An unexpected pregnancy causes poor drainage in automated peritoneal dialysis

C.-H. Hou1, C.-N. Lee2, K.-Y. Hung1, C.-H. Huang1, T.-J. Tsai1 and C.-Y. Chen1

Departments of Internal Medicine and Gynecology and Obstetrics, National Taiwan University Hospital, Taipei, Taiwan, Republic of China

Introduction

Pregnancy is a rare occurrence in maintenance dialysis females, with an estimated incidence of around 1.5% in a 2-year cohort [1]. Obstetric complications are frequent in dialysis patients, including polyhydramnios, preterm labour, intra-uterine growth retardation, fetal distress, anaemia, hypertension, abruptio placentae and spontaneous abortion [2].

Theoretically, continuous ambulatory peritoneal dialysis (CAPD) has potential advantages for the fetus, i.e. a more constant biochemical environment, easy control of hypertension, infrequent hypotensive episodes, avoidance of heparin use, and higher haematocrit levels [3]. CAPD was thought to be a successful supplemental therapy for severe renal insufficiency occurring during pregnancy [4,5]. Therefore some authors advise CAPD instead of haemodialysis as renal replacement therapy whenever pregnancy occurs [6]. However, experience of peritoneal dialysis during pregnancy is still limited, and no standardized guide of optimal management is available.

Systemic lupus erythematosus (SLE) is an additional problem when managing pregnancy. Lupus activity flare-up, renal function deterioration, preterm labour and fetal loss are potential problems [7]. Only one case of SLE on CAPD delivering a premature, small for gestation age baby was reported in the literature.

We report a successful pregnancy occurring in a patient with end-stage lupus nephritis maintained on automated peritoneal dialysis. The management of pregnancy in such a case is discussed.

Case report

A 39-year-old female patient had SLE. Initial manifestations were joint pain, malar rash, oral ulcer, photosensitivity, alopecia and high ANA and anti-dsDNA titre, beginning in 1988. Nephrotic syndrome occurred in January 1992, when class IV lupus nephritis was diagnosed. Progressive anasarca and oliguria developed despite steroid therapy. Serum albumin was 1.9 g/dl, urea nitrogen (BUN) 80 mg/dl, and creatinine (Cr) 3.6 mg/dl. Haemodialysis was begun for ultrafiltration of excessive fluid retention. The patient selected CAPD as a permanent dialysis modality. CAPD was started in December 1992. She had regular menstruation before lupus nephritis occurred, and developed amenorrhoea when the nephrotic syndrome had set in. However, menstrual cycles reappeared 2 months after the start of CAPD. Initially she had four–five exchanges of 2.1 Dianeal per day. CAPD was changed to automated peritoneal dialysis (APD) in July 1993. The prescription of APD was five exchanges of 2.1 Dianeal with the last bag retained during daytime. Her urine output was stable at around 800–1000 ml daily. She became normotensive without medicine.

She missed her period in November 1994. However, she did not pay attention to that and did not experience morning sickness. In April 1995, she found that drainage of APD was not smooth, with many interruptions of the operation of the automated machine. Therefore, an abdominal film was taken to check the position of the catheter. Unexpectedly, she was found to be pregnant in the 23rd week of gestation. The abdominal plain film did not show migration of the Tenckhoff catheter. She decided to proceed with the pregnancy. Her blood pressure was around 140/90 mmHg, body weight had increased by 5 kg since the start of pregnancy. BUN was 30.4 mg/dl, Cr 5.3 mg/dl, albumin 3.3 g/dl, haemoglobin 9.1 g/dl, AST 11 IU/l, ALT 7 IU/l, triglyceride 315 mg/dl, total cholesterol 250 mg/dl, fasting sugar 86 mg/dl, Na 137 mmol/l, K 3.8 mmol/l, Ca 2.47 mmol/l, P 4.4 mg/dl. Anti-phospholipid antibody was negative. Lupus activity was negative. ANA 1:80, homogeneous pattern, anti-DNA 6.25 IU/ml, C3 118 mg/dl, C4 50.3 mg/dl. Ferritin 463 mg/dl, serum iron 126 mg/dl, and total iron binding capacity 331 mg/dl. Her urine output was nearly 1000 ml/day. The calculated weekly Kt/V was 3.85, and weekly creatinine clearance 192.5 l. Peritoneal dialysis dosage increased to 131 daily. As
pregnancy progressed, the abdomen became distended after instillation of 21 Dianee. The instilled volume was decreased to 1.5 l, but the exchange frequency was increased to a total dialysate dosage of 14.5 l/day (six exchanges nightly by machine and three additional exchanges daily manually). The data on adequacy and biochemistry are shown in Table 1.

No fetal structural malformation was noted by ultrasound screening in the 23rd week of gestation and the clinical course was smooth until the 35th gestation week. Blood pressure rose to 170/110 mmHg after a flu-like episode and she also suffered from right peripheral facial palsy. She was admitted for close observation because her blood pressure was high and fluctuated. Labour was induced and she delivered a normal-appearing female baby in the 36th week of gestation with birth weight 2388 g. Apgar score at 1 min and 5 min was 8 and 9. Prednisolone 10 mg twice daily was given for 2 days before delivery and continued for 7 days thereafter.

**Discussion**

Delayed diagnosis of pregnancy is common in peritoneal dialysis patients [3]. First, the female patients involved often have irregular and anovulatory menstrual cycles [8], so a missed period is not necessarily an early sign of pregnancy. Secondly, nausea and vomiting, common symptoms in early pregnancy, are also not uncommon in peritoneal dialysis patients. Thirdly, the initial enlargement of the uterus in pregnancy is not easily discernible in the setting of peritoneal dialysis. Finally, the patients often have decreased libido and do not take into consideration the possibility of pregnancy in such an ‘ill’ condition; consequently no contraception is used. Early diagnosis is critical for the appropriate management of pregnancy in dialysis patients. Medical personnel should always keep in mind the possibility of pregnancy in the presence of any signs and symptoms pointing to this possibility.

<table>
<thead>
<tr>
<th>Table 1. Follow-up lab data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gestation age</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>PD dose (l/day)</td>
</tr>
<tr>
<td>Body weight (kg)</td>
</tr>
<tr>
<td>Urine output (ml)</td>
</tr>
<tr>
<td>Weekly K+/V</td>
</tr>
<tr>
<td>Weekly Ccr (l/week)</td>
</tr>
<tr>
<td>RRF (ml/min)</td>
</tr>
<tr>
<td>BUN (mg/dl)</td>
</tr>
<tr>
<td>Creatinine (mg/dl)</td>
</tr>
<tr>
<td>Albumin (g/dl)</td>
</tr>
<tr>
<td>C3 (mg/dl)</td>
</tr>
<tr>
<td>C4 (mg dl)</td>
</tr>
<tr>
<td>Anti-DNA (IU/l)</td>
</tr>
<tr>
<td>Haemoglobin (g dl)</td>
</tr>
<tr>
<td>EPO (U week)</td>
</tr>
</tbody>
</table>

Of note, the enlarging uterus could pose a problem for peritoneal dialysate drainage, as occurred in the present case. If pregnancy is suspected, abdominal sonography is the preferred examination and X-ray exposure should be avoided. Finally, it is a good advice that all uraemic females of reproductive age on maintenance dialysis should be using some form of contraception to avoid unexpected pregnancy.

Guidelines on what levels of BUN and creatinine are optimal during pregnancy have not been worked out. It is generally accepted that BUN should be below 50 mg/dl [9]. There is no doubt that the higher residual glomerular filtration rate (GFR) and total creatinine clearance (combining renal and peritoneal clearance) [2], the more likely is a successful pregnancy. During pregnancy, increased intra-abdominal volume becomes difficult to tolerate and exchange volume must be reduced to prevent dyspnoea and abdominal fullness. When the exchange volume is decreased, exchange frequency has to be increased to deliver an adequate amount of dialysis. In the case of nightly APD, as in this patient, daytime manual exchanges should be added to ensure dialysis adequacy. After pregnancy was diagnosed, the level of BUN of the present case remained below 30 mg/dl and her total creatinine clearance reached 19 ml/min. Adequate peritoneal dialysis with near normal BUN is considered an important factor to permit normal growth of the fetus and to reduce maternal complications.

Residual renal function made an important contribution to the success of pregnancy in our patient [10,11]. Successful pregnancies are more frequent in predialysis than in dialysis patients [2]. Furthermore, dialysis patients who get pregnant usually have some residual renal function. In transplanted mothers, gestation age and birth weight of newborns were influenced markedly by graft function [12]. The higher the serum creatinine, the lower the birth weight and the more likely is prematurity of the baby. Patients with the highest residual GFR will have the best chances of a successful outcome of pregnancy. In this context it is of note that CAPD preserves residual renal function better than haemodialysis. We think that residual renal function should be evaluated and considered as an important prognostic factor in the decision-making process.

The issue of flare-up of lupus during pregnancy is controversial [13]. Administration of prednisolone during late pregnancy and immediately postpartum has been advised to suppress flare-ups. In our patient SLE had been quiescent for years prior to the pregnancy, and remained quiescent throughout pregnancy [14]. A low dose of prednisolone was used in the present case but we think it had a placebo effect rather than immunosuppressive action. No significant difference in frequency of flare-ups between pregnant and non-pregnant patients was noted in prospective studies [15,16]. In addition, lupus activity usually subsides with the onset of end-stage renal failure [17].

In summary, we conclude that peritoneal dialysis offers a satisfactory mode of renal replacement therapy for patients who become pregnant when they are...
Successful pregnancy on automated peritoneal dialysis

already on this treatment. Residual renal function is a favourable prognostic factor for a successful pregnancy, and should be a factor in favour of the decision to continue pregnancy. Adequacy of dialysis is of paramount importance and the lower the BUN, the better outcome.

Acknowledgements: We would like to thank Ta Tung Kidney Research Fund for the grant support.

References


Received for publication: 10.7.96
Accepted: 17.7.96