

Pregnancy On Chronic Dialysis Patients: A Case Series

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ABSTRACT

Background: Pregnancy in patients with chronic dialysis is uncommon due to various factors, one of it is the increasing incidence of CKD among women in reproductive age. Even if pregnancy occurs, the risks and complications that may arise during pregnancy present a challenge in managing the patient. Risks to the child such as congenital abnormalities, premature birth, low birth weight, and even fetal death can still occur if the mother's kidney failure management is not optimally provided.

Case illustration: Two patients who had been undergoing hemodialysis for about 2.5 years, discovered their pregnancy after the second trimester. Subsequently, the patient underwent dialysis for 15 hours/week, received PRC transfusions, erythropoietin injections, antihypertensive medications, and multivitamins. The babies were being delivered via cesarean section (C-section) with a birth weight of 1600 and 1800 g. The patients were discharged within the first week post-C-section without complications and continued dialysis twice a week, while the baby was admitted to the NICU for stabilization.

Discussion: Many literatures recommended increased hemodialysis sessions up to 20 hours per week during pregnancy to improve maternal and fetal outcome. With limited resources in our center and our universal health insurance, we can only give these patients 15 hours of dialysis per week. Nevertheless, we can maintain BUN below 50 and SBP about 140-150 mmHg. The problem in this patient was the Hb level that keeps decreasing despite ESA injection, supplement, and PRC transfusion. The baby of the second patient was having CTEV, small secundum ASD, mild TR, and hypoganglionosis. She discharged after about one month admitted in the NICU.

Conclusion: Even with recent advances in CKD management resulting in increased prevalence of pregnancy, it still a relatively high-risk event. Provision of multidisciplinary team along with good quality of universal health coverage are necessary to manage these cases.

Keywords: pregnancy, women, child, chronic kidney disease, renal failure, dialysis, hemodialysis, hypertension, universal health coverage.

INTRODUCTION

Although unusual, pregnancy in chronic dialysis patients does occur and the incidence of pregnancy in chronic dialysis patients may be increasing [1]. Despite many advances in the last decades, pregnancy in a woman on dialysis remains a relatively high-risk event [2]. Women with CKD require specific management during pregnancy. Women on dialysis have both lower fertility rates and a higher rate of unsuccessful or complicated pregnancies due to hypertension, preeclampsia, anemia, miscarriage, polyhydramnions, prematurity and intrauterine growth restriction [3]. A successful outcome depends on a close collaboration between the patient, nephrologist, dialysis nurse, dietician, obstetrician, and neonatologist [1].

CASE REPORT

Case 1

A 41 year-old female who had been undergoing chronic dialysis since the previous 2 years complained of delayed menstrual cycle and abdominal enlargement. She was scheduled for abdominal USG and discovered a single pregnancy about 28-30 weeks of gestational age. She was managed comprehensively with a team of OBGYN and nephrology ever since.

She had been married for 18 years with two children. The first delivery was caesarean section due to post date pregnancy and severe oligohydramnion. The baby was healthy and aged 17 year-old at the time of the third pregnancy. The second delivery was 13 years later also with C-section at the 7th month pregnancy. She used IUD after the firstborn and changed to monthly hormonal injections after the second one. She had history of hypertension since the age of 27 but she did not routinely take the medication. One year before she start dialysis,

she had severe low back pain caused by ruptured and infected cyst of the kidney. She underwent surgery and monitored by urology outpatient departement.

She was referred to nephrology departement after the renal function continued to decline after the surgery. She was found to have bilateral polycystic kidney, stenosis of right hilar artery, right segmental artery, and slight stenosis of left segmental artery of the kidneys. She then advised to have hemodialysis twice a week and increased to be three times a week after we discovered the pregnancy.

The fetomaternal sonography assessment was found favourable and she was planned to have C-section after the gestational age reached 34 weeks minimum, as long as the clinical and laboratory findings were within target range. Her blood pressure were normal without antihypertension medication, her hemoglobin level were also above 10 g/dL, and BUN were maintained under 50 mg/dL. The baby was born with 1600 gr and 38 cm, and APGAR score was 6-7. She spent almost 1 month in the NICU before transferred to ward and finally discharged in good condition.



Figure 1. Abdominal sonography result with single fetus and polycystic kidneys.

Case 2

A 34 year-old Javanese female who had been undergoing hemodialysis for 2.5 years complained of gradual abdominal enlargement within the last few months. She also mentioned about missing her menstrual periods but after she checked with OTC pregnancy test, the result came back negative. She was advised to have abdominal sonography where finally we found out that she was pregnant with single fetus, alive and gestational age about 20-22 weeks.

The current pregnancy was her third, with her firstborn was 9 years ago, a male, healthy, and without any complication during pregnancy nor during delivery. She had history of eclampsia in her second pregnancy when she had caesarean section at 8 months gestational age and the baby was passed away after one month care in the NICU due to complication of hydrocephalus and sepsis. She had IUD implanted after the second delivery but spontaneously expelled few months later when she was having her period. She found out that she was pregnant before she has time to reinsert the IUD.

She was consulted to the fetomaternal outpatient department to monitor her pregnancy and found no major congenital abnormalities of the fetus during the sonography. She has her laboratory checked regularly to monitor the hemoglobin, renal function, and electrolyte level within the recommended range. The dialysis frequency was increased to three times per week, about 13.5-15 hours/week, QB 150-200 mL/min, QD 500 mL/min, minimal heparin, and ultrafiltration adjusted to gestational weight and IDWG at the time. She had 2 packs of PRC transfusion in two different times to reach hemoglobin level as close to 10 g/dL.

She also underwent echocardiography with result hypertensive heart disease and normal systolic function of left ventricle (EF Biplane 57%). She received Metildopa 3x500 mg, Nifedipin 3x10 mg, Ferrous sulfas 2x200 mg, and calcium lactate 2x500. Her blood pressure was maintained between 130-150 mmHg.



Figure 2. Abdominal USG result with visible fetus.

Table 1. Laboratory result monitoring throughout pregnancy

Test	5/6	3/7	7/8	4/9	8/10	21/11	23/11	3/12	12/12	31/12	1/1	4/1	5/1	Normal
Hb	7,6	7,6	7,9	6,3	8,9	6,3	8,2	8,9	9,3	8,0	8,3	7,7	9,7	11-14,7 g/dL
BUN	46,8	-	-	88	24	38	22	34,1	32	29	25	22	-	7-20 mg/dL
Cr	9,8	-	-	14,4	4,3	6,2	3,3	5,17	5,1	4,7	3,7	2,8	-	0,5-1,2 mg/dL
eGFR	4,6	-	-	2,9	11,8	7,7	-	-	136	138	137	-	-	mL/min/1.72m ²
Na	-	-	-	139	133	137	-	-	3,8	3,7	3,8	-	-	135-145 mmol/L
K	-	-	-	4,2	2,9	3,9	-	-	99	100	98	-	-	3,5-5,0 mmol/L
Cl	-	-	-	92	90	98	-	-	-	-	-	-	-	98-107 mmol/L
Ca	-	-	-	7,6	11,3	-	-	-	-	-	-	-	-	8,5-10,5 mg/dL
P	-	-	-	6	2,61	-	8,2	8,9	9,3	8,0	8,3	7,7	9,7	2,5-4,5 mg/dL
SI	45,1	58	-	85	104,7	94	-	-	-	-	-	-	-	50-150 ug/dL
TIBC	217	215	-	295	322	385	-	-	-	-	-	-	-	150-450 ug/dL

We had multidiscipline discussion on how to manage this patient with conclusions to terminate the pregnancy around 34-35 week of gestational age. Two days before the expected date, the patient experienced of frequent contraction and amniotic fluid leakage that brought her to the ER. She was admitted with conservative treatment and expected to have the delivery as planned. The process was relatively uncomplicated, the baby was female, 1800 gr with APGAR score 6-7 and proceed to NICU for further care and monitoring. Later, she was found to have CTEV at the left foot, small ASD, mild TR, but she was thriving and discharged after about 40 days with body weight 2100 gr and body length 44 cm. The mother was discharged after 5 days postpartum with dialysis returned to twice a week.



Figure 3. The baby was born 1800 gr in 34 weeks gestational age

DISCUSSION

The development of tools to assess kidney function as well as dialysis adequacy may be contributing to a less “uremic” or more “normal” hormonal milieu in premenopausal women with chronic kidney disease and potentially affecting fertility[4]. The introduction of erythropoietin has been associated with the return of normal menses [5]. Those factors could probably increase the prevalence of pregnancy in chronic dialysis patients. This patient was still in her early 30's when she started dialysis. There was also no history of other diseases that could be underlying her CKD. She had severe preeclampsia on her second pregnancy that made her had to had dialysis due to acute kidney injury. The renal function did not recover after a few weeks observation, so she had to underwent routine dialysis.

It is recommended to increase the frequency and duration of dialysis to a minimum of 20 hours per week, to reduce the risk of unfavourable outcomes such as preterm birth and small gestational age (SGA) [6]. The goal of dialysis intensification is to achieve better clearance of uremic toxins, increase ultrafiltration rate, reduce the risk of high blood pressure and cardiac hypertrophy and improve endothelial function [7]. Since there are limited resources in our healthcare facility, we could not provide the recommended amount of dialysis for this patient.

Nevertheless, we still managed to maintain BUN < 50 mg/dL throughout the pregnancy with $\pm$ 15 hours of dialysis per week. We hope with that duration we still manage to reduce the risk of polyhydramnion, hypertension, small for gestational age (SGA), prematurity, maternal malnutrition, and increasing the possibility of live birth.

The second case with hypertension, the systolic blood pressure was stable between 120-140 mmHg and diastolic blood pressure was between 80-90 mmHg, with methyldopa and nifedipine. Hemoglobin level tended to be low, even with PRC transfusion and erythropoietin injection 3000 IU twice per week. The iron (SI, TIBC) was still within normal limit. Possibly the dose of erythropoietin should be increased, but due to our limitation we can only provide twice per week.

The amount of ultrafiltration was adjusted to body weight target according to gestational age. Dry weight is expected to increase by approximately 0.5 kg/week during the second and third trimesters. But the patient often came with stationary bodyweight, even sometimes decreased a few ounces. So, we adjust the ultrafiltration accordingly. The QB was between 180-200 ml/min and the QD was 500 ml/min. Ultrafiltration rates of 6–8 mL/kg/h during HD sessions did not have any serious negative effects on fetal middle cerebral, placental, and umbilical artery blood flow. Although evidence for adjusting renal-replacement therapy to target a specific BUN threshold is not strong, some experts suggest aiming for a BUN target of less than 35 mg/dL. Ultrafiltration goals should be adjusted according to the patient's clinical situation and blood pressure to avoid hypotension and hypertension episodes. The primary focus during dialysis should be to minimize hemodynamic instability and decrease in adverse pregnancy outcomes [6].

In pregnant women with residual kidney function, the physician should prescribe the dialytic regimen according to urine output (>1 L), time on dialysis (<1 year), and most importantly mid-week pre-dialysis urea (<35 mg/dL). However, to achieve a successful pregnancy, the physician must evaluate not only biochemical parameters but also obstetric parameters such as fetal growth and amniotic fluid volume [6]. Due to the high intensity of electrolyte exchanges in the HD regimen, it is recommended to use dialysate with potassium 3.00 mmol/L, calcium 1.50 mmol/L, and high bicarbonate (28–32 mmol/L) [8].

Frequent dialysis sessions may lead to a decrease in magnesium levels, which is associated with hypertensive disorders of pregnancy and uterine contraction. Therefore, oral supplementation of magnesium may be necessary [9]. Heparin is considered safe for use during dialysis sessions in pregnant women as it does not cross the blood–placenta barrier [10]. It may be difficult to distinguish excess fluid gained between dialysis sessions from weight gain due to pregnancy-associated weight gain throughout the pregnancy. So, we must be very cautious in determining how much ultrafiltration we give to the patient on dialysis [11].

We collaborate with obstetricians to monitor the fetal growth, the risk of developing pre-eclampsia of the mother, and planning of labor. The fetal bodyweight tends to be low during the monitoring, but there were no polyhydramnion nor major congenital disorder found in the sonography. At the 33rd week, the patient experienced amniotic leakage and abdominal cramps, so she went to the hospital. The obstetrician still tried conservative treatment with strict monitoring and managed to keep the baby until due date as previously planned. The prematurity, low birth weight and congenital abnormality found in the baby were commonly found in a pregnancy with many comorbidities as this patient. The uremic milieu, anemia, relative maternal malnutrition, hypertension, are most possible to be the cause of the condition. With many limitations in our healthcare facility, pregnancy in chronic dialysis patients proven to be unfavourable with higher possibility of complications for the development of the fetus. In other condition, if a chronic dialysis patient still want to have a baby, we should prepare their condition as early and good as possible to facilitate good environment for the baby to grow and developed until delivery.

CONCLUSION

Pregnancy in dialysis patients is challenging but achievable with intensive multidisciplinary care. Continuous clinical and ultrasound monitoring is critical. Maintaining hemoglobin level > 10 g/dL, BUN < 50 mg/dL, BP < 140/90, and dialysis prescription adjusted as the condition of the patient. Planning for pregnancy carefully is recommended post-renal transplantation to minimize risks.

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