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BRIEF REPORT

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Successful transplantation of kidneys from a donor with HELLP syndrome-related death

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Abstract We report on the successful use of kidneys procured from a donor with HELLP syndrome. The use of organs from a donor with HELLP syndrome has not been reported previously, perhaps because of the renal complications associated with it. Both recipients have been doing well since renal transplantation, with immediate graft function and acceptable graft function at 2 years of follow-up. In view of the continuing shortage of cadaveric kidneys for transplantation, this report highlights how organs from "marginal" donors should not be discarded without worthy consideration.

Keywords HELLP syndrome · Organ procurement · Renal transplantation

Abbreviations *DIC* Disseminated vascular coagulation · *ESRD* End-stage renal disease · *HELLP* Haemolysis (H), elevated liver enzymes (EL), low platelet count (LP) · *HUS* Haemolytic uraemic syndrome · *POD* Postoperative day · *PRA* Panel-reactive antibody

Introduction

The continuing shortage of cadaveric kidneys for transplantation has resulted in the utilisation of organs procured from "marginal" donors [1, 3]. HELLP syndrome, an acronym which denotes haemolysis (H), elevated liver enzymes (EL) and low platelet count (LP), is a disorder of pregnancy characterised by haemolysis, hepatic dysfunction and thrombocytopenia [2]. It is reported to occur in 4–14% of all pre-eclampic pregnancies and is associated with a mortality rate of up to 24–33% [8]. The condition is often complicated by disseminated intravascular coagulation (DIC) and acute renal failure and is thus not considered for organ donation. We report herein the successful use of kidneys procured from a donor who had died of a cerebro-vascular accident associated with HELLP syndrome. This, to our knowledge, is the first report of the use of kidneys procured from such a donor.

Case report

Donor details

A 33-year-old pregnant woman was admitted to hospital on 16 June 1997 at 25 weeks gestation. On arrival she was comatose with a Glasgow Coma Scale of 3, her blood pressure on admission was 183/108, hemoglobin 8.6 mg/dl, platelets 14×19^9/l, her hepatic transaminases were grossly elevated – alanine transaminase 1260 IU, aspartate transaminase 1940 IU, and serum creatinine was 89 mmol/l. A diagnosis of HELLP syndrome was made. She was transfused with 2 units of whole blood and 8 units of platelets prior to an uneventful caesarean section. After surgery, her condition deteriorated. She never regained consciousness and was pronounced dead on 20 June 1997. At the time of brain stem testing, her creatinine was 93 μmol/l. Because of persistently elevated liver biochemistry, only kidneys were procured. They were perfused in situ and cold-stored in University of Wisconsin (Viaspan) solution. Anatomically, both kidneys appeared perfect and perfused excellently and uniformly.

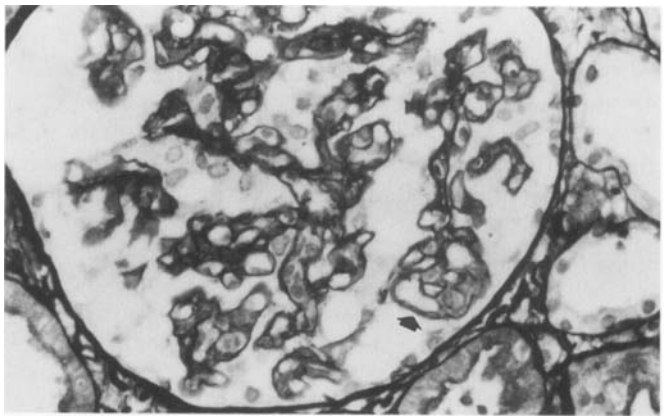

Fig. 1 Glomerulus (× 250) showing segmental endocapillary abnormalities with duplication (*arrow*) of the capillary wall typical of an organising thrombotic microangiopathy (H&E stain)

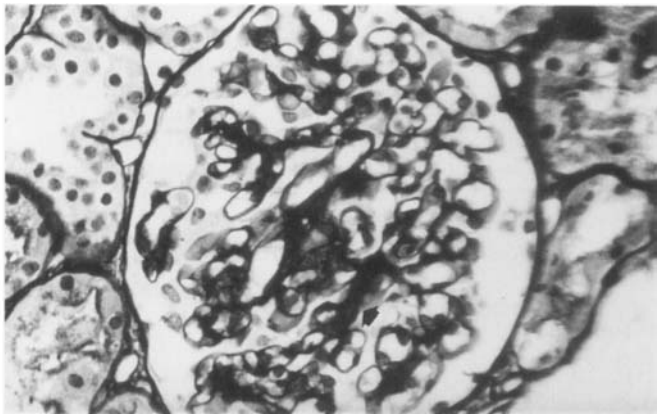

Fig. 3 Glomerulus (× 250) in repeat biopsy showing less endocapillary abnormalities with mild segmental mesangial expansion (*arrow*)

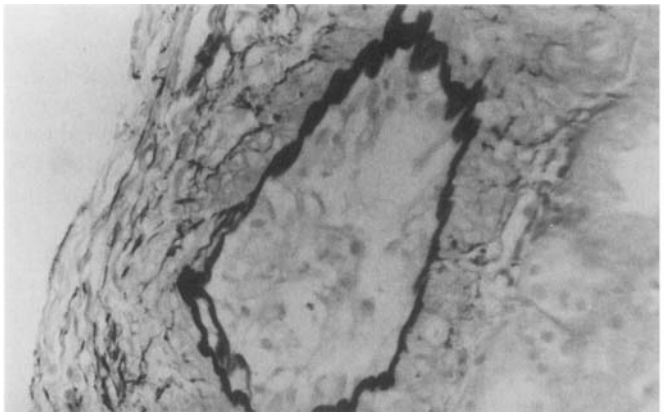

Fig. 2 Artery (× 250) showing organising thrombosis

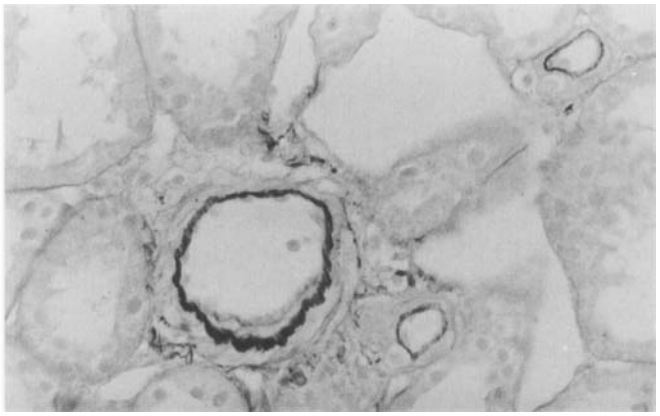

Fig. 4 Arteries from the repeat biopsy (× 125) showing marked improvement in thrombotic lesions

Case 1

DB, a 58-year-old, 85-kg male, with end-stage renal disease (ESRD) secondary to rapidly progressive glomerulonephritis, underwent transplantation on 21 June 1997 after a cold ischaemic time of 20 h 46 min and a total ischaemic time of 21 h 18 min. The donor/recipient HLA mismatch was 1:1:0 at the A, B and DR loci. Panel-reactive antibody (PRA) was 0%, and he had a current and historic negative lymphocytotoxic crossmatch. Immunosuppression consisted of cyclosporine, steroids and azathioprine. Cyclosporine commenced at 10 mg/kg, and doses were adjusted to maintain a whole blood trough level between 200 and 300 ng/ml. Azathioprine was started at 1.5 mg/kg, and intravenous steroids were given for 4 days postoperatively. Then, oral Deltacortril commenced at 20 mg daily and was subsequently reduced to a maintenance dose of 7.5 mg daily. Postoperatively, the kidney functioned immediately with the serum creatinine falling from 925 μmol/l on postoperative day (POD) 1 to 289 μmol/l on POD 5. The serum creatinine remained at this level throughout the following week. A renal biopsy was performed on POD 8, which showed features of an early organising thrombotic microangiopathy in the glomeruli (Fig. 1) and in one of two arteries present (Fig. 2). This was in the presence of a relatively mild tubulitis and was interpreted as renal involvement by HELLP syndrome. Because there was an organising vascular lesion, the differential diagnosis included an idiosyncratic reaction to cyclosporine or acute vascular rejection.

He was treated with a 3-day steroid course of 500 mg/day i. v. methylprednisolone and switched from cyclosporine to tacrolimus at a dose of 0.15 mg/kg. He responded well to this treatment and was discharged on POD 19 with a serum creatinine of 180 μmol/l. At 25 months of follow-up after transplantation, his serum creatinine is 170 μmol/l. Repeat biopsy performed on POD 150 for a rising creatinine showed a marked improvement in the glomerular and arterial endothelial lesions. Mild focal and segmental capillary wall thickening and splitting is seen in Fig. 3, representing organisation of the lesions seen on POD 8. Figure 4 shows mild focal arteriosclerosis with active thrombotic and inflammatory lesions now absent.

Case 2

AH, a 20-year-old female with ESRD secondary to chronic pyelonephritis received the other kidney on 21 June 1997. The cold ischaemic time for this kidney was 16 h 59 min and the total ischae-

mic time was 17 h 55 min. Her PRA was 0%, the donor/recipient HLA mismatch was 1:2:2 for the A, B and DR loci, and she had a current and historic negative lymphocytotoxic crossmatch. Her immunosuppressive regime consisted of cyclosporine, steroid and azathioprine triple therapy as described in the case above. Her kidney functioned immediately and she was discharged on POD 15 with a serum creatinine of 127 μmol/l. At 22 months of follow-up, she has excellent renal function with a serum creatinine of 100 μmol/l.

Discussion

HELLP was first described in 1954 [8] and occurs most frequently as a complication of pre-eclampic pregnancies. The majority of cases occur in the second trimester after 20 weeks gestation, but up to 30% can occur post partum [10]. Post partum HELLP syndrome is associated with a higher incidence of pulmonary oedema and renal failure [11]. Maternal complications associated with this syndrome include acute renal failure, DIC, hepatic hematomas and rupture, multisystem organ failure and death.

It is estimated that approximately 50% of patients with HELLP syndrome develop a mild degree of renal impairment, which usually resolves after delivery [9, 12] and is characterised by a thrombotic microangiopathy, as seen in this case. More significant renal impairment in HELLP syndrome is usually prerenal in aetiology, secondary to hemorrhagic shock and results in acute tubular necrosis or, occasionally, complete cortical necrosis. These problems are more frequently seen in patients with HELLP syndrome complicated by DIC and abruptio placentae [7].

The use of organs from a donor with HELLP syndrome has not been reported previously, perhaps because of the abovementioned renal complications associated with it. We elected to procure and use the organs because the donor had no previous renal history, and because of the relatively normal agonal serum creatinine and the literature evidence of complete resolution of the renal impairment after delivery. In this case we elected not to perform a baseline renal biopsy; however, we would probably elect to do so in future similar cases.

Both our patients have been doing well since transplantation, with excellent immediate function and acceptable function at 2 years of follow-up. It is also reassuring that, histologically, the lesions seen on the first biopsy have improved markedly. There is conflicting evidence in the literature as to whether cyclosporine- or tacrolimus-based immunosuppression is less or more likely to cause hemolytic uremic syndrome (HUS). Some support the conversion to tacrolimus as an effective treatment for cyclosporine-related HUS after renal transplantation [5]. Others believe that the side-effect profile of cyclosporine and tacrolimus are indistinguishable when considering post-transplant HUS-like changes [4], and the successful conversion to cyclosporine for tacrolimus-associated HUS has also been reported [6].

We report this case to add to the growing list of marginal kidneys from high-risk donors, which transplant dogma would have heretofore precluded and which can provide good renal function.

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