predominant. The main underlying conditions were generalised glomerulosclerosis/fibrous crescents/interstitial disorders (compatible with advanced extracapillary GN) without the lesions typical of proliferative forms of LN.[2] In addition, obtaining a positive test for c-ANCA antibodies (antiproteinase 3) instead of p-ANCA was also uncommon; p-ANCA is more prevalent according to most authors (present in 15%-30% of cases of SLE).[3-5] Complications that arose after diagnosis included ACS as an expression of systemic inflammation and atherosclerosis, and evolution of the initial haemolytic anaemia to irreversible medullary aplasia of unknown aetiology (possibly secondary to chronic infection with parvovirus B19).[6,7] The patient did not respond to discontinuing AZA or to intensive treatment with intravenous gammaglobulins, plasmapheresis or colony-stimulating factors. This fact, combined with the array of symptoms caused by CMV (enteritis and pulmonary haemorrhage) defined the final outcome and made us re-consider that both infections were co-existing opportunistic entities, and perhaps, the agents triggering the lupus flare.[7-10]

## Conflicts of interest

The authors affirm that they have no conflicts of interest related to the content of this article.

1. Hochberg MC. Updating the American College of Rheumatology revised criteria for the classification of SLE. Arthritis Rheum 1997;40:1275.

2. Weening JJ, D'Agati VD, Schwartz MM, Seshan SV, Alpers CE, Appel GB, et al. The classification of glomerulonephritis in systemic lupus erythematosus revisited. Kidney Int 2004;65:521-30.

3. Galeazzi M, Morozzi G, Sebastiani GD, Bellisai F, Marcolongo R, Cervera R, et al. Anti-neutrophil cytoplasmic antibodies in 566 European patients with systemic lupus eythematosus: prevalence, clinical associations and correlation with other autoantibodies. European Concerted Action on the Immunogenetics of SLE. Clin Exp Rheumatol 1998;16(5):541-6.

4. Nasr SH, D'Agati VD, Park HR, Sterman PL, Goyzueta JD, Dressler RM, et al. Necrotizing and crescentic lupus nephritis with antineutrophil cytoplasmic antibody seropositivity. Clin J Am Soc Nephrol 2008;3(3):682-90.

5. Pan HF, Fang XH, Wu GC, Li WX, Zhao XF, Li XP, et al. Anti-neutrophil cytoplasmic antibodies in new-onset systemic lupus erythematosus and lupus nephritis. Inflammation 2008;31(4):260-5.

6. Wells DK, Ward MM. Nephritis and the risk of acute myocardial infarction in patients with systemic lupus erithematosus. Clin Exp Rheumatol 2010;28(2):223-9.

7. Hession MT, Au SC, Gottlieb AB. Parvovirus B 19-associated systemic lupus erythematosus: clinical mimicry or autoimmune induction? J Rheumatol 2010;37(11):2430-2.

8. Ramos-Casals M, Cuadrado MJ, Alba P, Sanna G, Brito-Zerón P, Bertolaccini L, et al. Acute viral infections in patients with systemic lupus erythematosus: description of 23 cases and review of the literature. Medicine 2008;87(6):311-8.

9. Declerck L, Queyrel V, Morell-Dubois S, Dewilde A, Charlanne H, Launay D, et al. Cytomegalovirus and systemic lupus: severe infection and difficult diagnosis. Rev Med Interne 2009;30(9):789-93.

10. González León R, Castillo Palma MJ, García Hernández FJ, Sánchez Román J. Severe infections in a cohort of patients with systemic lupus erythemathosus. Med Clin (Barc) 2010;135(8):365-7.

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# Pregnancy and haemodialyisis: a case study

## To the Editor,

Pregnancy among patients in periodical haemodialysis programmes is still unusual, conception rates ranging between 0.5% and 1.4%, depending on the series.[1,2] This is due to a number of factors that decrease fertility and the difficult management of pregnancy during dialysis, owing to scarce experience. However, the most recent studies published by different work groups report encouraging pregnancy success rates of nearly 70%, thanks to improved dialysis techniques and better maternal and foetal care.[3-5]

We present the case of a 35 year old woman with chronic kidney disease secondary to type 1 membranoproliferative glomerulonephritis, diagnosed by renal biopsy in 1989. She started haemodialysis treatment in June 1994 and underwent cadaver-donor kidney transplantation in December 1995.

On 11 July 2008, she started periodical haemodialysis treatment again due to chronic allograft nephropathy. Comorbidities included secondary hyperparathyroidism treated with calcitriol, hyperuricaemia treated with alopurinol, anaemia treated with subcutaneous epoetin alfa and oral iron supplements, and hypertension treated with calcium channel blockers, beta blockers and diuretics.

When the patient returned to dialysis, immunosuppressant drugs were gradually discontinued (steroids, calcineurin inhibitors and mycophenolate mofetil) and the patient was transitioned to darbepoetin alfa and intravenous iron supplements Transfusion of 2 units of red blood cells was necessary during the first session due to anaemia with a haemoglobin level of 6.9g.

On 13 August 2008 the patient reported amenorrhea lasting 2 months. Human chorionic gonadotropin-beta levels and a vaginal ultrasound revealed that she was approximately 4 weeks pregnant. In light of these results, the patient started a daily haemodialysis programme.

For the dialyser, we used a high-flux polyethersulfone membrane with a surface area of $2.1m^2$ and a dialysate bath consisting of 3mEq/l calcium and 1.5mEq/l $K^+$, although this was adjusted depending on laboratory results. Dalteparin was administered as an anticoagulant agent at an initial dose of 2500IU per session. Dry weight was adjusted by applying increases of 0.3-0.5kg per week from the second trimester.

Regarding drug treatment, tacrolimus was suspended and steroid and calcitriol treatments were maintained. We did not continue to decrease steroids in order to prevent graft rejection, using a dose of 5mg daily. The diuretic agents and the calcium channel blocker were suspended and folic acid and Vitamin B complex were increased. No oral iodine supplement was prescribed due to lack of experience and because it is excreted in urine. The patient received no zinc supplements because plasma levels were normal (Table 1).

The patient was placed on an unrestricted diet.

Our goal was to maintain pre-dialysis urea levels below 100mg/dl and normal calcium levels, prevent acid-base balance disorders and maintain haemoglobin levels at approximately 11g/dl. The dialysis dose that we established as our target was an equivalent renal urea clearance of 30ml/min according to the Casino and López method.

In this case, evolution of anaemia during the pregnancy was slow, and maintaining haemoglobin levels above 9g/dl was difficult. The patient required 2 units of red blood cells in week 21 (Table 2).

Session duration was gradually increased from an initial length of 3 hours. After gestation, the patient's programme consisted of 6 weekly sessions of 4.5 hours (27 hours weekly). No relevant episodes of hypotension were recorded and the maximum ultrafiltration rate was 500ml/h.

It was necessary to increase the anticoagulant dose to 5000IU dalteparin per session. The only incident was graft thrombosis in week 24 and doctors placed a jugular tunnelled catheter so as not to expose the patient to thrombolytic drugs or excessive radioscopy.

Regarding obstetrics, hypertension was recorded in week 16, and treatment with methyldopa was initiated. Polyhydramnios and foetal macrosomia were detected in week 20. In week 32, the patient was referred to a tertiary hospital for assessment and to end the pregnancy due to the foetal monitor showing poor responsiveness. A planned caesarean section was performed 2 weeks later, delivering a live newborn weighing 2200g.

Available information on managing pregnant patients in haemodialysis programmes is scarce; it is mainly based on small cohorts and a handful of meta-analyses published by different hospitals around the world. This highlights the need for creating national and international registers.[6] In these series, we observed a proportional relationship between the time the patient remained on dialysis and the prognosis for the pregnancy. In general, programmes of more than 20 hours weekly are related to longer gestational periods and decreased risk of preterm birth.[6] It also seems that increasing dialysis frequency to a programme of 6 weekly sessions is better than scheduling longer, less frequent sessions.

One hypothesis is that prolonging dialysis sessions may decrease risk of polyhydramnios and foetal distress and improve the patient's nutritional state, thereby decreasing the risk of preterm birth.[7]

Anaemia, another chronic complication of patients on dialysis, must be monitored and treated with iron and folic acid supplements, and erythropoietin treatment must be increased in order to maintain haemoglobin levels at 10g/dl and transferrin saturation above 30%.[8]

Although there is still very little available information on the management of these patients, the most recent published results give us a more optimistic view.

**Table 1.** Haemodialysis and treatment parameters

| Weeks of gestation | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 |
|---|---|---|---|---|---|---|---|---|
| Session duration (min) | 180 | 180 | 195 | 210 | 225 | 225 | 270 | 270 |
| Kt/V | 1.49 | 1.49 | 1.32 | | 1.43 | | 1.50 | 1.59 |
| Dry weight (kg) | 90.15 | 89.50 | 91.75 | 92.75 | 95.4 | 97.8 | 100.8 | 104.95 |
| Blood pressure (mm Hg) | 140/80 | 120/70 | 140/70 | 110/60 | 110/60 | 105/50 | 100/50 | 110/60 |
| Methyldopa (mg) | | | | | 1000 (initial) | 750 | 1000 | 1250 |
| Darbepoetin alfa (mcg/week) (mcg/kg) | 60 0.66 | 80 0.89 | 80 0.87 | 100 1.07 | 120 1.25 | 150 1.53 | 150 1.48 | 150 1.42 |
| Monthly iron doses (mg) | 800 | 200 | 200 | 400 | 400 | 200 | 800 | 200 |

# letters to the editor

**Table 2.** Laboratory data

| Weeks of gestation | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 |
|---|---|---|---|---|---|---|---|---|
| Haemoglobin (g/dl) | 9.2 | 9.7 | 9.8 | 9.4 | 8.4 | 9.8 | 10.3 | 9.4 |
| Haematocrit (%) | 27 | 29.1 | 30.9 | 27.0 | 24.4 | 29.0 | 30.1 | 27.8 |
| Calcium (mg/dl) | 8.2 | 9.2 | 9.7 | 10.1 | 9.4 | 9.1 | 9.9 | 9.6 |
| Bicarbonate (mmol/l) | 21.8 | | 24.2 | | | 25.4 | | 25.0 |
| Pre-dialysis urea (mg/dl) | 104 | 109 | 92 | 68 | 63 | 101 | 64 | 96 |

## Conflicts of interest

The authors affirm that they have no conflicts of interest related to the content of this article.

1. Gómez-Vázquez JA, Martínez Calva IE, Mendiola-Fernández R, Escalera-León V, Cardona M, Noyola H. Pregnancy in end stage renal disease patients and treatment with peritoneal dialysis: report of two cases. Perit Dial Int 2007;27:353-8.

2. Swaroop R, Zabaneh R, Parimoo N. Pregnancy in end-stage disease patients on hemodialysis: two case reports. Cases Journal 2009;2:8139.

3. Piccoli G, Conijn A, Consiglio V, Vasario E, Attini R, Deagostini M, et al. Pregnancy in dialysis patients: is the evidence strong enough to lead us to change our counseling policiy? Clin J Am Soc Nephrol 2010;5:62-71.

4. Bagon JA, Vernaeve H, De Muylder X, Lafontaine JJ, Martens J, Van Roost G. Pregnancy and dialysis. Am J Kidney Dis 1998;31:756-65.

5. Okundaye I, Abrinko P, Hou S. Registry of pregnancy in dialysis patients. Am J Kidney Dis 1998;31:766-73.

6. Furaz Czerpak KR, Puente García A, Corchete Prats E, Moreno MA, Martín Hernández R. Gestación con éxito en una paciente con insuficiencia renal crónica en programa de hemodiálisis. Nefrologia 2011;31(2):219-21.

7. Levy D, Giatras I, Junger P. Pregnancy and end-stage renal disease-past experience and new insights. Nephrol Dial Transplant 1998;13:3005-7.

8. Jungers P, Chauveau D. Pregnancy in renal disease. Kidney Int 1997;52:871-85.

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## C1q Nephropathy and Malignancy

**Dear Editor,**

C1q nephropathy (C1qN) is an idiopathic glomerular disease characterized by extensive mesangial deposition of C1q with associated mesangial immune complexes, in the absence of evidence of systemic lupus erythematosus[1].

The prevalence of C1qN has been estimated from 0.2% to 16%[1-9]. Light microscopy (LM) findings range from no glomerular abnormalities to mesangial proliferation[1,6-9,11,12] or focal segmental glomerulosclerosis (FSG)[2-4,6-8,13]. Clinical presentations vary from asymptomatic urinary anomalies[5,7,8,11,13], and macroscopic hematuria[14], to nephritic syndrome[3,15] and corticorresistent nephrotic syndrome (NS)[1,2-4,6-8]. Earlier reports found a poor response to steroids and a high risk of progression to end-stage renal disease (ESRD)[1,3,6,12,15], particularly those with FSG. Patients presenting asymptomatic urinary anomalies have been found to have a good prognosis[2-5,7,8]. The variability in the prevalence, clinical presentation and prognosis of C1qN has been attributed to different ages and ethnicities of the patients included in the series, and to different thresholds to perform a renal biopsy.

The association between NS and malignancy has been reported in various glomerulopathies, but not with C1qN. Recognition of malignancy-associated glomerulopathies is important to prevent ineffective and potentially harmful treatment.

A 56-year-old male was admitted to our Department with NS. He reported persistent peripheral edema lasting for two months. He was a smoker of 80 packs/year. He had exuberant edema of lower extremities and abdominal wall. Laboratory findings revealed hypoalbuminemia (1.1g/dL), proteinuria (10g/day) and microscopic hematuria; serum creatinine was 1.1mg/dL and urea: 48mg/dL. Hyperlipidemia (total-cholesterol: 326mg/dL) was also noted. HBs-antigen, HCV-antibody and HIV-antibody were all negative. Serum protein electrophoresis was unremarkable; complement levels, ANCA, ANA, cryoglobulins and anti-phospholipid antibodies were normal. Ultrassonography of the kidneys was unremarkable. Abdominal ultrassonography showed small volume ascites, and chest X-ray revealed small pleural effusions, without any other abnormal findings.

A renal biopsy was performed, whose histological findings are shown in Figure 1. Fifteen glomeruli were observed, showing segmental thickening of glomerular basement membranes (GBM) and mesangium by an eosinophilic Congo-