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Correlations between Peripheral Blood and Bone Marrow Parameters of B-cell Acute Lymphoblastic Leukemia Patients during Post Induction Chemotherapy

Warnakulasuriya N.V.[1#], Wanigasinghe D.N.[1], Tudugala R.[2], Herath P.[3], Kottahachchi D.U.[1]

[1]*Department of Medical Laboratory Sciences, 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 Haematology, Apeksha Hospital, Sri Lanka*

[#]***Corresponding author:*** *nethmiviranya98@gmail.com*

Background: Acute Lymphoblastic Leukemia (ALL) is the most common childhood malignancy, characterized by the uncontrolled proliferation of lymphoid progenitor cells in bone marrow (BM). Examining the BM is the method of choice for monitoring ALL, which can be challenging and time-consuming. Although expensive Minimal Residual Disease (MRD) methods could be used to monitor treatment, they are unfeasible for routine practice. Using PB parameters to screen the bone marrow could provide a cost-effective alternative in the absence of MRD.

Objectives: To assess correlations between peripheral blood (PB) and BM parameters of B-Cell Acute Lymphoblastic Leukemia (B-ALL) patients during post induction chemotherapy

Methods: A total of 75 newly diagnosed B-ALL patients who attended the Haematology clinic at Apeksha Hospital, Maharagama, were selected for the study. Full Blood Count was performed by Haematology analyzer (Mindray BC-6800), and the BM parameters of Blast% (BL%_BM) and Lymphocyte% (L%_BM) were obtained from myelogram reports. The estimations were performed for the 3 phases; Initial diagnosed (D0), Induction phase I- After 8 days chemotherapy (D8) and Induction phase II- After 29 days chemotherapy (D29). Statistical analysis was performed using SPSS version 26.0. The data was separately tested for normalization, followed by Correlation bivariate analysis.

Results: The non-parametric Spearman's correlations showed that the PB parameters have stronger correlations with L%_BM than BL%_BM. The D8 correlations are prominent among all, and it showed L%_PB and N%_PB have significant ($p<0.01$) positive and negative correlations with L%_BM ($r=0.365$ & $r=-0.341$). BL%_BM too has a significant ($p<0.01$) negative correlation ($r=-0.337$) with N%_PB in D0. In D29, only platelets showed a significant ($p<0.05$) weak correlation ($r=-0.246$) with L%_BM.

Conclusion: There is a significant weak correlation between PB cell counts and BM cell counts during the induction chemotherapy phase of B-ALL. Further studies are required to evaluate applicability of these findings in B-ALL care.

Keywords: *B-Cell Acute Lymphoblastic Leukemia, Bone marrow lymphoblast., Bone marrow lymphocyte, Induction Chemotherapy*