

SAFETY OF PLATELETPHERESIS IN HEALTHY DONORS: A STUDY ON HEMATOLOGICAL PARAMETER CHANGES

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Background: The Greek word apheresis originally meant to “take away,” “separate” or “remove”. This procedure involves withdrawing whole blood from a donor/patient, separating into individual components for removing one particular component. With the increasing demand for component therapy and advancements of automated cell separators, the use of single-donor platelet (SDP) concentrates has increased worldwide. Although plateletpheresis is generally considered safe, apheresis may lead to transient changes in hematological parameters because of extracorporeal circulation and selective component removal. It is crucial to comprehend these changes to ensure donor safety, optimize donation protocols, and sustain donor retention. This study seeks to analyze the hematological parameter alterations in healthy donors undergoing plateletpheresis and to assess the safety of the procedure in order to support wider acceptance. The study aims to measure and compare the pre and post donation hematological parameters in plateletpheresis donors and to determine the consequences of plateletpheresis on donor’s health. **Methods:** This cross-sectional observational study, conducted at the Department of Transfusion Medicine, Bangladesh Medical University, Dhaka, spanned one year from approval. It included 55 healthy plateletpheresis donors. Hematological parameters were assessed pre- and post-donation. Complete Blood Count (CBC) samples were collected both before and after the procedure. Post-donation parameters were compared with pre-donation values. Quality control was applied to all Single Donor Platelet (SDP) products, and donors were monitored for adverse reactions. Paired t-tests compared mean pre- and post-plateletpheresis values, with statistical analysis conducted using SPSS-22. **Results:** A total of 55 healthy donors were included in the study. The mean age of donors was 27.18±5.3 years, with the average weight of 70.65±7.14 kg and height 169.61±5.63 cm. The majority 45 (81.8%) of subjects were repeat donor while only 10(18.2%) donors were first time donor. The decline in platelet count was more pronounced, with the mean platelet count decreasing from 291.18±74.25 ($\times 10^9/L$) in pre to 205.35±65.61 ($\times 10^9/L$) in post donation. The mean hemoglobin (Hb), red blood cell (RBC) count, hematocrit (Hct), mean platelet volume (MPV), platelet distribution width (PDW) was increased from pre to post donation. In contrast, white blood cell (WBC) count, mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin concentration (MCHC) decreased in post donation. The difference of RBC, WBC, MCHC and MPV were statistically significant ($p<0.05$) between pre and post donation values. Despite these changes, all hematological values remained within acceptable physiological limits following the procedure. No serious adverse events except minor, self-limiting reactions such as transient dizziness or mild citrate-related symptoms were reported in a small proportion of donors. **Conclusion:** The findings reinforce that apheresis is a safe and well-tolerated procedure for healthy donors and is associated with only minimal hematological changes. Meeting the rising demand for platelet concentrates in a resource-limited setting like Bangladesh, promoting awareness about the safety of apheresis is essential. Wider acceptance of this procedure can help increase the availability of donors for single donor platelets. In addition, this will reduce dependence on multiple donors for RDP and improve the efficiency and safety of transfusion practices.

Keywords: Plateletpheresis, Hematological Changes, Donor Safety

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