

# Pregnancy outcome during haemodialysis: a case report

**Caterina Cosimo**  
**Ciro Franco**

Artemisia Fetal Maternal Medical Centre, Rome (Italy)

Corresponding Author: Franco Ciro  
V. Raffaele Calzini, 14 (F24)  
cap: 00159; Roma - Italy  
e-mail: francociro@tiscali.it  
tel.: +39 3495565247; fax: +39 06233207477

## Case Report

A 29-year-old white woman, nulliparus, affected by systemic lupus erythematosus since she was nine years old. Her renal insufficiency became evident when she was 24-y, thus she underwent haemodialysis twice a week.

She was admitted to our clinic at 8th week of amenorrhea. Ultrasonography revealed a single pregnancy and the Crown-Rump Length (10 mm) was correspondent to the median values for the 7th week of gestation<sup>1</sup>. Her medical therapy was: calcium channel blocker [nifedipina (30 mg x 2/day)], folic acid (4 mg/day), acetylsalicylic acid (100 mg/day), erythropoietin (4000 UI/ twice weekly), heparin i.v. and sodium ferrous gluconate i.v. during haemodialysis, calcium bicarbonate (2 grams o.s./day). Her blood counter showed a condition of moderate anaemia (RBC: 3.3\*10<sup>6</sup>/mL; Hb: 10 g/dL; WBC: 8.05\*10<sup>3</sup>/mL; Hct: 29,8%; MCV: 90 fL; PLT: 215\*10<sup>3</sup>/mL). Other blood tests were: BUN: 126 mg/dL; creatinine: 7.4 mg/dL; uricemic acid: 5.8 mg/dL; Na+: 134 mEq/L; K+: 4.5 mEq/L; Cl-: 105 mEq/L; Ca++: 9.8 mg/dL. Her blood pressure values were at the upper limit despite therapy (median value: 140/85 mm-Hg). At 17th week of gestation the ultrasonography revealed that the size of lateral ventricular diameter (mm 9) was at the upper limit for gestational age while biometry of the fetus was normal. The blood tests didn't change. At 20th week of gestation the ultrasonography confirmed previous foetal biometry, a normal morphology and the measure of lateral ventricular diameter corresponding to the upper limit for gestational age, showing also an increased amniotic fluid index. Thus at 21st week the woman underwent to Nuclear Magnetic Resonance that was negative for fetal malformation but it confirmed polyhydramnios. After medical team consultation, she underwent to daily haemodialysis because of polyhydramnios.

At 25th gestational week, echocardiography didn't show anomalies but ultrasound examination confirmed again polyhydramnios while the cervical length was 20 mm. Because of uterine activity, the woman was admitted in our hospital and she started tocolysis (ritodrina i.v.).

At 28th gestational week the fetal biometry showed a growth corresponding to the 50° centile of Lubchenco's

curves<sup>2</sup>, an estimated foetal weight of 1260 grams (+/- 10%); the amniotic fluid was abnormal and foetal-maternal Doppler velocimetry was normal.

At 29th week i.m. therapy with betametasone (12 mg x 2 day) was administered to induce foetal lung maturity. At 32nd week the foetal growth corresponding to the 25° centile (2), an estimated weight of 1630 gram (+/- 10%) and fetal-maternal Doppler velocimetry was normal.

At 33rd gestational week the woman underwent to caesarean section because of starting labour. The newborn, female, well-being baby of which weight was 1530 grams and APGAR score was 8/9 at 1st and 5th min. During the second day post-delivery maternal blood tests were: WBC: 10.2\*10<sup>3</sup>/mL; RBC: 3.03\*10<sup>6</sup>/mL; Hb: 10.2 gr/dL; Hct: 30.5%; MCV: 100 fL; PLT 228\*10<sup>3</sup>/mL; ATIII: 73%; creatinine: 5.90 mg/dL; uric acid: 5.90 mg/dL; proteines: 5.7 grams/dL; albumin: 3.10 grams/dL; Na+: 140 mEq/L; K+: 5.0 mEq/L; Cl-: 106 mEq/L.

Currently, there isn't evidence of fetus-neonatal pathology and the patient follows a twice weekly haemodialysis treatment, like before pregnancy.

## Discussion

Women with end-stage renal disease have markedly reduced fertility. Uremia-associated hypothalamo-pituitary dysfunction and malnutrition generally result in amenorrhea or irregular anovulatory menstrual cycles (3, 4, 5, 6). Since the first description of conception and a successful delivery in a woman receiving hemodialysis by Confortini et al. (7), further case reports and registries followed. In 1980 the European Dialysis and Transplant Association (EDTA) reported a pregnancy incidence of 0.9%<sup>8</sup>. Recent publications, between 1992 and 2003, report pregnancy in 0,75-7 % in women on chronic dialysis (1, 4, 9). Common complications are abortion, intrauterine growth retardation, fetal death, polyhydramnios, premature delivery while commonly, maternal health complications are pre-eclampsia, hypertension and severe anaemia (3, 4, 10).

Direct consequences of haemodialysis in pregnant women may be a severe reduction of amniotic fluid due to a impairment of liquid removal and hypertension or hypotension during dialysis that should cause ischemic fetal-maternal damages (3). Thus, duration and frequency of haemodialysis treatment is the golden point and the challenge for having a better outcome. However, polyhydramnios is the most common complication of haemodialysis during pregnancies leading to a bigger risk of premature labour and delivery and daily dialysis is recommended for its control and to maintain the ideal value of BUN under 50 mg/dl (3, 5, 6, 7, 10).

The pathophysiology of polyhydramnios has not yet been clarified. An influence of the fetal osmotic diuresis,

caused by the increased concentrations of urea and related substances in the maternal blood, has been proposed (3, 5, 6, 7,11).

The woman developed polyhydramnios at 19th week of gestation thus she started daily haemodialysis. Probably the schedule of haemodialysis twice a week had become insufficient and polyhydramnios was the effect of impaired fetal osmotic diuresis. In our case, daily haemodialysis didn't reduced amniotic fluid to a better level but it prevented its excessive development with a prolonged gestational period, a higher fetal weight and fetal lung maturity. Most studies suggest that increasing dialysis time during pregnancy results in a longer gestational period, in a higher number of viable pregnancies and in a higher birth weight because of the reduction of plasmatic urea which favours a better maternal diet, a better blood pressure level with a good control of intra and extra vascular fluid mass (9, 11).

In our case, thanks to daily haemodialysis, hospitalization and bed rest, the woman ended her pregnancy at 33rd week and gave birth to a normal and well-being baby of 1530 grams and a good APGAR score.

Another maternal risk factor is established as anaemia and correction of it always requires higher doses of erythropoietin even if its dose is a matter of controversy. Some authors believe that 120-200 UI/Kg/Week should be sufficient to maintain hematocrit between 30 and 35% (7). In our case, a dose of 4000 UI twice weekly, during all the pregnancy, was administered with a good haemoglobin level of 10 mg/dL.

The pregnancy of an woman in chronic dialysis is at very high risk but it should reach a good outcome with a multidisciplinary management, by nephrologists, obstetricians and neonatologists. Although maternal prognosis is good, the fetal outcome remains poor so the aim of the management is to check and correct blood pressure, anaemia and blood coagulation and to check and establish the better fetal growth, the amniotic fluid level and the fetal-maternal Doppler velocimetry. The timing of dialysis remains the most important approach and aim of the treatment of pregnant patient in chronic haemodialysis (7, 12, 13, 14).

## References

1. Hadlock FP, Shah YP, Kanon DJ, Lindsey JV. Fetal crown-rump length: reevaluation of relation to menstrual age (5-18 weeks) with high-resolution real-time US. *Radiology*. 1992; 182: 501-5.
2. Lubchenco LO, Hansman C, Boyd E. Intrauterine growth in length and head circumference as estimated from live births at gestational ages from 26 to 42 weeks. *Pediatrics*. 1966; 37: 403-8.
3. Kazancioglu R, Sahin S, Has R, Turkmen A, Ergi-Karadayi H, Ibrahimoglu L et al. The outcome of pregnancy among patients receiving hemodialysis treatment. *Clin Nephrol*. 2003; 59: 379-82.
4. Hou S. Pregnancy in chronic renal insufficiency and end-stage renal disease. *Am J Kidney Dis*. 1999; 33: 235-52.
5. Torna H, Tanabe K, Tokumoto T, Kobayashi C, Yagisawa T. Pregnancy in women receiving renal dialysis or transplantation in Japan: a nationwide survey. *Nephrol Dial Transplant*. 1999; 14:1511-6.
6. Shemin D. Dialysis in pregnant women with chronic kidney disease. *Semin Dial*. 2003; 16: 379-83.
7. Giatras I, Levy DP, Malone FD, Carlson JA, Jungers P. Pregnancy during dialysis: case report and management guidelines. *Nephrol Dial Transplant*, 1998; 13:3266-72.
8. Successful pregnancies in women treated by dialysis and kidney transplantation. Report from the Registration Committee of the European Dialysis and Transplant Association. *Br J Obstet Gynaecol*. 1980; 87: 839-45.
9. Hou S, Firanek C. Management of the pregnant dialysis patient. *Adv Ren Replac Ther*. 1998; 5:24-30.
10. Reister F, Reister B, Heil W, Schroder W, Mann H, Rath W. Dialysis and pregnancy a case report and review of the literature. *Ren Fail*. 1999; 21 :533-9.
11. Romao JE, Luders C, Kahhale S, Pascoal IJ, Abensur H, Sabbaga E et al. Pregnancy in women on chronic dialysis. *Nephron*. 1998; 78:416-22.
12. Confortini P, Galanti G, Ancona G, Giongo A, Bruschi E, Lorenzini E. Full term pregnancy and successful delivery in a patient on chronic haemodialysis. *Proc Eur Dial Transplant Assoc*. 1971; 8:74-80.
13. Holley JL, Reddy SS. Pregnancy in dialysis patients: a review of outcomes, complications, and management. *Semin Dial*. 2003; 16:384-8.
14. An-Shine C, Jeng-Yi H, Reyin L, Fu-Tsai K, Po-Jen C, Hsieh PCC. Pregnancy in women who undergo long-term hemodialysis. *Am J Obstet Gynecol*. 2002; 187:152-6.