ABSTRACT

TITLE: Characterization of immature platelet fraction in patients with thrombocytopenia presenting to a tertiary care center in India.

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OBJECTIVES:

• To determine whether Immature platelet fraction (IPF) and other platelet indices can be used to reliably distinguish between different causes of thrombocytopenia and to correlate these indices with morphological features of platelets on a stained peripheral smear.

• To analyze the trends in IPF in patients undergoing hematopoietic stem cell transplantation (HSCT) and to see whether it can be a reliable predictor of platelet recovery.

METHODS:

• Blood samples from patients with platelet count <100000/µL (N=196) were run on Sysmex XN®9000 hematology analyser to obtain Impedance and Fluorescent platelet counts, IPF, Mean platelet volume (MPV), Platelet distribution width, Plateletcrit and Platelet large cell ratio.

• On a stained peripheral smear, platelets were categorized according to:
  1. Size - Normal, Large (slightly smaller than red blood cell/nucleus of small lymphocyte) and Giant (larger than red blood cell).
  2. Cytoplasmic colour - Grey, Bluish grey and Blue.

• Megakaryocyte adequacy was recorded from bone marrow aspirate/trephine reports.

• Serial IPF values and platelet counts were monitored in patients with aplastic anaemia and thalassemia undergoing allogenic HSCT and patients with lymphoma and myeloma undergoing autologous HSCT.
Data was tabulated in a Microsoft Excel sheet and Mann-Whitney U tests or Two sample t tests were performed to calculate statistical significance between platelet parameters in patients with hypoproducive, peripheral destructive and ethnic causes of thrombocytopenia. Graphs were plotted to look at trends of IPF in relation to platelet recovery.

**RESULTS:**

- Platelet counts and indices except MPV were significantly higher in patients with peripheral platelet destruction than patients with decreased platelet production (p value <0.05).
- IPF ≥ 9.3% can distinguish patients with destructive thrombocytopenia from patients with hypoproducive thrombocytopenia with 80% sensitivity.
- IPF ≥ 45% can distinguish patients with ethnic macrothrombocytopenia with 100% specificity.
- Patients with ethnic macrothrombocytopenia and destructive thrombocytopenia have larger, bluer platelets.
- Patients with adequate megakaryocytes had significantly higher IPF than patients with decreased megakaryocytes (p value <0.05).
- In 76% patients being followed up post HSCT, IPF went above the age specific reference interval cut offs and this rise preceded platelet recovery by a median of 1 - 3.5 days.
- Patients with primary engraftment failure had a marked daily variation in IPF with no sustained rise in IPF.

**Key words:** Immature platelet fraction, Thrombocytopenia, Platelet recovery.