CASE REPORT

Pyonephrosis: A Rare Cause of Puerperal Pyrexia

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Introduction

Nephrolithiasis affects 10 % of general population and does not spare the pregnant population. Incidence of urinary tract calculi is infrequent during pregnancy with wide variation from 1 in 244 to 2000 pregnancies [1]. Although a simple stone event is usually straightforward in the general population, it is complex during pregnancy. Acute

nephrolithiasis in pregnancy may be asymptomatic or presents with many complications such as premature rupture of membrane and preterm labor. Because of imaging limitations and compartmental approach, the diagnosis is challenging. Here we are presenting one case of nephrolithiasis, which presented as preterm labor and in postpartum period developed puerperal pyrexia with giant pyonephrosis. The case report aims to review the current knowledge concerning this subject and stresses importance of a holistic approach in antenatal care.

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Case Report

28-Year third gravida with gestational diabetes mellitus on oral hypoglycemic drugs at 32-week period of gestation reported to labor room with preterm labor. Her random blood sugar was 106 mg/dl on admission. Admission test at labor room was normal, but ultrasonography incidentally revealed a large reniform hypoechoic lesion suggestive of

Fig. 1 USG of right kidney showing large reniform hypoechoic lesion suggestive of hydronephrosis

Fig. 2 CT Scan showing enlarged right kidney with urolithiasis

right-sided hydronephrotic kidney (Fig. 1). She was started on tocolysis with Tab Nifedipine 20 mg stat followed by 10 mg six hourly. Injection betamethasone 12 mg in two doses 24 h apart was given for enhancing fetal lung maturity. On day 2 of her admission, she had preterm premature rupture of membranes and Inj Ampicillin 1 g IV $\times$ 8 hourly was added. However, her preterm labor could not be arrested and she delivered a 1.32-kg male baby with APGAR of 7/10 and 9/10 who was shifted to NICU because of prematurity.

During the postpartum period, she was asymptomatic and urine culture was negative. CT scan in postnatal period showed $24 \times 14 \times 17$ cm enlarged right kidney with gross hydronephrosis and 4×2 cm ureterolithiasis at pelviureteric junction with mild hydroureter (Fig. 2).

In the puerperal period, she was on Tab Metformin 500 mg 12 hourly with good glycemic control till the 10th postnatal day when she developed sudden onset high-grade fever with chills and rigor. Since the fever had developed after 10 days, patient was started on first-line empirical

Fig. 3 HE stain (100 $\times$) showing sclerosed glomeruli and tubules show atrophy with inflammation

intravenous antibiotics and her blood and urine were sent for hematological, serological and biochemical investigation. Patient continued to have fever with right loin pain for 48 h. On investigation, her urine culture showed growth of *E. coli*, sensitive to piperacillin, and her antibiotic therapy was amended.

In view of the ibid findings, presumptive diagnosis of pyonephrosis was made and patient underwent right-sided percutaneous nephrostomy (PCN) and 1.5 l of frank pus was drained out. Patient showed remarkable recovery and became afebrile after 48 h. The pus continued to drain from the PCN site, which became sterile after 6 weeks.

Renal dynamic scan done with 185 mBqTc DTPA shows $<10\%$ split function of right kidney and with normal left kidney function. After being diagnosed with non-functioning right kidney, she underwent nephrectomy. Postoperative period was uneventful. Histopathological examination was consistent with chronic pyelonephritis (Fig. 3).

Discussion

Mild hydronephrosis is common during pregnancy. As such, renal and ureteric calculi are relatively rare complications in pregnancy. The diagnosis of asymptomatic nephrolithiasis in pregnant women does not require specific measures in most cases [2]. In pregnant women, nephrolithiasis has some particularities related to clinical manifestations, diagnosis and treatment of this condition.

There is an increase in renal size by one centimeter and cranial displacement in pregnancy. The “physiological” hydronephrosis because of hormonal and mechanical factors develops from seventh week and is more pronounced on the right side. Hydronephrosis increases urinary stasis,

acting as a major risk factor for nephrolithiasis as well as urinary infections [1]. Many factors inhibitory to the urinary crystallization are increased, but hypercalciuria in pregnant women is associated with increased urinary pH, favoring urinary super saturation by brushite and calcium phosphate stone formation, especially carbapatite [2].

Renal stones increase the risk of premature membrane rupture and 1.4–2.4 times increased risk of preterm labor [1]. Renal colic is caused by the distention of the urinary tract and kidney capsule by the stone. In a cohort of pregnant women with symptomatic urinary stones, the authors observed that the most frequent symptoms were back pain (71 %) and hematuria (57.1 %) [3].

During antenatal examination, the urine sample for urinalysis may reveal microscopic hematuria in 92.9 % of the cases of urolithiasis. Additional tests such as serum creatinine, to estimate kidney function and CBC to assess possible evidence of systemic infection, may also be carried out [4].

Because of teratogenesis, non-contrast abdomen CT scan, although considered the gold standard, is avoided during pregnancy, especially in the first trimester, so we did that after delivery in our case. Total abdominal ultrasound (TAS) examination should be the initial image test as it has a high specificity of 90 % for the diagnosis of urolithiasis, but the sensitivity of this method is quite low (11–24 %) [3]. Though TAS may not give a conclusive diagnosis, it can demonstrate indirect signs of obstruction, notably ureterohydronephrosis, the degree of hydronephrosis, absence of ureteral stream or increased renal artery resistivity index [1, 3]. If we can add TAS visualization of renal pelvis during second-trimester anomaly scan, lot of the asymptomatic cases can be labeled as high risk of preterm labor. In our case, antenatal USG could not detect any ureteric calculi in the setting of giant hydronephrosis. But puerperal CT scan had detected ureteric calculi.

After analgesia and clinical compensation for the pregnant women, one should rule out UTI, acute kidney failure and preterm labor. Antibiotic prophylaxis is recommended in pregnant patients with symptomatic urolithiasis, as there is a significant risk of urinary tract infection with an incidence as high as 52.4 % [5].

Pyonephrosis is again a very rare disease, and upper urinary tract infection and obstruction play a role in its etiology. Clinical presentation of patient varies from asymptomatic bacteriuria to sepsis. Most common

symptoms are fever, chills and flank pain [4]. Our patient did not present with any of these symptoms or was possibly masked by preterm labor at the time of admission, but in the puerperal period became symptomatic with features of urosepsis, fever and mild flank pain.

Antibiotics have no effect in pyonephrosis unless the pus is surgically drained. Percutaneous nephrostomy and urethral catheter insertion is therefore necessary. Thus we too proceeded with the same. Studies show percutaneous drainage to be a fast, trusted and effective diagnostic and therapeutic method as in our case [3].

Giant pyonephrosis is rare in the present era due to the advanced diagnostic methods and modern treatment. This is probably the first reported case of asymptomatic giant hydronephrosis with ureteric calculi antenatally developing into a giant pyonephrosis with non-functioning kidney in puerperium, as we were unable to find any similar case in the literature.

This case illustrates the nuisance of compartmental approach at antenatal care exhibited these days. Thus, it is important to visualize the adnexa and kidney too, during routine antenatal scan during the first and the second trimesters, which can be done with minimal effort and detect any form of obstructive uropathy.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical standards All procedures followed were in accordance with the ethical standards and informed consent was obtained from the patient.

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