

An Analysis of Deferral Pattern in Plateletpheresis Donors

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Abstract

Background: Platelet utilization has increased much more than other components worldwide in last 2 decades. Single donor platelets (SDP) have several benefits over random donor platelets, therefore being preferred. However, stringent criteria of donor selection and therefore high rate of deferral are major limitations to availability of SDP. **Aim:** The present study was carried out to evaluate the various reasons for deferrals in plateletpheresis donors. **Material & Methods:** This retrospective study was conducted to analyze the reasons for deferrals in platelet donors at Blood bank, SMS&R, Sharda hospital, Greater Noida from January 2013 to December 2013. In an ABO identical donor, selection criteria for plateletpheresis followed were: Platelet count -1.5 lakhs; Weight-55 Kg; Good vein in one or both arms; no Aspirin intake in last 72 hours & minimum interval of 72 hours from last plateletpheresis along with all other criteria for whole blood donation. **Results:** Out of 283 donors screened, 58 were deferred with an overall deferral rate of 20.5%. Out of these, 89.65% deferrals were due to temporary causes. Low platelet count & low hemoglobin levels accounted for 44.82% & 18.96% temporary deferrals respectively. 10.34% of deferred donors had Hb in range of 11.5-12.4gm% while 8.6% deferred donors had platelet count of 1.4 lacs to 1.49 lacs and 6.8% had weight in range of 50-55 kg. **Conclusion:** As it is difficult to convince donors for plateletpheresis, screening criteria of the same should be revised and formulated separately from whole blood donation. Criteria for hemoglobin and donor weight for plateletpheresis can be relaxed.

Keywords: Donor deferral, Plateletpheresis, Stringent criteria

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Introduction

Blood transfusion service (BTS) is an integral part of health care system which primarily aims at providing adequate and safe blood and blood components. For this, the most important step is proper selection of the blood donor by formulating and following donor selection criteria. Appropriate donor selection ensures safety of donor as well as recipient. Donors can donate whole blood or a particular component like platelets during apheresis procedure.

Platelet transfusions are indicated in patients who are bleeding or at an increased risk of bleeding secondary to thrombocytopenia or platelet dysfunction. Platelets for transfusion

can be provided as random donor platelets / platelet concentrate prepared by harvesting routine whole blood donation or as single donor platelets by apheresis. Plateletpheresis procedure is designed to collect large number of platelets from single donor thereby giving more consistent product.¹ As per guidelines of American association of blood banks plateletpheresis (Single Donor Platelets) unit must have platelet count of 3×10^{11} which in turn raises platelet count by 30,000-60,000 per microlitre and is equivalent to 4-6 units of random platelet concentrates². Besides providing good yield, single donor platelets have numerous advantages over random donor platelets for the recipients which include

decreased risk of transfusion transmitted infections, bacterial contamination and alloimmunization due to reduced donor exposure.³ Over the years, the demand for single donor platelets has increased manifold. It is estimated that 79% of therapeutic platelet doses transfused in the United States of America are apheresis platelets¹

The demand of plateletpheresis is increasing in our country also mainly because of dengue epidemics since last 10-15 years.⁴ Now a days, most of the tertiary care centers are demanding plateletpheresis to increase platelet count of patients. But prolonged procedure time, improper knowledge and social taboo are some of the factors that lead to noncooperation by donors in Indian scenario. Besides these, stringent donor selection criteria of - predonation platelet count and hemoglobin concentration further diminish the donor pool.^{3,5} The present study was carried out to analyze the frequency and causes of donor deferral for plateletpheresis.

Materials and Methods

This retrospective study was carried out at SMS&R, Sharda Hospital, and Greater Noida over a period of one year (from 1st Jan 2013 to 31 Dec 2013). Donor selection criteria for plateletpheresis followed at our institute were:

- a) Age 18-60 years
- b) Hb- 12.5gm%
- c) Platelet count- 1.5 lakhs
- d) Weight- 55 Kg
- e) Good vein in one or both arms
- f) No Aspirin intake in last 72 hours
- g) ABO identical blood group
- h) Interval from last whole blood donation- 3 months and 72 hours from last plateletpheresis

- i) Proper medical history
- j) Physical examination
- k) Negative serology for HIV, HBsAg, HCV, malaria parasite and syphilis

Besides these, all other criteria for whole blood donation were followed. For ABO identical donors, detailed history and physical examination was done. This was followed by checking adequacy of vein and blood samples collection for complete blood counts and serological tests. Platelet counts were done on SYSMEX 1800i. The serological tests were done using ELISA for HIV, HBsAg (4th generation, Bio-Rad) and HCV (3rd generation, Bio-Rad). Test for Syphilis was done by RPR (Tulip Diagnostics). Test for malaria was done by Para bank (Tulip diagnostics). Donors who fulfilled above cited criteria were taken for apheresis by MCS Haemonetics, Intermittent flow cell separator.

Results

Over a period of one year 283 donors were screened for plateletpheresis, out of which 58 were deferred. Majority of donors deferred were males in 20 to 40 years age group. This can be because males of this age group constituted majority of donors screened. Reasons for donor deferral were divided into temporary and permanent. Out of 58, 52 (89.65%) were deferred for temporary reasons and 6 (10.35%) were deferred permanently-due to positive serology. Low platelet count was the most common cause of temporary deferral followed by low hemoglobin levels constituting 44.82% and 18.96% deferrals respectively. Two donors were deferred for dual reasons of low platelet and low hemoglobin levels.

Table- 1: Causes of plateletpheresis donor deferral

Temporary deferrals (n=52, 89.65%)		Permanent deferrals (n=6, 10.35%)	
Cause	Donors Deferred (%)	Cause	Donors Deferred (%)
Low platelet count	26 (44.82%)	Serology positive for HBsAg	2 (3.45%)
Low Hemoglobin	11 (18.96%)	Serology positive for HCV	2 (3.45%)
Abnormal leucocytes count	4 (6.89%)	Serology positive for VDRL	2 (3.45%)
Poor venous access	5 (8.62%)		
Low weight	4 (6.89%)		
Recent ailment/medication	3 (5.17%)		
Surgery in recent past	1 (1.72%)		

Note: 2 donors were deferred for dual reasons of low platelet and low hemoglobin.

Of the 11 donors deferred for anemia, 6 donors had hemoglobin in range of 11.5 gm % to 12.4gm%; constituting 10.34% of all deferral. Out of 26 donors deferred for low platelet counts, 5 donors had platelet values between 1.4 lakhs to 1.49 lakhs.

Discussion

Platelet transfusions are essential to prevent morbidity and mortality in patients who are severely thrombocytopenic and are at risk of spontaneous bleeding. The quality of single donor platelets (SDP) in terms of yield influences platelet recovery in the recipient and allows prolongation of intervals between transfusions.¹ But the most significant limitation to ever increasing use of apheresis platelets is poor availability of SDP donors-in part due to increased procedure time, causing non cooperation by donors and partly due to lack of awareness. Besides these, ineligibility of donors due to low platelet count, low hemoglobin or low weight further aggravates the problem.

In the present study, 20.5% platelet donors were deferred due to various reasons. A deferral rate of 10.6%-27.5% is described by other authors.^{3,5,6,7}

In present study, most of the donor deferrals-89.65% were for temporary reasons. Low platelet count was most important cause

accounting for 44.82% of deferrals followed by low hemoglobin contributing 18.96% of deferrals. This is comparable to Pujani et al who found 43.5% & 27 % of deferrals due to low platelet and low hemoglobin respectively³. Tondon et al and Pandey et al also observed the similar trends^{6,7}. But Kusumgar et al found 21 % and 29% deferrals due to low platelet count and low Hb respectively.⁵ Two out of 58 donors were deferred for dual reasons i.e. low platelet and low hemoglobin.

Out of 11 donors (18.96%) deferred for anemia, 6 (10.3%of total deferred) had Hb in range of 11.5-12.4 gm%. Kusumgar et al observed no effect on platelet yield or adverse donor reactions while performing apheresis in 49 donors with 11.5-12.4gm% hemoglobin and stated that one fifth of deferred donors can be reconsidered if criteria for hemoglobin is relaxed⁵. Fraser et al also found lowering the cut off value of hemoglobin up to 11.5 g/dl has no deleterious effect on apheresis donors.⁸ This may be because only 20-40 ml of blood (PRBC) is lost if procedure is performed properly. The rationale for hemoglobin testing and setting the cut off at > 12.5g/dl for donor acceptance is justified in whole blood donation because of the red cell loss during donation with a decrease of 1g/dl in Hemoglobin level; but not in case of plateletpheresis.

Table- 2: Percentage of donors able to reenter donor pool if Hb criterion is relaxed

Study	% Deferral if criteria of Hb>12.5gm%	% Deferral if criteria of Hb-11.5gm%	% of donors re-enter the donor pool
Tondon et al	14	5.35	8.65
Kusumgar et al	29.44	15.83	13.61
Pujani et al	27.05	9.85	17.2
Present study	18.96	8.62	10.34

Out of 26 donors deferred for low platelet count, 6 (10.34% of all deferrals) had platelets in range of 1.40 lakh -1.49 lakh. As per DGHS guidelines platelet count is not required in first time donors⁹. Tondon et al found 22% decrease in platelet count after the procedure⁶. Literature has documented no adverse effect in donors even at a post platelet count of 69,000¹⁰. But pre procedure platelet count effects platelet yield, therefore we follow a policy to do platelet count even in first time donors. In case of emergency and unavailability of donors, this

criterion can be relaxed to reduce family anxiety.

In our study, we deferred 4 (6.89%) donors having weight less than 55 kg. M Pujani et al & Kusumgar et al followed a cut off value of 60 kg and 50 Kg and deferred 4.7% donors and 5% donors for low weight respectively.^{3,5} Kusumgar et al did not report any adverse effect in weight range of 50-60 kg. Buchholz et al did not find any adverse effects in plateletpheresis donors of 45-49.9 Kg of weight¹¹.

Five donors (8.62%) were deferred for poor venous access as compared to 9.41% & 9 % of

Pujani et al and Kusumgar et al respectively.^{3, 5} Good venous access is an important criterion for successful completion of the procedure. Four donors (6.89%) were deferred for abnormal total and differential counts which is comparable to Kusumgar et al who observed 5% deferral due to abnormal white cell counts. Four donors were deferred for cause of medications and h/o recent surgeries/transfusion.

Six out of 58 (10.3% of donors deferred) were positive for TTI. In a study done at the same institute 3.4% whole blood donors were found positive in serology while 2.1% of total donors screened for plateletpheresis were positive¹².

Conclusion

The demand of plateletpheresis is increasing. Selection of plateletpheresis donor follows the stringency of whole blood donation criteria along with certain additional criteria. This leads to high rate of donor deferral. Majority of deferrals are due to temporary causes like low hemoglobin, low platelet count and low weight. As it is difficult to convince donors for plateletpheresis, screening criteria should be revised and formulated separately from whole blood donation criteria. In view of present study, criteria for hemoglobin and donor weight can be relaxed to suit Indian scenario.

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References

1. R Arun, A Yashovardhan, K Deepthi et al. Donor demographic and laboratory predictors of single donor platelet yield. *J Clin Sci Res* 2013;2:211-5.
2. Mark E Bretcher (ed) Apheresis. Technical Manual American Association of blood banks 15 th edition AABB press 2005;139-158.
3. Mukta Pujani, P Lalita Jyotsna, Shalini Bahadur, Sangeeta Pahuja et al. Donor Deferral Characteristics for Plateletpheresis at a Tertiary Care Center in India- A Retrospective Analysis. *J Clin Diagn Res.* 2014;8(7): FC01-FC03. [\[PubMed\]](#)
4. Makroo RN, Raina V, Kumar P, Kanth RK. Role of platelet transfusion in the management of dengue patients in a tertiary care hospital. *Asian J Transfus Sci* 2007;1:4-7. [\[PubMed\]](#) <http://dx.doi.org/10.4103/0973-6247.28065>
5. Rima Kusumgar, Shailee Mehta, Manoj Shah, Mr. Rajesh Rajvanshi. A Two Years Study of deferral among platelet pheresis donors in a cancer care Institute. *Pathol and lab medicine* 2014;6(1):37-39.
6. R Tondon, P Pandey, R Chaudhry. A 3-year analysis of plateletpheresis donor deferral pattern in a tertiary health care institute: assessing the current donor selection criteria in Indian scenario. *J Clin Apher* 2008; 23:123-28. <http://dx.doi.org/10.1002/jca.20171>
7. P Pandey, AK Tiwari, J Sharma, MB Singh, S Dixit, V Raina. A prospective quality evaluation of single donor platelets (SDP) - an experience of a tertiary healthcare center in India. *Transfus Apher Sci* 2012;46:1163-67. [\[PubMed\]](#) [CrossRef](#)
8. JL Fraser, LU Whatmough, MS Kruskall. Lowering the hemoglobin cutoff for female plateletpheresis donors. *Transfusion* 1998;3: 855-59. [\[PubMed\]](#) <http://dx.doi.org/10.1046/j.1537-2995.1998.38998409006.x>
9. RK Saran. Apheresis In Saran RK(ed): *Transfusion Medicine Technical manual.* Directorate General of Health Services, Ministry of Health and Family Welfare. 2003;229–66.
10. Jeffery CW, Alvaro AP. Hemapheresis In Richard A Macpherson, Mathew R Pincus(eds) *Henry's clinical diagnosis and management* 21st edition Saunders; 2007;685-711
11. Buchholz DH, Squires JE, Herman JH, Ng AT, Anderson JK, Hedberg SL. Plateletpheresis in 90-to 110-pound donors using the CS-3000 blood cell separator. *Transfusion* 1997;37:715-8. [\[PubMed\]](#) [CrossRef](#)
12. Dua S, Manocha H, Deshmukh G. Seroprevalence of transfusion transmitted diseases (single and dual) infections in blood donors of western U.P. India. *Indian journal of public health research and Development.* 2014;5(3):307-11. [CrossRef](#)