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Prediction of Viable CD34 Count in Harvested Product/Peripheral Blood by Peripheral Blood Progenitor Count of Automated Haematology Analyzer in Multiple Myeloma Patients Undergoing Autologous Peripheral Blood Stem Cell Transplantation

Hewapathirana T.D.[1#], Perera T.C.[1], Tudugala R.[2], Suresh S.[3], Kottahachchi D.U.[1]
[1]*Department of Medical Laboratory Science, Faculty of Allied Health Sciences, General Sir John Kotelawala Defence University, Sri Lanka*
[2]*Department of Radiography and Radiotherapy, Faculty of Allied Health Sciences, General Sir John Kotelawala Defence University, Sri Lanka*
[3]*Department of Hematology, Apeksha Hospital, Maharagama, Sri Lanka*

[#]***Corresponding author:*** *dtharushikakdu@gmail.com*

Background: Multiple myeloma (MM) is a clonal neoplastic disorder of plasma cells in the bone marrow. Autologous Peripheral Blood Stem Cell Transplantation (PBSCT) is one of the promising treatments of choice for MM. Success of PBSCT depends on the viable CD 34 cells (VCD34) harvested from peripheral blood. Therefore, optimal engraftment can be assured by improved estimation of CD 34 yield.

Objective: To assess the possibility of predicting VCD34 count in peripheral blood or harvested product by apheresis of MM patients by using hematopoietic progenitor cell counts (HPC) in peripheral blood (PB) from an automated hematology analyzer (AHA) compared to flowcytometry

Methods: MM patients of age 40-65 years, admitted to Bone Marrow Transplant Unit of a tertiary referral center were selected for the study (n=45). HPC in PB were enumerated using AHA and compared with VCD34 count obtained by flowcytometry in both PB and apheresis. Statistical analysis was performed using SPSS version 26.0. Data were separately tested for normalization, followed by bivariate correlation analysis and linear regression analysis.

Results: HPC in PB obtained from AHA and VCD34 in both PB and apheresis obtained from flowcytometry showed normal distribution. In the correlation bivariate analysis, HPC in PB showed significant strong positive correlations with parameters; VCD34 by flowcytometry of PB (r=0.942) and apheresis (r=0.778) (p<0.01)). Equations were derived using regression analysis; VCD34 in PB by flowcytometry=1.210 (HPC of PB by AHA) -1.750 (R^2=0.891) and VCD34 of apheresis by flowcytometry=17.079 (HPC of PB by AHA) + 241.46 (R^2=0.660).

Conclusions: HPC of PB by AHA can be used as a predictive marker to determine the VCD34 either in PB or apheresis as an alternative for flowcytometry. Further studies are required for the validation of these findings for clinical application.

Keywords: *Autologous Peripheral Blood Stem Cell Transplantation, Flowcytometry, Hematopoietic Progenitor Cells, Multiple Myeloma*