Three Successive Pregnancies in a patient with Chronic Kidney Disease

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Abstract:

A 30 year old female soon after marriage was diagnosed as chronic kidney disease (CKD) with bilateral small kidneys of unknown etiology. Serum creatinine was 2.0 (estimated creatinine clearance 43 ml/min). She underwent three successive pregnancies and all were live deliveries. During all the three pregnancies the blood pressure was well controlled. In the first and second pregnancies serum creatinine remained stable. During third pregnancy and soon after delivery renal function started deteriorating and preterm cesarean delivery was needed at 34 weeks. Pregnancy in CKD can be well tolerated if renal impairment is mild or moderate and blood pressure is well controlled. With more advanced renal impairment the outcome for both mother and fetus is unfavorable

Introduction:

When a woman with CKD becomes pregnant two aspects need to be attended to: how the pregnancy affects the kidney disease progression and what will be the effect of kidney disease on the outcome of pregnancy. The present case gives a fair chance of studying the reciprocal effect in three successive pregnancies.

Case Report:

A 30 year old female soon after marriage in 2003 was found to have hypertension. Blood pressure was 150/100 mm Hg; urinalysis showed proteinuria ++, red blood cells 2-4/high power field and white blood cells 20-30/hpf. Proteinuria was 1.4 g/day, serum urea 57 mg/dl, serum creatinine 2.0 mg/dl, hemoglobin (Hb) 9.8 g/dl. Urine culture showed growth of E.coli. Both kidneys were small on ultrasonography. She was diagnosed as chronic kidney disease (CKD) stage 3 (creatinine clearance 43 ml/min). Blood pressure was controlled with losartan 50 mg/d. Subsequently she underwent three pregnancies.

First pregnancy:

During pregnancy blood pressure was well controlled with amlodipine. She had first delivery on 26-1-2005. It was full term (37 weeks) normal delivery. On follow-up on 11-11-2006 BP was 150/100 mm Hg. Urinalysis showed proteinuria and microscopic hematuria, 24 hour proteinuria of 0.8 g, serum urea 45 mg/dl, creatinine 2.1 mg/dl, uric acid 10.5 mg/dl and hemoglobin 10.2 g/dl. Treatment with losartan 50mg/d and hydrochlorothiazide 12.5 mg/d was initiated. On next visit on 5-1-07 she had amenorrhea of 6 weeks.

Second pregnancy:

Soon after diagnosis of pregnancy losartan was changed to amlodipine and aspirin 75 mg/day was added. The investigations were serum urea 40 mg/dl, creatinine 2.2 mg/dl, uric acid 8.5 mg/dl and 24 hour proteinuria 0.75 g/dl. The need of regular follow-up with an
obstetrician as well was discussed. Blood pressure was well controlled with amlodipine. Target BP was 130/80. On last follow up investigations were serum urea 48/dl, creatinine 2.2 mg/dl, uric acid 11.2 mg/dl, hemoglobin 10 gm/dl. Cesarean delivery was conducted at 36 weeks on 11-8-07 and the baby weighed 2500 gm. Following delivery antihypertensive therapy with losartan and hydrochlorothiazide was resumed and aspirin discontinued. On follow up on 24-10-07 BP was 135/80 mmHg, Hb 10.2 g/dl, serum urea 68 mg/dl, serum creatinine 2.4 mg/dl. The renal function remained stable on follow-up and BP was well controlled.

**Third pregnancy:**

Soon after diagnosis of third pregnancy losartan was changed to amlodipine and therapy with aspirin 75mg/d initiated and continued throughout pregnancy. The expected date of delivery calculated on ultrasonography was 30-4-09. Close monitoring of BP and renal function and follow up with obstetrician was advised. Serial BP, Hb, serum urea, creatinine and uric acid levels on follow up during third pregnancy are presented in table. During this pregnancy therapy with erythropoietin 4000 IU subcutaneously weekly was initiated. Preterm delivery at 34 weeks was performed by cesarean section on 12-4-09 (also underwent tubal ligation at the same time). The baby weighed 2500 gram. Following delivery antihypertensive medication with losartan was resumed and aspirin discontinued. Follow up on 18-5-09 showed BP 130/80 mmHg, Hb 8.5 g/dl, serum creatinine 3.6 mg (creatinine clearance 23 ml/min), and uric acid 8.5 mg/dl. On last follow up on 19-8-09 serum urea was 76 mg/dl, creatinine 4.5 mg/dl, uric acid 7.4 mg/dl and Hb 8.4 g/dl.

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<th>Date</th>
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<th>S. uric acid (mg/dl)</th>
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Table 1. Serial blood pressure (BP), hemoglobin (Hb), serum urea, creatinine and uric acid in third pregnancy.

**Discussion:**

The effect of pregnancy on fetal outcome depends on the level of renal impairment, presence of hypertension, proteinuria and infection (1). There is a gestational increase in glomerular filtration rate (GFR) in normal pregnancy which is attenuated in moderate renal impairment and is absent if serum creatinine is more than 2.3 mg/dl (1, 2). The first two pregnancies were well tolerated with stage 3 CKD without any significant worsening of renal function. Severe hypertension can lead to worsening of renal function, premature delivery and poor fetal outcome and blood pressure control remains the cornerstone of successful treatment of CKD in pregnancy (3). Well controlled blood pressure might have significantly
contributed to the stability of kidney function and successful pregnancy outcome. Renal function though impaired remained stable during all the pregnancies but progressively worsened soon after delivery of the third pregnancy. This observation corroborates well with those of other authors who have noted an accelerated decline in renal function during or following pregnancy. In addition development of preeclampsia in more than 40 percent of pregnancies was noted (4, 5) as in the present case.

In pregnancy with normal or mildly impaired renal function (CKD stages 1 and 2) and well controlled blood pressure live birth rate is above 90 percent (6). Third pregnancy was terminated at 34 weeks by cesarean section in view of pre eclampsia and intrauterine growth restriction. Preterm delivery is mostly related to intervention for pre-eclampsia and intrauterine growth restriction as noted in other studies (4, 7).

In a prospective study in women with CKD stages 3-5 with estimated GFR<40 ml/min/1.73 m² and proteinuria more than 1g/day before pregnancy an accelerated decline in renal function and poor fetal and maternal outcome was noted(8) Many women with moderate renal insufficiency may have an irreversible decline in GFR greater than predicted in natural course of the disease (9,10).

Current consensus suggests the degree of renal insufficiency rather than the underlying renal disease as primary determinant of outcome(11).Baseline renal function ,presence of hypertension ,proteinuria and urinary tract infection are the determining factors for pregnancy outcome and not the etiology except lupus nephritis (10,12,13).

Anti hypertensive medications safe in CKD are methyldopa, labetolol, calcium channel blockers and alfa blockers. Angiotensin converting enzyme inhibitors and angiotensin receptor blockers are contraindicated and should be discontinued once pregnancy is confirmed. Low dose aspirin should be commenced and continued till delivery (3) as was done in the present case. Reduction in hemoglobin occurs in CKD and worsens in pregnancy. Erythropoietin may be needed and has been safely used in pregnant patients on dialysis (14, 15).

In the first and second pregnancy erythropoietin was not used since hemoglobin remained above 10g/dl.In the third pregnancy erythropoietin was used after 20th week of pregnancy since hemoglobin was declined to 8.0 g/dl. Use of erythropoietin was safe and no fetal abnormalities were detected. Erythropoietin was continued even after delivery.

In conclusion in the present case with moderate renal failure (stage 3 CKD) two pregnancies were well tolerated. In the third pregnancy there was a premature delivery and renal function started deteriorating soon after delivery.

REFERENCES


Conflict of Interest: None
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