noticeable improvement in about two thirds of the remainder. About one sixth of the total cases showed slight or no improvement.[4] These differences between their and our results were mainly due to an inadequate dose of the drug being given for an inadequate time. We found that nodular lesions responded quickly and depigmented macules very slowly. Our high dose and longer duration of treatment were based on the fact that sodium stibogluconate is quickly excreted in the urine and six hours after an intravenous injection blood concentrations have fallen to less than 1% of peak values. The danger of cumulative toxicity might be exaggerated.[5]

We thank Dr R S Jha, department of pathology; Mr R J Sharma, technician; and Mr C P Singh, who typed the manuscript. We received financial support from the United Nations Development Programme/World Bank/World Health Organisation special programme for research and training in tropical disease.

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(Accepted 11 June 1987)

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The haemolytic uraemic syndrome and bone marrow transplantation

The haemolytic uraemic syndrome has been reported in seven patients[1-4] and thrombotic thrombocytopenic purpura in two[5] after allogeneic bone marrow transplantation. All these patients died; only one received specific treatment (plasma exchange) for these complications, but he died before the response could be evaluated.

We successfully controlled the haemolytic uraemic syndrome after allogeneic bone marrow transplantation by plasma exchange with fresh frozen plasma.

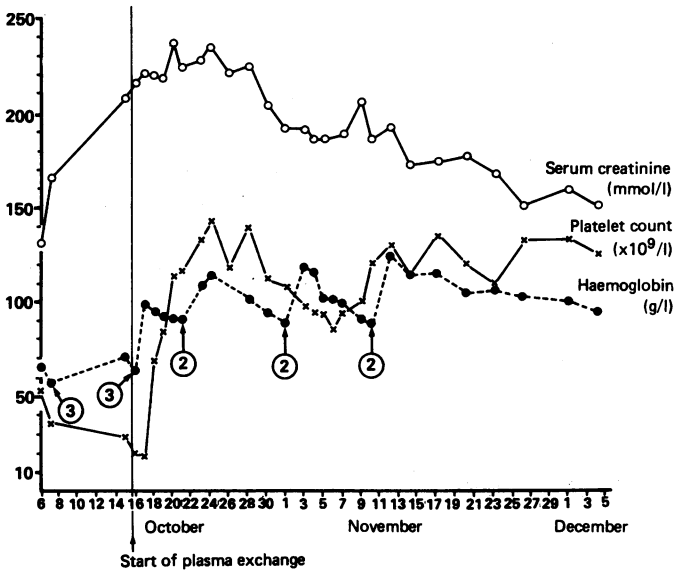
Case report

A 17 year old man received an allogeneic bone marrow transplant from an HLA compatible sibling in March 1986 for a T cell lymphoma while in third remission and after conditioning with total body irradiation and high dose cyclophosphamide. Prophylaxis against graft versus host disease consisted of intravenous cyclosporin 2·5 mg/kg twice daily until day 14 followed by oral cyclosporin 5 mg/kg twice daily until day 50. Thereafter the dose was reduced by 5% each week and the drug stopped at six months. He did not have antibodies to cytomegalovirus, and only blood products negative for cytomegalovirus were transfused. Full haematological recovery ensued, and there was no evidence of graft versus host disease or recurrence of the lymphoma.

In September he developed a normochromic normocytic anaemia (haemoglobin concentration 86 g/l) and thrombocytopenia (platelet count 114 × 10^9/l). There was mild red cell fragmentation, and intravascular haemolysis was confirmed by laboratory investigations. Cyclosporin was stopped.

In October he developed hypertension (blood pressure 165/110 mm Hg) with deteriorating renal function (blood urea concentration 18 mmol/l, plasma creatinine concentration 207 μmol/l, and creatinine clearance 16 ml/min). Results of a coagulation screen were normal, as were immunoglobulin and complement concentrations. Blood cultures and fungal and viral studies, including tests for cytomegalovirus, yielded negative results. A renal biopsy specimen showed changes compatible with the haemolytic uraemic syndrome. A trial of intravenous infusion of fresh frozen plasma was stopped because of an abrupt rise in blood pressure despite concomitant antihypertensive treatment. Plasma exchange was then begun, the haemoglobin concentration being 63 g/l, platelet count 20 × 10^9/l, and plasma creatinine concentration 215 mmol/l. Altogether 28 plasma exchanges with 2·5-3·0 litres of fresh frozen plasma were performed from October to December with concentrated red cell transfusions as required.

The frequency of exchanges was determined by his clinical state, haemoglobin concentration, and platelet count (figure). Clinically there was a dramatic response, with resolution of headache during the first exchange and a reduction in blood pressure from 160/100 mm Hg to 140/90 mm Hg at 24 hours; his malaise gradually improved and his blood pressure was stabilised with various drugs over the next two weeks. Although the serum creatinine concentration rose during the first week of plasma exchange, with continued treatment it gradually fell. Seven months after the last exchange he was clinically well with a normal haemoglobin concentration and platelet count and no evidence of haemolysis. Hypertension persisted but was controlled with oral hydralazine and metoprolol. Renal function had improved (blood urea concentration 7·2 mmol/l, plasma creatinine concentration 119 μmol/l, and creatinine clearance 42 ml/min).



Serum creatinine concentration, platelet count, and haemoglobin concentration in a patient receiving 28 plasma exchanges with fresh frozen plasma. Arrows indicate transfusions of red cell concentrate (2 or 3 units).

Comment

This patient is the tenth reported as having the haemolytic uraemic syndrome or thrombotic thrombocytopenic purpura complicating allogeneic bone marrow transplantation, but is the first to have responded to treatment with plasma exchange. The aetiology is unclear: cyclosporin toxicity, graft versus host disease, and cytomegalovirus infection have been suggested as causes. Of the patients reported on, six received cyclosporin as prophylaxis against graft versus host disease, five developed cytomegalovirus infection, and four developed graft versus host disease. Our patient showed no evidence of graft versus host disease or bacteriological, fungal, or viral infection. Although he was still receiving cyclosporin when he developed the haemolytic uraemic syndrome, his condition worsened after the drug was stopped. This suggests that the syndrome was an uncommon complication of allogeneic bone marrow transplantation; his response to plasma exchange indicates that this treatment should be considered early in such patients.

This patient was under the care of Dr A C Parker. We also thank Dr R Winney and Dr J Gillon for their advice, Dr M Cook for referring the patient to us, and Pat Stewart for typing the manuscript.

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(Accepted 20 July 1987)

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