

# Pregnancy in chronic dialysis, late diagnosis, and other problems

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**Abstract.** The incidence of pregnancy in patients with chronic kidney disease (CKD) undergoing hemodialysis is rare. For pregnant patients with CKD undergoing regular hemodialysis, the effects of renal disease on the fetus should be noted and require specific strategies. A 30-year-old woman had no menstruation for 4 months. Abdominal ultrasound showed single fetus within 16 weeks of pregnancy. She had previously been in regular hemodialysis twice a week since 2015, then the frequency of hemodialysis was increased to thrice a week for 4 hours/dialysis. During pregnancy, she was given erythropoiesis stimulating agent, controlled protein nutrition (0.6-1.5g/kg/day) and routine pregnancy controls to an obstetrician. After 31-32 weeks gestation, the baby was born alive with low birth weight (1800g). Maintaining pregnancy in women with regular hemodialysis is still challenging and difficult. Prolonged/intensive dialysis during pregnancy results in longer gestational periods, higher fetal weights, and a higher likelihood of survival. Based on a dialysis guideline for pregnancy in CKD, hemodialysis is performed at least 20 hours/week to maintain pre-dialysis of BUN  $\leq$  50mg/dl; hemoglobin should be at least 10-11g/dL. We reported a case of pregnancy in dialysis CKD patient undergoing hemodialysis thrice a week (4 hours/dialysis). The baby was born alive with low birth weight (1800 g).

## 1. Introduction

Although rare occurrence, there has been an increase of pregnancy in chronic dialysis patient.[1] Pregnancy occurs in 3% of all fertile age women undergo chronic dialysis, and despite being a gift, nephrologist should worry about the troublesome complications.[2] First successful pregnancy and labor happened in 1970 and considered as a great accomplishment.[3]

While in reality, even with the high mortality rate in premature birth and low birth weight, there was a high rate in successful labor with survival rate (per decade) 23% in 1980 → 50% in 1998 → 90% in recent years.[4]

Most of the hemodialysis (HD) patients, men or women, are susceptible to sexual dysfunction because of physical and emotional problems. Psychosocial factors could cause such distress, depression and in the end decrease in libido.[5] Some of the challenges faced by a pregnant woman in chronic dialysis are: 1) Blurred diagnosis because of high gonadotropin serum level ( $\beta$ -HCG) in chronic kidney disease (CKD) patient even without pregnancy. Ultrasonography could be the helper here, and also to determine the gestational age. 2) How to maintain the pregnancy. Today, maternal prognosis in chronic dialysis is quite good. Spontaneous abortion still happened though (21% during 2nd trimester). Most often complications are premature birth and low birth weight. 3) Intensive HD



play an important role by giving a suitable environmental condition for normal placental growth, as needed for the baby to reduce complications. Pregnant woman in chronic dialysis who received more frequent HD as the results had better successful labor rate, longer gestational time, and higher birth weight.[1,3,6]

## 2. Case report

Mrs. D, a 30-year-old woman undergoing chronic dialysis with the main complaint of stomach swelling and amenorrhea for 4 months. She never thought of pregnancy because of urine strip examination always showed negative results in previous months. Abdominal ultrasound demonstrated a single, intrauterine fetus,  $\pm 16$  weeks gestational age. From physical examinations, the patient looked anemic with a slight increase in systolic blood pressure (140 mmHg) and pretibial edema. Laboratory showed Hb 7.1 g/dl, Calcium 7 mEq/L, Phosphor 2.3 mEq/L, and the other results were within normal range for CKD patient. She underwent HD twice a week since 2015, with 4-5 hours duration per session.

After pregnancy was diagnosed, her HD frequencies were increased to three times a week. She refused to undergo more HD times per week, even when she had a spiked level of blood urea nitrogen. Her lowest level of urea was 79 mg/dl pre-dialysis and 24 mg/dl post-dialysis (URR 69%). She also had problems with severe anemia (Hb 4.5 g/dl) and high blood pressure (systolic blood pressure more than 200 mmHg) often in her last trimester.

During follow up, she had received a blood transfusion, a regular dose of erythropoiesis stimulating agent (ESA) per HD session, mineral supplements such as iron and calcium, vitamins, folic acid, controlled HD, controlled diet (in salt and protein intake) and routine prenatal care to an obstetrician.

After 31-32 weeks of gestation, she gave birth by operation procedure due to placenta previa. While her baby is born with low birth weight (1800 g), until recently, her baby is in good health.

## 3. Discussion

Menstrual problems and abdominal discomfort in chronic dialysis women are often misjudged as another hormonal problem and not as pregnancy by a physician. This confusion came from the thought that HD women must be in low fertility condition, because of hypothalamus – hypophysis dysfunction related to chronic anemia and malnutrition.[2]  $\beta$ -HCG hormone produced by somatic cells will be eliminated by the kidneys, which in CKD patients the level will be increased. USG should always be used if there was a doubt about the diagnosis.[1] In this case, an ultrasound performed to confirm pregnancy.

To achieve a healthy pregnancy and successful labor in a chronic dialysis patient, we need a proper management in anemia, blood pressure control, dialysis procedure, hydration status, and more importantly nutritional status. Severe anemia could occur in pregnancy because of the expansion in plasma volume (3-4L) without the increase in erythrocyte. Normally, erythropoietin level will increase in the first trimester to boost erythrocyte, which is not the case in CKD patient. Thus, erythropoietin dose should be increased to 50-100% to maintain hematocrit target of 33-36%. Until now, long-term use of ESA has not been related to the fetal defect. Also, during pregnancy, mother and baby will need at least 800-1000mg of iron supplement.[1,7] In this case, blood transfusions, regular ESA, mineral, folic acid and vitamins supplement given to the mother.

Hypertension can make serious complications in pregnancy. Mother diastolic blood pressure must be maintained between 80-90 mmHg. As in non-pregnant dialysis woman, the first step in the treatment is to make sure there is an adequate volume movement through dialysis. Also, in a pregnant woman, to determine correct dry weight means to preserve mother's health.[8] In this case, the mother took tolerable anti-hypertension drugs such as CCB's and methyldopa, as well as controlled salt diet.

The longer duration or intensive HD during pregnancy will result in longer gestation and better birth weight. The recommendations are to increase HD frequencies to at least 20 hours per week to achieve less than 50 mg/dl predialysis level of blood urea nitrogen. It is also to facilitate volume control by ultrafiltration. Another problem is a severe decrease in amnion fluid volume because of

dialysis itself, hypertension or hypotension during dialysis. A challenge that can be answered by managing HD duration and frequencies.[1,2,7] In this case, more frequent HD session and controlled HD recipes were performed, although patient refused to add more than 3 times a week HD session. Careful HD recipes are given by taken her dry weight, interdialytic weight gain, and comorbid conditions into account each HD session.

Nutritional management also an important factor to keep mother and baby healthy. Controlled protein diet (high or low) and enough calories during pregnancy.[9] In this case, the mother had controlled diet.

**Table 1.** Recommendation of management for pregnancy in chronic dialysis.

<i>Factor</i>	<i>Recommendations</i>
Anemia	
Hemoglobin	10-11 g/dL; requires increase in erythropoietin dose by 50%-100%
Iron saturation	maintenance intravenously iron to keep iron saturation >30%; administer in small doses
Folate	1 mg/d
Hypertension/hemodynamics	Avoid maternal hypotension or volume depletion; increase EIW by about 0.5 kg Per week; requires close clinical follow-up and frequent assessments 2nd-3rd trimester
Hemodialysis prescription dialysate	Nonreusable, biocompatible, smaller surface area dialyzer to reduce ultrafiltration rate per treatment
Predialysis BUN	To avoid metabolic alkalosis use 25 mEq/L HCO <sub>3</sub> bath;
Frequency of treatments	To avoid hypokalemia use 3-4 mEq/L potassium bath
	Add phosphorus to dialysate as needed to keep predialysis phosphorus 4-5 mg/dL
	keep less than 45-50 mg/dL
	5-6 a week; daily nocturnal hemodialysis and hemodiafiltration also possible
Nutrition	
Protein intake	1.5 g/kg/d in HD; 1.8 g/kg/d in PD
Caloric intake/fluid intake	30-35 kcal/kg/d/750-1,500 mL/d
Calcium	1,500 mg d; usually achieved with 2.5 mEq/L calcium dialysate; measure and Supplement 25OH vitamin D every trimester
Phosphorus	oral, or may add to dialysate
Vitamins	Vitamin C, thiamine, riboflavin, niacin, vitamin B <sub>6</sub> , folate
Preterm labor	Consider progesterone for prevention; tocolysis with indomethacin (short term), Magnesium, keep serum level <5 mg/dL, or calcium-channel blocker
Obstetric/fetal monitoring	nonstress testing, ultrasounds, close obstetric, and neonatal care

As for complications, premature birth happened to 80% of HD patients, which became the most important factor that caused neonates mortality and permanent organ damage (respiratory, neurologic, ophthalmologic). Premature birth is usually happening due to polyhydramnios and abruption in the placenta. Another complication is low birth weight.[1,8,10] In this case, premature birth occurred with placenta previa. The baby had low birth weight (1800 g).

#### 4. Conclusion

A case report of pregnancy in 30 years old woman undergoing chronic dialysis. Although there was delay in diagnosis and complications such as severe anemia and low birth weight, until recently, both mother and baby are in good health.

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