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Case Series

Acute pyelonephritis in pregnancy: a case series at Institute of Kidney Diseases and Research Centre

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ABSTRACT

Acute pyelonephritis is one of the most common indications for antepartum hospitalization, estimated at approximately 9.7% of all indications for predelivery hospitalization, and when diagnosed, conventional treatment includes intravenous fluid and parenteral antibacterial administration, and careful monitoring of fluid balance. Here, we present four cases of acute pyelonephritis in pregnancy treated and patient successfully delivered with healthy babies.

Keywords: Pregnancy, Antibacterial, Urinary tract infection, Maternal sepsis, Renal abscess

INTRODUCTION

Pyelonephritis complicates 0.5 -1% of pregnancies.¹ It is the most common cause of maternal sepsis, the third leading cause of maternal mortality worldwide.² Pyelonephritis in pregnancy is associated with significant maternal and fetal morbidities with complications including fetal growth restriction, preterm labour, preterm birth, acute respiratory distress syndrome (ARDS), sepsis, acute renal failure and maternal or fetal death. The most severe complications of pyelonephritis are sepsis and acute respiratory distress syndrome which occurs in 1.9 to 17% and 0.5 to 7% of cases respectively.^{1,3,4} The diagnosis of pyelonephritis in pregnancy is done based on symptoms of fever, flank pain and costovertebral angle tenderness, accompanied by pyuria and bacteriuria.^{4,5} Additional risk factors include prior urinary tract infections, sickle cell trait, anemia and diabetes mellitus.⁶⁻⁸

CASE SERIES

Case 1

A 19-year-old female with complaints of high grade fever, general weakness and headache since 2 to 3 days with 21

weeks of gestation came to hospital in emergency. Patient's baseline investigations were done. Patient had moderate anemia with Hb was 6.5, white blood cell count was 14230. Urine routine showed abundant pus cells 70-80 per high power field, with trace proteins and ketone bodies, nitrites and bile pigments present. Patient's c reactive protein was 302.56. Patient was further investigated. Urine culture report showed *Klebsiella pneumonia* >1,00,000 cfu/ml which was sensitive to Inj Meropenem and procalcitonin was >70 ng/ml. Patient was in septic shock. Ultrasonography was done which showed right kidney bulky and altered medullary echopattern possibility of pyelonephritis with well-defined irregular shaped hypoechoic lesion of 3x2x1 cm at upper pole of right kidney suggestive of abscess. A calculi of 4.5 mm size was seen in left kidney. Bilateral mild hydronephrosis due to pressure effect due to gravid uterus was noted. Also liver, spleen, gallbladder was mildly enlarged and minimal pleural effusion as well as peritoneal fluid collection was seen. Patient was explained about the risks of preterm delivery. Patient was treated with intravenous (IV) antibiotic Inj. Meropenem, IV fluids, IV antacid and anti-emetic. Urine output, blood pressure and temperature was monitored. Patient was given 2 units packed red cell for anemia. Urology opinion was taken and Double J stenting

was done. Patient was then stabilized and followed up. USG finding showed resolved or residual abscess in kidney. After 2 months' patient again presented with flank pain and mild fever. Urine culture report showed *Escherichia coli* infection and ultrasound findings showed mild hydronephrosis. IV antibiotic Inj. Cefoperazone and Salbactam 1.5 gm was given. Patient at 38 weeks underwent LSCS for non-progress of labour and delivered a healthy male baby. Stent was removed at 6th week post-partum.

Case 2

19-year-old patient with 33 weeks of gestation with complaints of bilateral flank pain and fever with rigors and decreased urine output since 3 days presented in obstetrics and gynecology department. After ruling out preterm labour pain ultrasonography was done. There were no complaints of burning micturition. Ultrasound findings showed mild hydronephrosis with hydroureter and B/L pyelonephritic changes with developing abscess was seen. Urine routine showed abundant pus cells 40 to 50 per high power field. Urine culture showed growth of *Escherichia coli*. Patient was treated with appropriate antibiotic according to culture report. Inj. Cefoperazone and Salbactam 1.5 gm was started. Intravenous hydration was maintained and urine output, blood pressure and fever was monitored closely. Antenatal ultrasound was done which was normal. Follow up ultrasound report showed recurrence of pyelonephritis and mild cystitis. Inj Ceftriaxone was given 1 gm 12 hourly intravenously. Patient was discharged with negative urine culture report. Antenatal visits and followup was taken. Ultrasonography showed 37 weeks' pregnancy with normal Doppler. Patient presented with pain in abdomen and leaking. Patient was delivered at 37.6 weeks and a healthy male baby of 2.9 kg was delivered.

Case 3

A 24-year-old patient with acute flank pain with 22 weeks of pregnancy came in emergency to hospital. Patient had a history of high grade fever since 2 days. Patient had complaints of burning micturition. Patient was hospitalized and further investigated. Urine routine showed pus cells 15-20 (per high power field). Complete blood count, peripheral smear for malarial parasite, dengue, widal were unremarkable. Patient had fever spike of 102°F. Urine culture report showed growth of *Escherichia coli* sensitive to Ceftriaxone. Patient was started on intravenous Ceftriaxone 1 gm 12 hourly. USG KUB was done. Ultrasound findings showed 9mm sized calculus in right vesicoureteric junction with mild hydronephrosis and hydroureter. Urology opinion was taken and patient was diagnosed with pyelonephritis. Double J stenting was done as shown in Image 1 and patients fever spikes were reduced. Patient was discharged once afebrile for 48 hrs. Patient's antenatal checkup was done routinely. Patient delivered by elective cesarean section at term for cephalopelvic disproportion with a

healthy female baby of 2.7 kg. Post-delivery DJ stent was removed.



Figure 1: Double J stent in situ.

Case 4

27-year-old patient with gravida 4 abortion 3 with triplets at 9 weeks of pregnancy with cardiac activity present in two foetuses. At 16 weeks of pregnancy her antenatal ultrasound was done. Ultrasonography showed twins with 16 weeks 3 days' pregnancy with normal scan. And bilateral ovaries were enlarged. Patient had chronic hypertension. She was on medications labetalol 100 mg TDS and Nifedepine 20 mg TDS. At 16 weeks of pregnancy cervical encirclage was done as her cervical length was 2.9 cm. At 29 weeks of pregnancy patient presented with acute flank pain, fever and constipation. 24 hr urine protein volume was 2950 ml, 24 hrs urine protein was 0.16 gm/24 hrs. spot urinary creatinine was 85.78 mg/dl and spot urinary protein was 17.2 mg/dl. Protein: creatinine ratio was 0.20. Urine routine showed 40-50/high power field pus cells and urine culture report showed growth of *Enterococcus faecalis* >1 million cfu/ml resistant to most of the antibiotics. Ultrasonography showed mild hydronephrosis. Diagnosis was done as acute pyelonephritis. Inj. Ceftriaxone was given 1gm intravenously 12 hourly. For pain Inj. Paracetamol was given. Fosfomycin sachet 3gm with 200 ml of water was given for 2 weeks. Patient's repeat 24 hr urine protein was done which was 0.05 gm/ 24 hrs. Urine culture showed no growth. USG KUB was done which was normal. Patient was cured of pain and was discharged. Routine antenatal checkup was done. Ultrasonography was suggestive of Live, intrauterine, DCDA twin pregnancy with by date 32.1 weeks, BS-1 (by scan): 31.9 weeks, BS-2: 31.5 weeks of gestation. At term patient presented with leaking and abdominal pain. Patient delivered by cesarean section with healthy male baby 2.05 kg and female baby of 2.1 kg with apgar score 7 and 8 respectively.

Table 1: Summary of all four cases of prelongephritis in pregnancy.

S. no.	Age (years)	Period of Gestation	Presenting complaints	Organism Found in urine culture	Ultrasound findings	Antibiotics	
Case 1	19	21 weeks	High grade fever, weakness, headache	<i>Klebsiella pneumoniae</i> , <i>Escherichia coli</i>	Hypoechoic lesion of 3x2x1 cm at upper pole of right kidney suggestive of abscess.	Inj Meropenum, Inj. Cefoperazone and Salbactum 1.5 gm	Double J stenting done
Case 2	19	33 weeks	B/L flank pain, fever with rigors and decreased urine output	<i>Escherichia coli</i>	Mild hydronephrosis with hydroureter and B/L pyelonephritic changes with developing abscess	Inj. Cefoperazone and Salbactum 1.5 gm	
Case 3	24	22 weeks	High grade fever, burning micturition	<i>Escherichia coli</i>	Mild hydronephrosis and hydroureter	Ceftriaxone 1 gm	Double J Stenting done
Case 4	27	29 weeks	Acute flank pain, fever, constipation	<i>Enterococcus fecalis</i>	Mild hydronephrosis	Inj Ceftriaxone 1 gm, Fosfomycin sachet 3 gm	

DISCUSSION

Acute pyelonephritis develops more frequently in second trimester and nulliparity and young age are associated risk factors.⁴ In our case all four cases are of young age of range 19-27 years. Onset is usually rather abrupt with fever of varying degrees, chills, aching pain in lumbar regions, anorexia, nausea and vomiting. *E. Coli* is isolated from urine or blood in 75 to 80 percent of infections, *Klebsiella pneumoniae* in 10 percent of cases and *Enterobacter Proteus* in 10 percent.^{9,10} In our paper first case detected *Klebsiella* and recurred with *E. Coli*.

E. Coli was present in second and third case and fourth case showed growth of *Enterococcus fecalis*. Bacteremia is demonstrated in 15 to 20 percent of women with acute pyelonephritis. Differential diagnosis included labour pain, chorioamnionitis, appendicitis, placental abruption or infarcted myoma. 20 percent of women with pyelonephritis develop renal dysfunction, thus plasma creatinine is measured. Endotoxin hemolysis is common, about a third of women develop acute anemia.¹¹ As seen in first case pyelonephritis was associated with anemia. Renal sonography is essential in nonresponder patients as it detects hydronephrosis, hydroureter and renal calculi and is easy to diagnose and treat pyelonephritis. Antimicrobial therapy is empirical, and ampicillin plus gentamicin, ceftriaxone has shown to be 95% effective in randomized trials.^{10,12} In a fourth case where enterobacter fecalis was resistant to most of the antibiotics she was treated successfully with ceftriaxone. Recurrent infection is common in 30- 40% of women following completion of treatment of pyelonephritis.¹³ Tab nitrofurantoin 100 mg is reported to reduce recurrence of bacteriuria in 8% of

cases.¹⁴ Role of DJ stenting: Oral/ intravenous antibiotics are the mainstay of treatment of acute pyelonephritis however diversion procedures may be considered in the presence of two or more of the following conditions.¹⁵ Gross pyuria, significant fever spikes despite medication, persistent loin tenderness, persistently high total count despite medication, persistently high serum creatinine, thrombocytopenia, positive blood or urine culture and HbA1c>9.2%, urinary calculi causing obstruction. In a typical DJ stenting the X-ray exposure is 10-50 milligray (mGy) which is well within the guidelines of 0.1 Gy given by Centres for Disease Control and Prevention.¹⁶

CONCLUSION

In pregnant women asymptomatic bacteriuria, if left untreated can lead to acute pyelonephritis. Awareness of the presentation of acute pyelonephritis and other serious urinary tract ailments can lead to their early management and prevent life threatening complications.

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