

Original research article

A study on the pattern of donor deferral for plateletpheresis in a tertiary care hospital in Southern India and measures to decrease them

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Abstract

Background: Collection of platelets by plateletpheresis is a relatively simple, safe and important adjunct to blood bank inventory for provision of platelet components. Recruitment of plateletpheresis donors is challenging since the selection criteria are more stringent compared to whole blood donation resulting in higher deferrals. The aim of the study is to assess the causes of deferral among donors who registered for plateletpheresis so as to ascertain the preventable and temporary deferrals for reinduction of these donors.

Materials and Methods: Donor deferral data was collected retrospectively for donors who registered in the period of July 2022 – June 2023 in a tertiary care hospital attached blood center. The donors were selected or deferred based on the guidelines issued under the Drugs and Cosmetics Act, 1940 and the rules therein with guide transfusion services in India.

Results: Of the 759 donors registered for the plateletpheresis procedure during the study period, 235 (30.96%) donors donated and 524 (69.04%) donors were deferred. Among 524 deferred donors, the reason for deferral was unavailable in 44 donors while 245 (51%) donors were deferred due to lack of suitable venous access with 133 (54%) of them being deferred due to single vein availability. Temporary deferrals were seen in 171 (36%) donors of which low platelet count was the most common (89 donors). Permanent deferrals were done in 16 donors where previous sensitization history was the cause in 9 donors.

Conclusion: Donor deferrals diminish the donor pool and demotivate the donors from further donations. While some factors like lack of adequate venous access or seroreactivity cannot be altered, the conversion of replacement donors to a voluntary donor pool can help in overcoming shortages. The use of Information, education and communication sessions to increase social awareness may substantially decrease the deferral rates. Further, training and bolstering confidence in phlebotomists to collect platelets from donors with single vein can increase the donor pool.

Keywords: Platelets, Blood Transfusion, Single donor Apheresis platelets, donor deferral

Introduction

The provision of platelets for transfusion in patients with acute bleeding or severe thrombocytopenia has a number of challenges, especially the short half-life. While random donor platelets prepared from whole blood donations have been the norm, the introduction of advanced and more efficient apheresis platforms has made the use of single donor platelets (SDPs) more common. The increasing demand for platelets, driven by a growing number of patients with various bleeding conditions and advancements in medical science, such as transplantation programs, has significantly raised the need for platelets, especially for SDPs which have the added advantages of shorter intervals between donations for donors, decreased donor exposure and HLA sensitization [1]. However, recruiting plateletpheresis donors is a challenge because the selection criteria encompass those applicable to whole blood donation, along with additional parameters which decrease the donor pool. Deferral of these donors also decreases their motivation for further donations [2].

This study aimed to assess the causes of deferral among donors in Kamineni Hospital Blood center, a tertiary care hospital in Hyderabad, India. The donors who registered for plateletpheresis in our blood center whether they were accepted or deferred were included in the study.

Methods

This is a retrospective study with donor deferral data collected for donors who registered in the period of July 2022 – June 2023 in a hospital-attached blood center in a tertiary care hospital. The donors were selected or deferred based on the guidelines issued under the Drugs and Cosmetics Act, 1940 and the rules therein that guide transfusion services in India^[3].

A detailed history was taken from the donors and they were selected as per the following criteria for Single Donor Platelet (SDP) preparation in accordance with the hospital protocols:

1. Age 18 to 60 years, weight >50 kgs
2. Donor must meet *all* the criteria of routine whole blood donation
3. ABO/Rh typing.
4. Haemoglobin >12.5 gm/dl
5. Platelet count > $150 \times 10^3/\mu\text{l}$
6. Absence of any illness
7. Donor must not have taken aspirin containing medications in last 72 hours.
8. Negative test for HIV, Hepatitis B, Hepatitis C, Syphilis and Malaria.
9. Interval between 2 donations shall be at least 48 hours
10. Donors shall not have undergone plateletpheresis more than 24 times a year.

The blood samples of donors were collected for complete blood count as well as for Transfusion Transmitted Infection (TTI) testing. The samples were tested for HIV, HBs Ag, HCV using chemiluminescence immunosorbent assay (CLIA); Rapid plasma regain (RPR) for Syphilis and Rapid Malaria Antigen test for malaria. The donors who fulfilled all the above criteria were recalled as per the patient requirement and the apheresis procedure was performed.

The accepted donors underwent plateletpheresis while the deferred donor details were entered into our donor deferral register which contained details of the donor along with the reason for deferral. The data was entered into an Excel file, (Excel for Windows, Microsoft Corporation, 2017) for further analysis.

Results

A total of 759 donors registered for the plateletpheresis procedure during the study period. Of these donors, SDPs were collected from 235 (30.96%) donors while 524 (69.04%) donors were deferred. Of the 524 deferred donors, the reason for deferral was unavailable in 44 donors and were excluded from the analysis. Of the remaining 480 deferred donors, 245 (51%) donors were deferred due to lack of suitable venous access of which 133 (54%) were deferred due to single vein availability and 112 donors had no suitable venous access in both arms. Temporary deferrals were seen in 171 (36%) donors and 16 donors were permanently deferred. Two donors had multiple causes of deferral. After being screened suitable for donation, 48 donors (10%) did not undergo plateletpheresis for various reasons. The causes for deferral of these donors are shown in Table 1.

Donors with a single venous access constituted 54% (n=133/ 245) of the donors deferred due to lack of proper venous access. These donors can be included in the donor pool after proper training of the phlebotomy staff and bolstering their confidence. Donors with low Hemoglobin < 12.5 g/dl (n=7), Low platelet count < $150 \times 10^3/\mu\text{L}$ (n=89) can be included in the donor pool after proper investigation and correction wherever required. Donors with history of alcoholism (n=11), inadequate sleep (n=19), medication (n=17), vaccination (n=2), tattooing (n=8), age <18 years (n=5), health issues after selection (n=10) would be eligible for donation after proper counseling and completion of deferral period. Further, 48 donors did not undergo plateletpheresis for miscellaneous reasons which included the inability of the patient to pay for the procedure (n=13), demise of the intended patient (n=12) patient not requiring SDP (n=11) after screening and donor unavailability or refusal to come for donation (n=12).

Discussion

Single donor apheresis platelets, often referred to as SDP (Single Donor Platelets), represent a significant advancement in blood donation and transfusion medicine. These platelets are obtained through a specialized procedure known as plateletpheresis, which allows for the isolation and collection of a high concentration of platelets from a single donor while returning other blood components back to the donor's circulation.

SDPs offer several advantages over traditional platelet transfusions derived from whole blood donations.

Some key benefits of SDPs include^[1]

High Platelet Concentration: SDPs provide a much higher concentration of platelets, ensuring a more potent and effective treatment for patients in need of platelet transfusions.

Reduced Risk: With SDPs, there is a decreased risk of transfusion-transmitted diseases because the donation process is performed on a single, carefully screened donor.

Decreased Reactions: Alloimmunization and febrile nonhemolytic reactions are less common with

SDPs, enhancing the safety of platelet transfusions.

Shorter donation intervals: Decreased loss of red cells results in decreased donation interval.

Due to these advantages, SDPs have become an integral part of modern transfusion medicine, with advancements in apheresis technology and collection techniques further improving their efficiency and availability.

The demand for platelets in medical treatments has been steadily rising due to factors such as an increase in patients with bleeding disorders and advancements in medical procedures, including organ transplants. Consequently, SDPs play a critical role in meeting this demand. However, recruiting SDP donors can be challenging as they must meet the selection criteria for whole blood donation, along with additional parameters specific to plateletpheresis. Further increased deferrals of donors registering for SDPs are also a cause of concern.

The total donor deferral rate in our study (69%) is higher compared to other studies which reported a deferral rate of 10-44%^[4,7]. This is particularly due to the stricter donation criteria for SDP donors at our center where dual venous access was sought as a requirement for plateletpheresis. If donors with single vein were also included, the deferral rate would be about 49% comparable to the study by Yadav *et al*^[6]. Temporary deferrals were the most common cause of deferral in our study accounting for 87% of deferred donors. This is comparable to the studies by Ashok pal *et al* and Pujani *et al* who reported them to be 93.3% and 92% in their population^[5,7]. Further poor venous access in our study was a cause of deferral in 51% of our donors, with only 46% of them having no adequate venous access in both arms. This accounts for 23% of total deferrals. This is comparable to 31.5% reported by Pal *et al* and 22.4% by Yadav *et al* and much higher than the 9.4% reported by Pujani *et al*^[5,7]. Low platelet count of $<150 \times 10^3/\mu\text{L}$, as a cause of deferral was seen in 19% of our donors which is comparable to the study by Ashok pal *et al*. who reported 19.3% and much lower than the other studies who reported it to be 43-49%^[5,7]. However low Hemoglobin of $<12.5\text{g/dl}$ as a cause of deferral was seen in only 1% of our donors compared to a much higher prevalence in other studies in India^[4,7]. This could be due to our donor population being drawn from the middle and affluent classes, higher education standards and predominantly (>98%) male donors^[8]. The donor deferral due to anemia for whole blood donation is also <5% among our donors.

While many studies previously done have suggested a lowering of minimum hemoglobin and platelet count for increasing the donor availability for plateletpheresis in India, their contribution overall for deferrals in our study is about 20%^[5,7]. We have not further studied the hemoglobin and platelet levels of all our deferred donors. A study of 28 of these donors with low platelet count (of the 89 donors) has shown that 25 of them (89%) had a platelet count between 120- $150 \times 10^3/\mu\text{L}$.

Though the number is significant, it is preferable that these donors may be considered for inclusion following a thorough investigation and appropriate correction, as needed. Donors with a history of alcoholism, inadequate sleep, medication use, recent vaccination, recent tattooing, age below 18 years, or health issues arising after selection can also become eligible for donation after undergoing suitable counselling and adhering to the deferral period.

Furthermore, 48 of our donors did not undergo plateletpheresis due to various miscellaneous reasons like patients' inability to cover the procedure costs, the unfortunate demise of the intended patient, patients no longer requiring Single Donor Platelets (SDP) following donor screening, and instances of donor unavailability or refusal to come for donation. The implementation of Information, Education, and Communication (IEC) sessions can play a pivotal role in raising social awareness and inspiring these potential donors to adopt a healthier lifestyle and ultimately become part of the donor pool^[2]. As a result of these efforts, 331 (69%) of the initially deferred donors can be integrated into the donor pool. Notably, 181 donors (38%) are immediately eligible for donation, which has the potential to reduce the deferral rate from 69% to 31%.

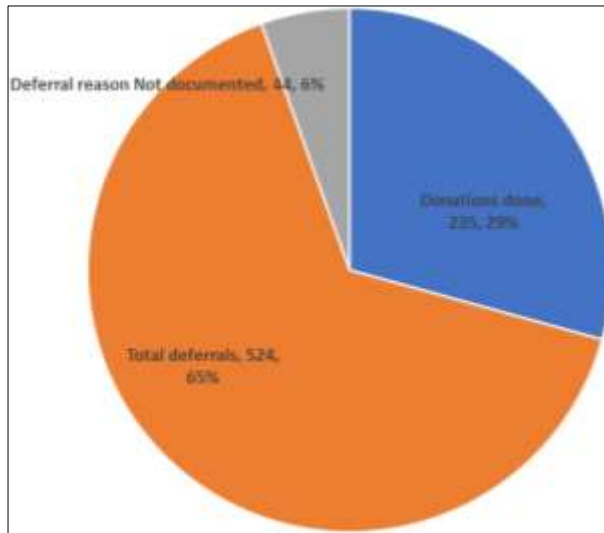


Fig 1: Donors registered

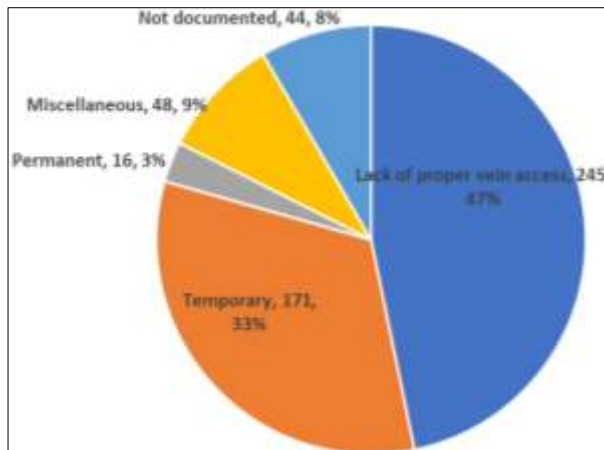


Fig 2: Reasons for deferral with percentages

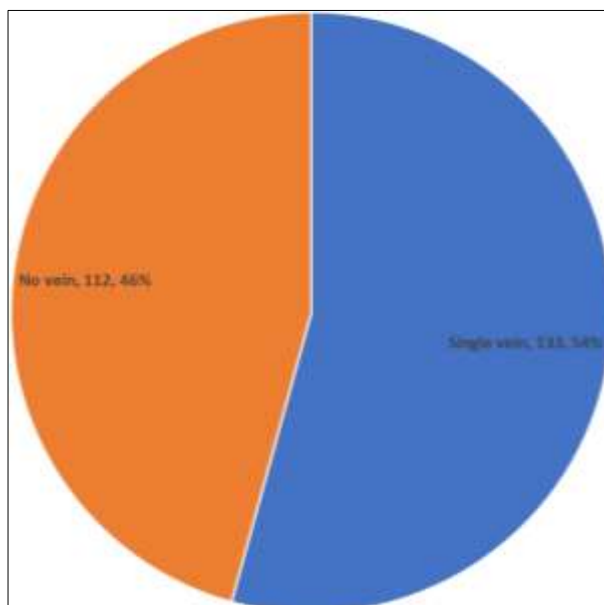


Fig 3: Venous access as reason for deferral

Table 1: Causes of Donor deferral

Reason for deferral	n	Percentage
Lack of proper vein access	245	51%
Single vein	133	28%
No vein	112	23%
Temporary deferral	171	36%
Decreased platelet count	89	19%
Inadequate sleep	19	4%
Medication	17	4%
Alcoholism	11	2%
Tattooing	8	2%
Low Hb	7	1%
Age<18	5	1%
Increased WBC count	3	1%
Vaccination	2	0%
Body weight <50 Kg	2	0%
Health issues after selection	10	2%
Permanent deferral	16	3%
Females with a history of pregnancy	9	2%
HbSAg reactive	5	1%
HCV reactive	2	0%
Miscellaneous	48	10%
Economical reasons	13	3%
Patient expired	12	3%
Donor unavailable on call	12	3%
SDP no longer required	11	2%
Deferral reason not documented	44	

Conclusion

Various reasons for pre-donation deferral diminish donor pool even though demand for blood and its components are increasing. Donor deferral is very painful and tragic for the donor as well as blood centre. Improving donor safety and retention can be significantly enhanced through comprehensive staff training in phlebotomy techniques, donor screening, and counselling. Additionally, conducting educational sessions to boost social awareness has the potential to substantially reduce the rates of deferral and increase donation.

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