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Case Report Open Access

Successful Twin Pregnancy in Hemodialysis Patient: Multidisciplinary Approach

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Abstract

Background and objectives: There is an increasing incidence and interest in pregnancy on hemodialysis (HD), as shown by the increasing number of reported cases, but woman that start dialysis during early pregnancy is rare. Fetal death is still a likely outcome without a multidisciplinary approach and adequate team communication, so accurate maternal and fetal monitoring from an early stage is required. Multiple pregnancies carry a higher-risk of fetal and maternal complications. We report the management of a twin pregnancy in a hemodialysis patient, in a woman with three previous cesareans. We have not found similar reports in the literature.

Case report: A 32-year-old woman started urgent hemodialysis when diagnosed hypertensive crisis with uremic syndrome and end-stage renal disease. An ultrasound 15 weeks later detected a 19 weeks twin pregnancy; gravida 4 para 3. Therapeutic adjustments were made with multidisciplinary management. She developed hypertension, gestational diabetes and anemia. Cesarean was planned for 35 weeks of gestation but labour started two days before during a hemodialysis session, heparin was used, and urgent cesarean was needed. Under general anesthesia both babies were extracted without major complications.

Conclusions: Successful pregnancy outcome in patients in hemodialysis is uncommon, but not an impossible event. Neuroaxial anesthesia can be safely performed in patients in hemodialysis. Use of heparin derivatives may preclude that approach since the unpredictability of the onset of labour or an eventual obstetric emergency makes the delivery schedule uncertain. An interdisciplinary team and cooperation between nephrologists, obstetricians, neonatologists and anesthesiologists proved essential to this good outcome.

Keywords: Anesthesia; Obstetric; Gemelar; Hemodialysis; Cesarean

Introduction

End-stage chronic renal disease affects few women in reproductive age but there is an increasing incidence and interest in pregnancy on dialysis, as shown by the growing number of reported cases [1]. Women that conceive before and start dialysis during early pregnancy is rare.

Fetal death still is a likely outcome without a multidisciplinary approach and adequate team communication, so accurate maternal and fetal monitoring from an early stage is required [2]. Multiple pregnancies further increase risk and carry a higher risk of fetal and maternal complications. Multiparity by cesarean is a predisposing factor for rupture of the uterus.

We report the management of a gemelar pregnancy in a hemodialysis (HD) patient, with three previous cesareans. We have not found similar reports in the literature. It is a very high-risk pregnancy that requires close cooperation between nephrologists, obstetricians, neonatologists and anesthesiologists.

The patient gave written consent for the publication of this case report.

Case Report

A 32-year-old woman, with chronic non-monitored glomerulonephritis, went to an emergency department with a hypertensive crisis and pre-cordial pain and was diagnosed with uremic syndrome and end-stage renal disease. She started several anti-hypertensive drugs to control symptoms and needed dialysis. A HD program was initiated through central venous catheter on right internal jugular vein 3 days/week and 5 h/session.

After the initial HD program she decided to switch method to peritoneal dialysis and a peritoneal catheter was implant. Despite starting this process she never actually initiated peritoneal dialysis. After 15 weeks an abdominal radiography and ultrasound were made for abdominal pain and a gemelar biamniotic bicorionic pregnancy of estimated 19 weeks was detected. She was informed about all the risks for mother and fetus and expressed her intention to carry on with pregnancy.

Her past medical history included hypertension without medication, dyslipidemia and chronic glomerulonephritis non-monitored for five years. She was gravida 4 para 3, with three cesareans for delivery, ten, twelve and fifteen years ago. The two first pregnancies had no problems but the last one was complicated by nephrotic syndrome and the cesarean occurs at 32 weeks. Renal biopsy detected focal segmental glomeruloesclerosis and started corticotherapy and

cyclophosphamide without response. She abandoned all follow up five years ago.

After the diagnose of this new pregnancy therapeutic adjustments were made and HD was increased to 5 days/week, 4 h/session until 27 weeks of gestation. At this time the patient was transferred to our tertiary referral hospital and increased dialysis to 6 days/week. Gestational diabetes was diagnosed at this time and she was started on an insulin scheme. At 28 weeks of gestation maternal corticosteroids were prescribed for fetal lung maturation. Erythropoietin, intravenous iron, folic acid, calcium carbonate and vitamin D were administered during follow up. To control hypertension nifedipine was used with increments to the maximum of 30 mg twice day.

Fetal growth was monitored by abdominal ultrasounds done every three weeks until 27 weeks of gestation and then, additionally with arterial doppler, every two weeks. Cardiotocography was made every day after HD session since the 30th week. Mother analytical controls where done weekly and are shown on Table 1, along with hemodynamic and weight control.

Gestation (week)	Emergency	14 w	18 w	24 w	27 w	29 w	31 w	32 w	33 w	34 w
Weight (Kg)	51	-	53,9	60,6	61,9	67,7	69,7	71,3	77,4	72,3
Blood pressure (mmHg)	243/157	-	134/96	125/83	120/79	126/81	138/100	112/67	143/106	136/90
Heart rate (bpm)	81	-	89	84	115	77	74	95	81	84
Hemoglobin (g/dL) /Hematocrit (%)	11,5/35	9,5/28,2	9,3/28,5	8,2/25,2	9,4/29	8,9/27,6	9,3/29,6	9,6/29,7	9,4/29,1	10,7/33,3
Platelet count	187	252	231	192	223	288	263	253	272	292
(x 10^9/L)										
Calcium (mg/dL)	9,3	9,0	9,6	8,7	9,2	-	-	8,9	8,8	9,1
Albumin (g/dL)	3,8	-	3,6	-	3,0	2,7	-	2,6	-	2,6
Creatinine (mg/dL)	5,9	-	8,1	5,6	5,82	3,86	4,1	4,49	5,82	3,2
Urea (mg/dL)	178	157	128	96	40	25	26	27	36,5	18

Table 1: Analytical, hemodynamic and weight control.

A cesarean was planned for the 35th week but labour started during a HD session two days before. Anticoagulation was administered during the session. The program was interrupted, prophylaxis of aspiration was secured with intravenous ranitidine (50 mg) and methoclopramide (10 mg) and the operating team was readied.

The patient was classified as ASA 4 according to the American Society of Anesthesiology (ASA) classification, with a full stomach. The use of anticoagulation on HD precluded a neuraxial technique. The patient underwent ASA standard monitoring combining with diuresis and anesthesia depth monitoring (Bispectral index®, BIS®). Pre-oxygenation with 100% oxygen for 3 minutes and head-up positioning was performed. General anesthesia was induced on a rapid-sequence with thiopental (375 mg) and succinylcholine (50 mg) and patient was intubated uneventfully with cuffed endotracheal tube size 7,5 mm. Anesthesia was maintenance with sevoflurano and 40% oxygen and 60% medical air keeping MAC 0.5 and titrated to maintain a BIS® at 40-60. Cisatracurium (6 mg) was administered. Both babies were extracted without complications and transported to intensive unit because of prematurity and glycemic control. After the babies delivery intravenous fentanyl was administered as needed (total 0.25 mg). Oxytocin (15 U in 500 ml 5% glicose) and antibiotics were given and fluid therapy performed with crystalloids. Bladder laceration occurred accidentally and raffia was performed without further complications. Tubal ligation was made with previous written informed consent. The procedure lasted 1 h and estimated blood loss was 450 ml. Before the end of the surgery paracetamol (1 g), tramadol (100 mg) and ondansetron (4 mg) were administered intravenous. The patient was extubated successfully and transported to post anesthetic care unit.

The patient needed labetalol (total 20 mg) to control blood pressure during the perioperative period and intravenous morphine (total 8 mg) for post-cesarean analgesia. A HD was programed 20 h post-cesarean to control hyperkalaemia 7,0 mg/dl. Two units of packed red blood cells for anemia (hemoglobin 7,0 g/dl) were administered and another two the next day (hemoglobin 7,4 g/dl). After this period HD sessions were reduced to 3 days/week. She was discharged to her residence hospital 10 days later with the 2 neonates.

Discussion

Twin pregnancy and end-stage renal disease are independent risks factors for both maternal and fetal complications. The mother is at higher risk of hypertension, preeclampsia, anemia, gestational diabetes, postpartum hemorrhage and infection. Uterine scars are the principal risk factor for uterine rupture in developed countries and are also a major risk factor for abnormal placental insertion, and the risk increases with the number of scars. On the fetus side, polyhydramnios, intra-uterine growth retardation, low birth weight, preterm delivery and stillbirth are more common with multiple pregnancy and augmented due to the mother's comorbidities.

Although advances in dialysis technology, obstetrical monitoring and neonatal intensive care over the last twenty years have improved fetal survival rates to roughly 80%, fetal mortality in pregnant women

on dialysis is still much higher than in the general population [3]. In this patient the main factors for success seem to be the increased duration and frequency of HD sessions, the ample supplementation of erythropoietin, iron, folate and vitamins and the adequate maternal nutrition in combination with the effective pharmaceutical support and close obstetric monitoring, as well as the advances of neonatal care [1].

The most frequently reported dialysis schedule was 5-6 days/week, 20-24 h/week. Cardiovascular instability and hypotension may compromise fetal wellbeing and must be avoid during HD [2]. A recent review concluded that the frequency and duration of dialysis expressed as the number of hours per week were significantly correlated with two major outcomes: prematurity and delivery of a small for gestational age babies (birth weight less than the tenth percentile) [1].

Multidisciplinary approach	Nephrologists, obstetricians, neonatologists, nutritionist and anesthesiologists	
Hemodialysis prescription	5 or 6 days per week	20-24 h per week
	Minimize heparin	
	Hemodynamic stability	Avoid hypotension Slow ultrafiltration
Prevent/treat	Hypertension	TA <130/80 mmHg
	Anaemia	Hb >10 g/dL
		Ht >30%
		Iron and EPO supplement
	Infection	Screen and treat asymptomatic bacteriuria
	Urea	Maintain <60 mg/dL
	Protein ingest	1,8 g/Kg/day
		Albumin >2,8 g/dL
	Hypocalcemia	Calcium carbonate supplement
	Acidosis metabolic	
Fetal monitoring	Abdominal ultrasounds	<32 weeks once-a-month >32 weeks twice-a-month
	Arterial umbilical doppler	> 30 weeks
	Cardiotocography	After dialysis > 30 weeks
	Lung maturation prior delivery	Corticosteroids
Anesthesia neuroaxial	Usual contraindications	
	Heparin and emergencies delivery can prelude	
	Expert anesthesiologist	

Table 2: General recommendations for managing pregnancy on dialysis.

The control of anemia is usually difficult, requires erythropoietin and iron supplement and it is necessary to have good nutritional support with high calorie and protein intake [4]. The general recommendations for managing pregnancy on HD are described on Table 2.

There are no standard recommendations for fetal monitoring in dialysis patients. Most babies born require neonatal intensive care unit admission because of prematurity. Even those born close to term should be monitored closely [2].

For urgent cesarean, selection of anesthetic technique can be challenging in a potentially volume contracted, hypertensive, immunosuppressed and recently anticoagulated patient [2]. Ideally in this case the cesarean should be programmed to allow withdrawal of heparin to allow neuroaxial anesthesia. When standard times to suspend heparin are not respect general anesthesia is an effective alternative. There are many reports outlining the safe and successful use of neuroaxial anesthesia in dialysis patients if there is no platelet dysfunction or coagulation abnormality [5]. Invasive monitoring may be indicated if the patient is unstable or if there is any cardiovascular compromise and if hypotension occurs the use of vasopressors to minimize volume overload is preferred.

To improve perinatal and maternal outcomes in these cases it is important to ensure multidisciplinary approach in referral centre, strict control of serum urea, hemoglobin and maternal blood pressure, as well as close monitoring of fetal well being and maternal morbidities [6]. In this case there was intensive and timely interdisciplinary cooperation amongst nephrologists, obstetricians, neonatologists and anesthesiologists during pregnancy, labour and delivery.

Conclusions

Successful pregnancy outcome in patients in HD is uncommon, but not an impossible event. Although neuroaxial anaesthesia can be safely performed for cesarean in patients in HD, the use of heparin derivatives may preclude the neuraxial approach since the unpredictability of the onset of labour or the eventual obstetric emergency make the delivery schedule uncertain. An interdisciplinary and timely approach and close cooperation between nephrologists, obstetricians, neonatologists and anesthesiologists proved essential to the good outcome observed in this report.

The outcome of such pregnancies also seems to be improving with the advances in obstetrics, neonatal medicine and treatment of dialysed patients. With careful monitoring and adjustments on HD program, a successful outcome is possible even in a high-risk twin pregnancy. We believe that this case report is useful to recall the management of this rare condition and address the anesthetic challenges based on uncertain time to delivery or an obstetric emergency.

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