Bone Marrow Transplantation, (1997) 20, 1009–1010

Correspondence

Syngeneic peripheral blood stem cell transplantation for severe aplastic anaemia

Due to the principal advantage of accelerated haemopoietic engraftment, mobilised peripheral blood haemopoietic stem cell transplantation (PBSCT) is being used increasingly in place of bone marrow transplantation for autologous, allogeneic and syngeneic procedures.[1,2] We report the first experience of syngeneic PBSCT in severe aplastic anaemia (SAA).

A 32-year-old woman presented with idiopathic SAA (haemoglobin 49 g/l, white cell count 2.2×10^9/l, neutrophils $<0.2 \times 10^9$/l, platelets 6×10^9/l, reticulocytes 0×10^9/l) and the availability of a syngeneic donor.

G-CSF (filgrastim) 10 μg/kg/day was used to mobilise donor PBSC and an initial PBSCT was given without prior immunosuppression. Two phereses, obtained using peripheral i.v. access with a Haemonetics V50 cell separator (Domedica, Sydney, Australia), were performed at each mobilisation. 6.3×10^6 CD34$^+$ cells/kg were reinfused in the first PBSCT and G-CSF 300 μg/day was given for 5 days from day +8. An initial platelet rise post-PBSC infusion from 36 to 143×10^9/l was observed as was a sustained increase in ANC. On day −1 ANC = 0.1×10^9/l and on day +2, following 2 consecutive days of PBSC infusion, ANC = 0.5×10^9/l with values for days +3, +4 and +6 being 0.4, 0.2 and 0.1×10^9/l, respectively. Initial haemopoietic recovery occurred with ANC $>1.0 \times 10^9$/l by day +12 and 8.2×10^9/l by day +13, when the platelet count was 32×10^9/l. Platelets reached a maximum of 65×10^9/l by day +18 but by day +24 graft failure had occurred, with a haemoglobin of 52 g/l, ANC 1.3×10^9/l and reticulocytes $<10 \times 10^9$/l. A platelet count of 12×10^9/l was recorded on day +28.

A second PBSCT was performed on day +35 after prior conditioning with cyclophosphamide 200 mg/kg, given in four divided doses over 4 days. 7.2×10^6 CD34$^+$ cells/kg were reinfused and G-CSF (300 μg/day) was given from day +2 to day +10 post-second PBSCT. An initial platelet increment of 18–125×10^9/l was again observed but the evaluation of potential neutrophil increments following the second PBSCT was impeded by the confounding effects of prior dexamethasone (given as an anti-emetic) and cyclophosphamide therapy. Prompt and sustained neutrophil recovery occurred with ANC $>1.0 \times 10^9$/l on day +9 and platelets $>50 \times 10^9$/l on day +13. Graphic illustration of blood count parameters in relation to treatment is shown in Figure 1a–c. One HLA matched platelet transfusion was required on day +9 post-second PBSC as prior HLA alloimmunisation had occurred despite the use of leucocyte depletion filters.

We believe that this is the first reported case of syngeneic PBSCT in SAA. The case confirms the potential for rapid and sustained engraftment characteristically associated with G-CSF-mobilised PBSC grafts but it also illustrates that

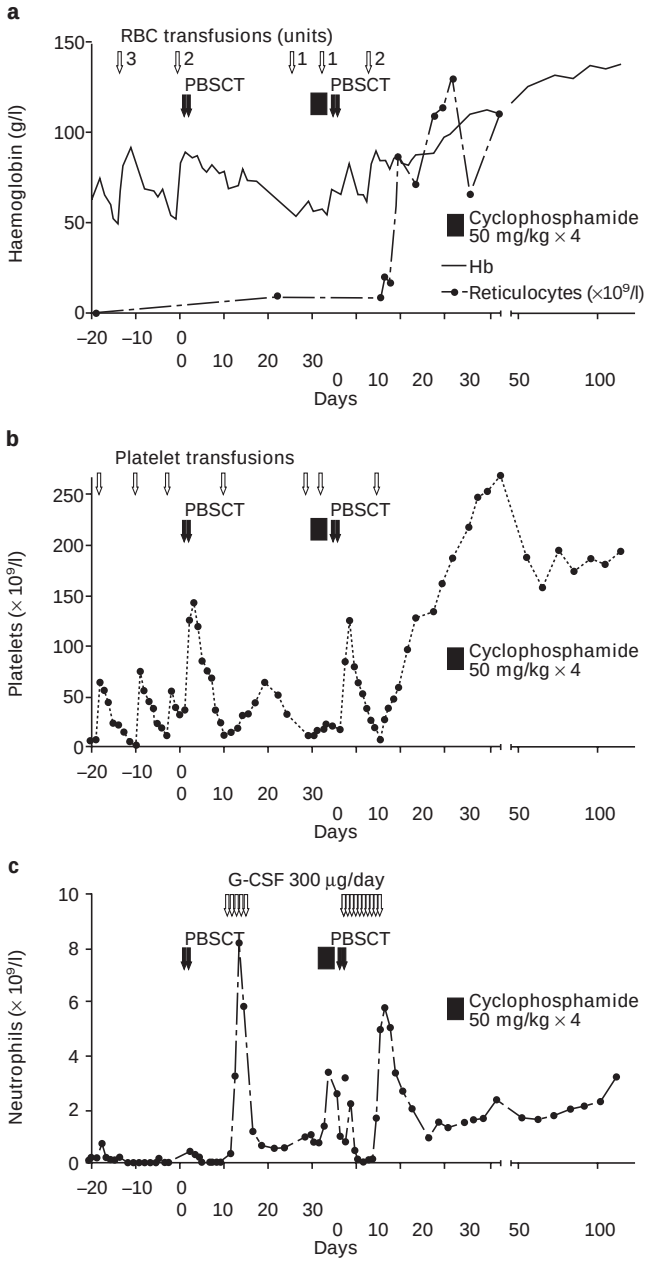

Figure 1 Full blood count in relation to transfusion, high-dose cyclophosphamide, PBSCT and G-CSF therapy; Hb and reticulocytes (**a**), platelets (**b**) and neutrophils (**c**).

useful temporary increments in both platelets, neutrophils and even erythrocytes can be obtained following the use of fresh G-CSF-mobilised PBSC in patients with SAA. The significant platelet increments would be of special value in HLA alloimmunised patients. As recently reported, our case also illustrates the risk of graft failure in syngeneic

transplantation for SAA without the use of prior conditioning.[3]

R Manley
D Fearnley
WN Patton
C Newhook
RL Spearing
DNJ Hart on behalf
of the South Island
Bone Marrow Transplant Team

Department of Hematology
Canterbury Health Laboratories
PO Box 151
Christchurch
New Zealand

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