Predictive Value of the Steady-State Peripheral Blood Progenitor Cell (PBPC) Counts for the Yield of PBPC Collected by Leukapheresis After Mobilization by Granulocyte Colony-Stimulating Factor (G-CSF) Alone or Chemotherapy and G-CSF

To the Editor:

We read with interest the report by Fruehauf et al suggesting that steady-state peripheral blood progenitor cell (PBPC) counts can predict the yield of PBPCs collected after mobilization by chemotherapy and filgrastim in cancer patients. Roberts et al did not find such a correlation in normal or chemotherapy-naive patients primed with granulocyte colony-stimulating factor (G-CSF) alone. In addition, steady-state granulocyte-macrophage colony-forming cell (GM-CFC) counts (but not CD34+ cell counts) did not predict for their peripheral expansion after G-CSF alone in patients previously treated with chemotherapy.

We measured the circulating CD34+ cells in one normal subject
and in 15 cancer patients (non-Hodgkin’s lymphoma [n = 5], multiple myeloma [n = 4], Hodgkin’s disease [n = 1], dysgerminoma [n = 1], chronic lymphocytic leukemia [n = 1], myelodysplastic syndrome [n = 1], neuroblastoma [n = 1], and ovarian adenocarcinoma [n = 1]) just before priming with G-CSF (Filgrastim; Amgen, Thousand Oaks, CA) alone (n = 5) or with chemotherapy and G-CSF (n = 11). Two patients were chemotherapy-naïve. In the 13 pretreated patients, the time interval from the last chemotherapy and priming was at least 3 weeks. The median daily dose of G-CSF was 64 µg/kg (range, 4.4 to 10 µg/kg). Fifteen-liter leukaphereses were performed using the Cobe Spectra device, with a median number of 2 leukaphereses per patient (range, 1 to 3). Leukaphereses were started by day 5 when G-CSF alone was used for priming, whereas in patients primed with G-CSF and chemotherapy, aphereses were started after recovery to at least 5.0 × 10^9 white blood cells/L. As observed by Fruehauf et al., a strong correlation was found between the premobilization CD34⁺ cell count and the higher circulating CD34⁺ cell count measured after priming (r = .870, P < .0001; Fig 1). The correlation held true both in patients primed with chemotherapy and G-CSF (r = .874, P = .0004) and in patients primed with G-CSF alone (r = .924, P = .0249).

Premobilization CD34⁺ cell counts also correlated with the mean yield of CD34⁺ cells collected per apheresis. This correlation was observed in the entire population (r = .813, P = .0001; Fig 2), in the population of patients primed with chemotherapy and G-CSF (r = .777, P = .0049), and in the patients primed with G-CSF alone (r = .960, P = .0006).

In addition, the premobilization CD34⁺ cell count correlated with the number of CD34⁺ cells collected during the most effective leukapheresis (r = .849, P < .0001) for the entire population [see Fig 3]; r = .826, P = .0017 in patients primed with chemotherapy and G-CSF; and r = .959, P = .01 in patients primed with G-CSF alone.
Taken together, our results support Fruehauf et al’s conclusions. At variance with Robert’s et al., we found that the circulating CD34+ cell count measured before priming can predict the potential for expanding the hematopoietic progenitors after G-CSF alone.

However, the practical interest of prepriming CD34+ cell count still has to be shown. Indeed, the ability to predict the number of leukaphereses needed to obtain enough progenitors for an hematopoietic reconstitution would be particularly interesting in multi-treated patients with limited bone marrow reserves. In Fruehauf et al’s report, 4 patients presented with steady-state CD34+ cell counts less than $0.2 \times 10^9/L$. In these patients a minimum of 2 and a maximum of 14 leukaphereses were needed to collect enough CD34+ progenitors ($2.5 \times 10^8$ CD34+ cells/kg), with a probability of 95%. Such information will not prove very helpful when a decision to perform or not to perform a progenitor collection has to be made. Thus, although steady-state peripheral blood progenitor cell counts may reflect the bone marrow reserves and mobilization capacities, the practical interest of its measurement in an individual patient has not been convincingly shown.

REFERENCES


Predictive value of the steady-state peripheral blood progenitor cell (PBPC) counts for the yield of PBPC collected by leukapheresis after mobilization by granulocyte colony-stimulating factor (G-CSF) alone or chemotherapy and G-CSF [letter; comment]

B Husson, C Ravoet, M Dehon, G Wallef, N Hougardy and A Delannoy