Plateletpheresis: A Donors Perspective

Muhammad Sajid Yazdani, Shahbaz Ahmad*, Muhammad Ali Rathore, Hamid Iqbal*****

Combined Military Hospital Abbottabad/National University of Medical Sciences (NUMS) Pakistan, *Armed Forces Post Graduate Medical Institute/National University of Medical Sciences (NUMS) Rawalpindi, **Pakistan, Armed Forces Institute of Transfusion/National University of Medical Sciences (NUMS) Rawalpindi Pakistan, ***Combined Military Hospital Abbottabad/National University of Medical Sciences (NUMS) Pakistan

ABSTRACT

Objective: To determine the plateletpheresis procedure adverse reactions as described by donors in a regional blood transfusion centre.

Study Design: Cross-sectional study.

Place and Duration of Study: Armed Forces Institute of Transfusion (AFIT), Rawalpindi Pakistan, from Oct to Dec 2018.

Methodology: The data of 300 plateletpheresis donors, who underwent the procedure, was collected from the donor record of AFIT. All these donors were contacted through cell phone for interviews. The donors willing to participate were interviewed as per the structured questions.

Results: Out of the 300 plateletpheresis donors contacted, only one was female (0.3%). The 166 (55%) male donors responded and showed willingness for inclusion in the study. The overall experience was described as very good by 89 (54%), good by 52 (31%), satisfactory by 23 (14%) and unpleasant by 2 (1%) donors. No adverse effects were observed in 144 (87%) donors, while 22 (13%) had mild adverse reactions. The 152 (91%) blood donors were willing to donate blood again in future.

Conclusion: Plateletpheresis was considered, by donors, a very safe and pleasant procedure if appropriately performed, taking all necessary precautions. However, chances of adverse reactions exist as in all procedures related to blood donation. Our study shows that the minor common adverse reactions do not limit the donors from future blood donations.

Keywords: Blood donation, Plateletpheresis, Platelet donation, Single donor platelets.

How to Cite This Article: *Yazdani MS, Ahmad S, Rathore MA, Iqbal H. Plateletpheresis: A Donors Perspective. Pak Armed Forces Med J 2022; 72(2): 493-496. DOI: https://doi.org/10.51253/pafmj.v72i2.4824*

INTRODUCTION

Aphaeresis is derived from the Greek word that means to draw or remove.[1,2] Plateletpheresis, also known as platelet aphaeresis, is a procedure in which the platelets are removed from the donor's blood in the presence of an anticoagulant, and the remaining components are returned to the donor circulation.[3,4] The plateletpheresis procedure results in the collection of a platelet unit with an adult therapeutic dose (6-8 random platelet units), called single donor platelet (SDP) unit,[5] which has many advantages over random donor platelets, including leukoreduction and reduc-tion of exposure to multiple donors antigens, thus reducing the risk of alloimmunization, and microbial contamination. This is the procedure of choice for cross-match compatible or human leukocyte antigen (HLA) matched platelets collection.[6] The main disadvantages include the higher cost, longer duration of donation procedure and availability of technical staff and equipment.[7] The proper guidance and supervision of technical staff are necessary to make a platelet-pheresis procedure effective and minimize donor-related adverse reactions.[8] Fortunately, the incidence of adverse reactions in plateletpheresis donors is very low, and the procedure is well tolerated. However, adverse reactions can occur during or even after completing the procedure. Adverse reactions can be local as well as systemic.[9,10] Local reactions are usually vascular injuries, including hematoma formation and pain at the venipuncture site due to incorrect needle placement.[10] Systemic reactions are mainly pallor, sweating, dizziness, nausea, hypotension and syncope. Citrate toxicity is also a potential event because of acid-citrate-dextrose use during the procedure as an anticoagulant. These all reactions pose a hazard to the donor's health, and some of the factors like longer donation time (due to smaller vein size or insufficient pressure), anticoagulant use, donation room environment etc., may be annoying for the donor. Considering all these factors, we conducted this study to know the plateletpheresis procedure-experience from donors' perspective.

METHODOLOGY

This cross-sectional study was started after the approval by the Ethics Committee of Armed Forces Institute of Transfusion (AFIT) Rawalpindi (vide letter

Correspondence: Dr Muhammad Sajid Yazdani, Department of Haematology, Combined Military Hospital, Abbottabad Pakistan

Received: 21 Jul 2020; revision received: 24 Aug 2020; accepted: 26 Aug 2020

no 106/Adm of 2 Sep 2018). The study was carried out from October to December 2018. The sampling size was calculated by using a WHO calculator.[11] The data from 300 plateletpheresis procedures was collected by consecutive non-probability sampling technique.

Inclusion Criteria: All the donors of either gender who responded and showed a willingness were included in the study.

Exclusion Criteria: Donors who did not respond or were unwilling were excluded from the study.

All the plateletpheresis procedures were performed by the trained laboratory and nursing technicians under the supervision of transfusion specialists. Fresenius Kabi®,[16] gauge double needle cell separator was used for all procedures. The specific disposable plateletpheresis kits were used to collect the standard volume of platelets for all donors. The donors fulfilling the selection criteria were typed for their blood group and screened for Hepatitis B (HBs Ag), Hepatitis C (anti-HCV Ab), HIV (anti HIVI/II, p24) and syphilis (anti treponema pallidum Ab). Donors found negative for these infections by Chemilum-inescence microparticle immunoassay (CMIA) method underwent the plateletpheresis procedure.

Donors were made comfortable on the donation couch, and the procedure details were explained before the start of phlebotomy. After completing the procedure, the donors were guided to stay on the couch for 10 min, served refreshments and allowed to leave after securing the venipuncture site. After their consent for inclusion in the study, these platelet-pheresis donors were interviewed by telephone, and responses were noted as per the questionnaire. The donors were stratified as per their ages into three groups. Group-1 included donors' age 18 to 30 years, group-2 between 31-45 years and group-3 from 46-65 years. The adverse reactions were classified as mild, moderate and severe based on the presenting complaints of the donor. Mild reactions did not warrant any medical intervention and included syncope, malaise, dizziness, sweating, paresthesia and headache. Moderate reactions included vomiting, hypotension and arrhythmia, which required immediate medical assistance but no hospital admission. At the same time, severe reactions required immediate interventions to save the life and needed hospital admission, including hyperventilation, tetany, apnea, loss of consciousness and convulsions.

The results were analyzed by Microsoft Excel 2010. The frequencies and percentages of adverse reactions were calculated for the overall study population and individual adverse reactions in the age groups.

RESULTS

All the three hundred (300) plateletpheresis donors (including the only female) were contacted on the provided cell phone numbers. Out of these, 166 (55.3%) responded and gave consent to participate in the study. After explaining the study and its purpose, they were interviewed as per the questionnaire. All the donors who took part in the study were males. 104 (63%) donors belonged to group-1, 60 (36%) in group-2 and group-3 had only 2 (1%) donors.

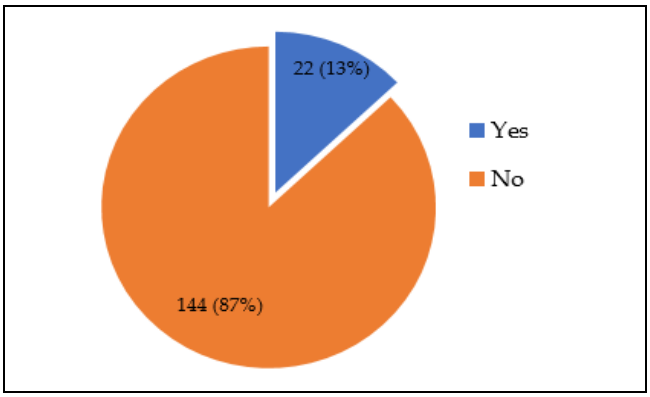

Figure-1: Frequency of plateletpheresis related adverse reactions (n=166).

The adverse reactions were experienced by only 22 (13%) donors (Figure-1). The duration of the plateletpheresis procedure in different age groups was shown in Figure-2, with no statistically significant difference among these groups. The type of adverse reactions and their age-wise distribution was shown in Figure-3, with no adverse reaction in the 45 to 65 years age group. The overall experience of plateletpheresis donation was described, subjectively, as very good by 89 (54%) donors, good by 52 (31%) donors, satisfactory by 23 (14%) and unpleasant by 2 (1%) donors (Figure-4). The 152 (91%) blood donors were willing to donate blood in future, while 14 (9%) showed their unwillingness for future blood donation based on plateletpheresis experience.

DISCUSSION

In contrast to the common belief in our part of the world, the plateletpheresis is considered, by donors, a very safe and pleasant procedure if appropriately performed, taking all necessary precautions. Chances of adverse reactions do exist, as in all blood donation procedures. Our study showed that the adverse reactions, which were primarily mild, do not limit the

donors from future blood donations as most donors were willing to enter the regular donors' pool.

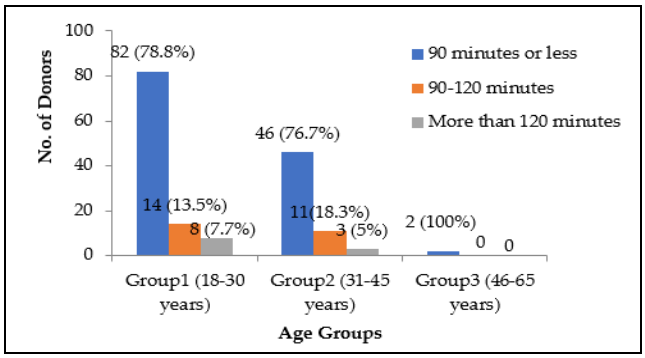

Figure-2: Duration of plateletpheresis donation time in different age groups (n=166).

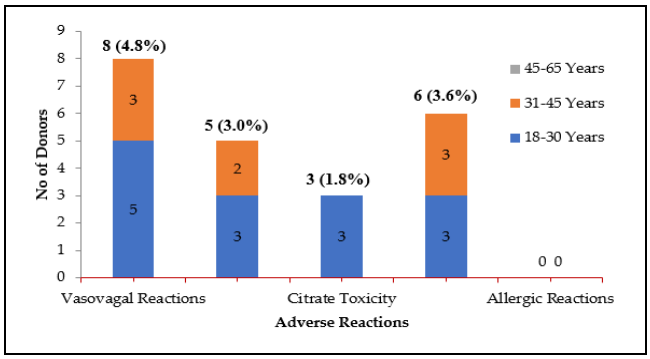

Figure-3: Frequency of different types of adverse reactions of plateletpheresis procedure (n=166).

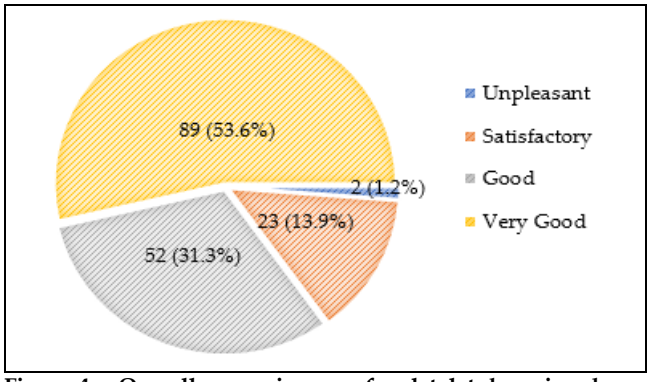

Figure-4: Overall experience of plateletpheresis donors (n=166).

The requirements for platelet transfusion are on the rise due to the availability of more aggressive chemotherapeutic agents and outbreaks of viral infections like dengue fever in our part of the world.[11,12] Single donor platelet (plateletpheresis) units, though costly, have become an essential part of treating various haematological and non-haematological conditions resulting from or associated with thrombocytopenia.[13,14] Although reasonably safe, the apheresis procedure is also relatively cumbersome for donors.[15,16] In our present study, we collected the data from the platelet-pheresis donors to record their experiences and to know the donor's perspective regarding the time in donation procedure, vasovagal reactions, vascular injuries, citrate toxicity, pain at the venipuncture site, allergic reactions, willingness for future blood donation and overall experience of plateletpheresis.

In our study, 22 out of 166 (all male) plateletpheresis donors (13%) developed adverse reactions. We also classified the adverse reactions according to three age groups. The findings of our study are similar to the study by Amanat *et al,* in which all the donors were males. 6 donors (3%) had adverse reactions, out of which 3 (1.5%) had mild reactions, 2 (1%) moderate reactions, and 1 (0.5%) developed hematoma. None had severe or life-threatening reactions as in our study.[17]

However, the results of our study are different from the study conducted by Philip *et al,* who reported 85 adverse reactions in 3,120 plateletpheresis procedures, i.e. with the frequency of only 2.7%. The frequency of vascular injury, citrate toxicity and vasovagal reactions in plateletpheresis was 1.6% (52/3,120), 0.96% (30/3,120), and 0.096% (03/3,120) respectively. All of these reported adverse reactions were of mild intensity.[18] Our study showed that the mild to moderate vasovagal reactions are the most frequent adverse reactions that developed in 2.9% (3/104) and 1.9% (2/104) of blood donors in the 18 to 45 years age group and after the procedure, respectively. In the 31-45 years age group, the frequency of vasovagal reactions was higher (5%) but similar (1.7%) after the procedure. The blood donors aged 46 to 65 years had no vasovagal reactions at all, maybe due to fewer donors in this group.

Our results regarding vasovagal reactions are in concurrence with a study conducted by Crocco *et al,* using a special, pre-arranged form within the quality system. In their study, vasovagal reactions, mostly of mild intensity, were the most commonly observed adverse reactions, with a frequency of 0.20% (487/240,596), although it included whole blood donations.[19] The frequency of the vasovagal reactions varied according to the different types of donation, being 0.19% (346/183,855) for homologous whole blood donations, 0.24% (16/6,669) for autologous whole blood donations, 0.16% (63/38,647) for plasmapheresis, 0.68% (18/2,641) for plateletpheresis and 0.49 (43/ 8,784) for multi -component donations. Citrate toxicity was reported in

0.38% (189/50,072) of aphaeresis donations in contrast to our study, which developed in 1.8% (3/166) of donors during the procedure, all from the 18-30 years age group. Severe adverse reactions were very rare in the study by Crocco *et al*, reported at 0.004% (10/ 240,596), 19 while no donor developed any of the severe reactions in our study.

In our study, all the adverse reactions were related to donors while no technical problems were seen. The frequency of adverse reactions (13%) of plateletpheresis donors in our study is slightly higher than the study conducted by Bassi *et al*. They reported 13 adverse reactions, of which 8 (61.6%) were associated with donors, 3 (23.1%) owed to a fault in kit/ equipment, and 2 (15.4%) were due to technical aberrations. However, all the Adverse reactions associated with donors were mild, and none of the donors was hospitalized in the study.[20]

Our study is unique as we also analyzed the adverse reactions from the donor's perspective and further studied these reactions in different age groups, time of the procedure, willingness as the future donor and overall experience not reported in the literature.

CONCLUSION

Plateletpheresis was considered, by donors, a very safe and pleasant procedure if appropriately performed, taking all necessary precautions. However, chances of adverse reactions exist as in all procedures related to blood donation. Our study shows that the minor common adverse reactions do not limit the donors from future blood donations.

Conflict of Interest: None.

Authors' Contribution

MSY: Idea conception, supervision of study and manuscript writing, SA: Performed the interviews, MAR: Technical support and review of manuscript, HI: Review of manuscript and data analysis.

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