open radical nephrectomy and histopathological examination of mass was done. Patient was reevaluated for spread of disease after delivery and placed on follow up protocol.

RESULTS AND ANALYSIS

In total of 63 cases all patients were between the ages of 19 and 34 years. The mean age was 24.5 years. The median age was 24 years. The age range at which maximum cases were located was 21 to 27 years. The gestational age at presentation was between 12 and 35 weeks. The mean gestational age was 24.75 weeks. The median gestational age was 24 weeks. The range of gestational age at which the maximum cases were located was 22 to 30 weeks.

The most common diagnosis was asymptomatic bacteriuria. The second most common diagnosis was calculus disease. The other diagnoses in descending order of frequency were urinary tract infection, pelviureteric junction obstruction, pyelonephritis and renal tumour.

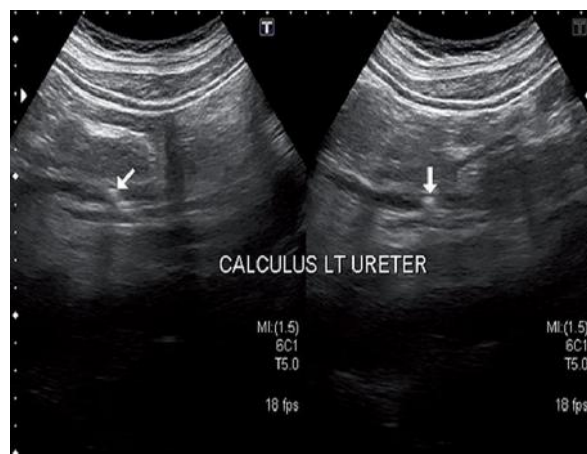
57 of patients were asymptomatic and were referred on basis of investigatory findings. 43 % of patients were referred for having symptoms. There were a total of 30 cases of asymptomatic bacteriuria as detected by urine culture done during routine antenatal visits. The cut off used was 103 CFUs per mL.

The most common organism isolated was *Escherichia coli*. The second most common organism was *Proteus* species and third was *Klebsiella* species. These cases were treated with oral sensitive antibiotics. Repeat culture was done at end of course of antibiotics to document resolution of bacteriuria. These patients were subjected to repeat cultures at every antenatal visit. None of the patients had recurrence of bacteriuria or progression to symptomatic UTI.

24 Out of 63 cases had calculus disease. 19 cases (79%) of calculus disease cases were identified on the basis of symptoms. 12 cases presented with loin pain as the only symptom. 7 cases presented with dysuria as the only symptom. Of the patients presenting with dysuria, 2 had a middle calyceal calculus, 1 had a proximal ureteric calculus and 4 had distal ureteric calculi. 15 patients had calculus on the right side. 9 patients had calculus on the left side. No patients had bilateral calculi. Renal calculi were equally distributed between right and left sides. Ureteric calculi were more common on the right side. The only renal pelvic calculus was on the left side. All of the calculi locations and sizes were determined on the basis of ultrasound findings. 6 cases of calculus disease had urine culture positivity on evaluation. *E. coli* was the most common organism cultured in 4 patients. The other organism was *Proteus* species. 17 Cases had PCS dilatation on ultrasound evaluation. All 16 ureteric calculi and the only renal pelvic calculi had PCS dilatation. None of the calyceal calculi had dilatation. The most common locations were ureter with equal distribution between proximal and distal ureters. The other locations in descending order of frequency are middle calyx, upper and lower calyces and finally renal pelvis. Only calculi greater than or equal to 4 mm were taken as significant for the study. All the calyceal and ureteric calculi were less than 10 mm in size. The only renal pelvic calculus was 25 mm in size and causing hydronephrosis. The distal ureteric calculi were visualized with transvaginal ultrasound examination. All the renal calculi without PCS dilatation were managed conservatively. They were advised to have fluid intake more than 3.5 Ltrs per day. Patients with urine culture positivity were treated with appropriate course of sensitive antibiotics and followed up with a repeat culture to confirm resolution of infection. The only patient with pelvic calculus was subjected to a percutaneous nephrostomy as a temporizing measure. The PCN was changed every 6 weeks. Two months after delivery the patient was subjected to left PCNL. All the patients with ureteric calculi were subjected to double J stenting via retrograde method. Semi rigid ureteroscopy were done in all but one distal ureteric calculi. In one case of distal ureteric calculus, the ureter could not be entered and hence cystoscopic stenting was done. Four distal ureteric calculi were removed with grasper while three calculi could not be removed and hence stenting alone was done. The double j stents placed were of the long standing durable variety and were changed at 6 months only where applicable. When the patient delivered before 6 months of stent placement, formal ureteroscopy and lithotripsy was done 4 weeks after delivery. Lithotripsy was not done for any case in the gestational period.

The patients whose renal calculi were subjected to ESWL 6 weeks after delivery as all calculi were less than 10 mm. The standard stent used was 3.8 Fr. / 26 cm.

USG IMAGE OF LEFT URETERIC CALCULUS



USG IMAGE OF URETERIC JET IN RIGHT LOWER URETERIC CALCULUS



There were a total of 5 cases of symptomatic UTI in this study. All the cases presented with fever associated with chills and rigors. Three cases had associated dysuria with fever. Urine culture done in these cases revealed *E. coli* growth in 4 cases and *Klebsiella* species growth in 1 case. The counts were more than 105 CFUs per mL in all the cases. The cases were managed with sensitive parenteral antibiotics with admission for seven days. Resolution of the infection was confirmed with repeat urine culture and the patients were put on suppressive cephalexin 250 mg od.

There were two cases of PUJ obstruction in this study. Both cases were diagnosed as they presented with left loin pain which was intermittent and dull aching in nature. They were diagnosed on the basis of ultrasound evaluation and RI measurements.

Both were on the left side. As the patients presented with pain, they were treated with left percutaneous nephrostomy done with ultrasound guidance. The PCN was changed every 4 weeks. They were put on suppressive antibiotics for the duration of the PCN. Both patients delivered normally at term. They were then subjected to thorough evaluation for PUJO with IVU and diuretic renograms. Anderson Heynes' dismembered pyeloplasty was done in both patients 6 weeks after delivery.

ULTRASOUND IMAGES OF LEFT PUJO



There was one case of pyelonephritis in this study. The patient presented with high grade fever and right loin pain. On examination, she had right loin tenderness. Ultrasound revealed a mildly enlarged right kidney with normal PCS. Urine culture was positive for *E. coli* sensitive to Cefotaxime. She was treated with intravenous cefotaxime 1 gram bd for seven days. Fever resolved with the second dose of antibiotic. Repeat urine culture showed no growth. She was put on suppressive antibiotics for the remainder of her pregnancy. The rest of the gestational period was uneventful and she delivered normally at term.

There was one case of a renal tumour in this study. The diagnosis was made incidentally in routine antenatal ultrasound evaluation at 15 weeks gestational age. The patient did not have family significant family history for RCC. The patient had a 12 x 8 cm heteroechoic mass in the right kidney arising from the interpolar region. The patient was subjected to a MRI of the abdomen and pelvis. MRI revealed a heterointense mass occupying the inerpole and lower polar regions of right kidney. It was confined within Gerota's fascia. There was no evidence of PCS invasion or extension into venous system. USG guided biopsy was done and the HPE revealed a malignant tumour. The diagnosis was made as a right clear cell renal cell carcinoma stage T2 N0 M0. Right radical nephrectomy was done in the patient at 17 weeks gestational age. The patient recovered well from surgery and went on to deliver at term. The final pathology was right clear cell renal cell carcinoma pT2 N0 M0. Furhman's grade 3. After delivery the patient was followed up with CECT abdomen and was put on follow up protocol for RCC.

DISCUSSION

The total number of antenatal cases referred for urological problems in a 15 month period in this study was 63 cases. The mean and median ages of the patients were 24 years. The mean and median gestational ages of the patients were 24 weeks. The most common diagnosis was asymptomatic bacteriuria with 48% of cases[7]. The other diagnoses in decreasing order of frequency were calculus disease, symptomatic urinary tract infections, pelviureteric junction obstruction, renal tumour and pyelonephritis[1]. Majority (57%) of the referrals were for incidental findings in laboratory or imaging investigations[2]. The most common organism isolated in culture was *E. coli* irrespective of primary diagnosis[8]. 79% of calculus disease presented with symptoms and 21% were asymptotically detected calculi[9]. The most common symptom in calculus disease was loin pain (63%) and the next most common syptom was dysuria. The most common side affected with calculus disease and pyelonephritis was right side (64%). Most common location of calculus was ureteric calculi (66%). Both proximal and distal ureters had equal distribution of calculi[11]. The largest calculus was located in renal pelvis. The symptomatic proximal calculus disease patients were managed by stenting only except for pelvic calculus which was managed by PCN because of the dangers of using energy sources for lithotripsy in pregnancy and the inability to access the upper tracts in pregnancy using semi rigid instruments due to the gravid status of the uterus and altered anatomy[3]. Definitive management of distal ureteric calculi was attempted by means of ureteroscopy and calculus removal without breaking and was successful in 50% of patients[4]. Symptomatic UTIs presented primarily with fever and associated dysuria. The organism most commonly cultured was *E. coli*[5]. Two cases of PUJ obstruction presented with loin pain and were diverted with PCN with regular PCN changes. One case of pyelonephritis on right side presented with fever and right loin tenderness [6]. One case of clear cell renal cell carcinoma was diagnosed with stage of pT2 N0 M0 and managed with a radical nephrectomy[10]. No adverse obstetric events were seen during this study.

CONCLUSION

Pregnant patients pose a unique clinical scenario to the urologist in terms of specific presentations, diagnostic modalities and management options. It is essential to understand the anatomical and physiological changes in pregnancy and tailor our investigations and treatment options pertaining to the situation. The goal of management should not only include relief from the urological condition but also the continued well being of the fetus and safe obstetric management of the patient. The management decision must be made taking note of these principles to achieve a successful outcome

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