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New technology and changing parameters of leukapheresis for blood cell transplantation

Sir,

Clinical investigators have recently developed an innovative technique of leukapheresis (LK) for blood cell transplantation (BCT) referred to as AutoPBSC System. This technique offers the following advantages: a) better collection efficiency of CD34+ hematopoietic progenitor cells; b) reduced collection of platelets; c) higher quality of LK components in terms of reduced contamination by granulocytes, platelets, and erythrocytes; d) reduced LK volume; and e) automation.[1] These advantages prompted us to evaluate the effectiveness of the AutoPBSC System and to extend classic parameters for starting LK, i.e., CD34+ cells $\geq 20/\mu L$ and platelets $\geq 30\times10^3/\mu L$,[2] also to poor-mobilizer and/or thrombocytopenic patients, i. e., with CD34+ cells $\leq 20/\mu L$ and/or platelets $\leq 30\times10^3/\mu L$, respectively. We confirm the advantages of the AutoPBSC System and demonstrate that efficient LK can successfully be performed also in these categories of patients.

Ninety-six leukaphereses were carried out in 65 consecutive patients undergoing BCT for treatment of poor prognosis malignancies (13 multiple myeloma, 12 breast cancer, 8 Ewing's sarcoma family of tumors, 9 non-Hodgkin's lymphoma, 7 Hodgkin's disease, 6 ovarian cancer, 3 rhabdomyosarcoma, 3 desmoplastic small cell tumor, 1 Wilms' tumor, 2 non-small cell lung cancer, 1 yolk sac tumor). The LK procedure implied processing 2.5-fold the individual's blood volume and adaptation of the AutoPBSC software default and harvest frequency as described by Ravagnani *et al*.[1] At the time of LK, the mean CD34+ cell count per µL was 106, the median 53, and the range 3-626; mean platelet count was 104×10^3 µL, median 92×10^3, range $15\text{-}456\times10^3$.

As detailed in Figure 1, the collection target of CD34+ cells $\geq 5\times10^6$ in a single LK was achieved in 100% (48/48) of procedures when the initial CD34+ cells $\geq 50/\mu L$ and 21% (10/48) when CD34+ cells $\leq 50/\mu L$. Single LK in poor-mobilizer patients (n = 17) with CD34+ cell counts $>10/\mu L$ and $\leq 20/\mu L$ (n=14) and $\leq 10/\mu L$ (n=15) yielded mean 2.1×10^6, median 1.8, range $0.7\text{-}3.7\times10^6$ and mean 1.7×10^6 CD34+ cells/kg, median 1.7, range $0.8\text{-}3.4\times10^6$, respectively; in

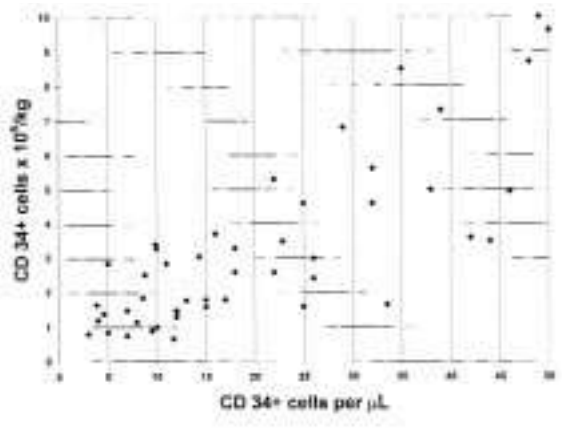

Figure 1. Yields of CD34+ progenitor cells by single LK versus CD34+ cell counts. Data shown are limited to the 48 procedures with CD34+ cells $\leq 50/\mu L$ (total LK=96).

thrombocytopenic patients (n = 7) a single LK yielded mean 3.9×10^6 CD34+ cells/kg, median 2.6, range $0.8\text{-}14.6\times10^6$; and in thrombocytopenic and poor-mobilizer patients (n = 5) it yielded mean 1.9×10^6 CD34+ cells/kg, median 1.8, range $0.8\text{-}3.1\times10^6$. Although platelet depletion in thrombocytopenic patients was negligible, a prophylactic platelet transfusion was given after LK to 3 patients.

Results of a single leukapheresis presented here compare favorably with those previously attained with other techniques[1,2] and confirm for the first time the advantages of the AutoPBSC System in poor-mobilizer and thrombocytopenic patients as well, thus facilitating the clinical application of blood cell transplantation.

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Key words

Leukapheresis, blood cell transplantation, CD34+ cells

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