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Original Article

Pathology Section

Donor Deferral Characteristics for Plateletpheresis at a Tertiary Care Center in India- A Retrospective Analysis

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ABSTRACT

Background: The demand for plateletpheresis is increasing day by day due to its many merits over random donor platelets. However, in our country, there is a dearth of apheresis donors due to greater devotion and time required for the procedure and lack of awareness.

Aim: The aim of the present study is to analyse the reasons for deferral of apheresis donors at a tertiary care center.

Materials and Methods: This retrospective analysis was conducted to study the causes, frequency and the type of plateletpheresis donor deferral at regional blood transfusion center, Lady Hardinge Medical College and associated Shrimati Sucheta Kriplani Hospital and Kalawati Saran Childrens' Hospital. The study was undertaken over a period of two years (from January 2010 to December 2011.

Results: Out of a total of 343 donors screened, 87 donors were deferred, the overall deferral rate being 25.36%. The most frequent cause of deferral was a low platelet count accounting for 43.5% of all the causes followed by a low hemoglobin level (27.05%). Among the donors deferred for anaemia, 15 out of 23 (65.2%) had hemoglobin in the range of 11.5-12.4gm%, representing 17.2% of all deferrals.

Conclusion: Based on these findings and the scarcity of apheresis donors in our country, we are of the opinion that the selection criteria for plateletpheresis donors should be revised to accommodate more donors and reduce deferral rate without compromising on the health of the donors.

Keywords: Apheresis, Deferral, Plateletpheresis

INTRODUCTION

Single donor plateletpheresis has numerous advantages over random donor platelets which include decreased risk of transfusion transmitted infections, bacterial contamination and alloimmunization due to reduced donor exposure [1,2]. Over the years, the demand for single donor platelets has increased manifold. The prime reason for the increasing awareness regarding plateletpheresis has been the occurrence of dengue epidemics in our country during the last 10-15 years [3]. However, plateletpheresis requires a greater dedication than whole blood donation on the part of the donor because of the prolonged duration of the procedure. Moreover, for adequate platelet yield (more than or equal to 3×10^{11}/ bag) [4] and optimal patient and donor safety, the donor selection criteria are more stringent. Stricter donor acceptance rules and greater cost per unit leads to higher rate of donor deferral as well as greater donor attrition.

There is a paucity of literature regarding donor deferral characteristics in plateletpheresis [5,6]. A study on the causes of donor deferral and the platelet yield parameters shall help in analysing ways to maximise and expand the already limited apheresis donor pool as well as to determine if certain criteria can be relaxed. Therefore, we conducted a retrospective analysis to study the causes, frequency and the type of plateletpheresis donor deferral at a regional blood transfusion centre.

MATERIALS AND METHODS

The present study was conducted at Regional blood transfusion center, Lady Hardinge Medical College and associated Shrimati Sucheta Kriplani Hospital and Kalawati Saran Childrens' Hospital. The study was undertaken over a period of two years (from January 2010 to December 2011).

The following characteristics were noted – age, sex, voluntary/ replacement donors, cause of deferral, hemoglobin, red cell indices, platelet count (wherever possible). For plateletpheresis, the donor selection criteria followed at our centre include:

- Weight > 60 Kg
- Age 18-65 years
- Hemoglobin > 12.5 gm/dl
- Platelet count >1.5 lac/ µl
- A gap of eight weeks from the last whole blood donation or three days from the last plateletpheresis
- No intake of non steroidal anti-inflammatory drugs in the last seven days
- ABO identical donor for the patient
- Negative serology for HIV, HBsAg, HCV, Syphilis and Malaria
- Adequate venous access

Thus, a thorough history was taken and samples were collected for complete blood count as well as for Transfusion Transmitted Infection (TTI) testing. The samples were tested for HIV, HBsAg, HCV using 4th generation enzyme immunosorbent assay (ELISA; Biorad), Treponema Pallidum Hemagglutination assay (TPHA; Biorad) 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 using MCS plus Hemonetics intermittent flow cell separator.

RESULTS

During the period of study, out of a total of 343 donors screened, 87 donors were deferred, deferral rate being 25.36%. Meanwhile, 147 plateletpheresis procedures were performed in this two year

period. The deferred donors were predominantly males who belonged to 25-30 years age group. The demographic profile of deferred donors is shown in [Table/Fig-1].

The most frequent cause of deferral was a low platelet count accounting for 43.5% of all the causes followed by a low hemoglobin level (27.05%). [Table/Fig-2] shows various causes of donor deferral. Three donors had dual causes of deferral, that is, low platelet count with concomitant low hemoglobin, low platelet count with history of aspirin intake and low platelet count with history of antibiotic intake.

Temporary deferrals accounted for approximately 90% of all plateletpheresis deferrals. Among this group, the most common cause was a low platelet count. We wish to highlight the fact that this was based on the results of a one time platelet count, this deferral rate could be lowered if these donors were followed and repeat platelet counts performed.

Of the 23 donors deferred for anaemia, 15 (65.2%) had hemoglobin in the range of 11.5- 12.4gm%. 37 donors were deferred due to low platelet count, out of which 27% had counts in the range of 1.3-1.49 lac/µl.

We evaluated the apheresis donors with platelet counts in the range of 1.5-1.8 lac/µl, who underwent plateletpheresis procedure [Table/Fig-3]. Although the platelet yield was lower than the recommended (range 2.1-3.0 x 10^{11}/ bag; mean 2.34 x 10^{11}/ bag), but none of these donors developed any adverse reaction. In one of the case, the procedure had to be aborted due to hematoma formation.

	Categories	No. of Donors Deferred (n=87/343; 25.36%)	Percentage
Age Range	18-24 years	16	18.4%
	25-30 years	38	43.67%
	31-36 years	23	26.43%
	> 37 years	10	11.49%
Gender	Males	81	93.10%
	Females	6	6.89%
Type of donation	Voluntary	51	58.62%
	Replacement	36	41.37%

[Table/Fig-1]: Demographic characteristics of deferred donors

Temporary Deferral (n= 80; 91.96%)			Permanent Deferral (n=7; 8.04%)		
Cause	**No.**	**Percentage**	**Cause**	**No.**	**Percentage**
Low Platelet Count	37	43.5%	Seropositive for Syphilis	3	3.52%
Anemia/ Low hemoglobin	23	27.05%	Seropositive for HBsAg	3	3.52%
Poor Venous Access	8	9.41%	Seropositive for HCV	1	1.17%
Underweight	4	4.7%			
High Blood Pressure	2	2.35%			
Allergy/ Dermatitis	2	2.35%			
Upper Respiratory infection (on antibiotics)	2	2.35%			
Whole blood donation within last 2 months	2	2.35%			
History of dogbite & vaccine	1	1.17%			
History of Aspirin intake	1	1.17%			
History of discomfort during last donation	1	1.17%			

[Table/Fig-2]: Causes of plateletpheresis donor deferral
Note: 3 donors had two causes of deferral

Donor	Platelet count (x 10^3/ µl)	Platelet Yield (x 10^{11}/ unit)	Adverse reaction in donor
1	150	2.7	Nil
2	172	2.6	Nil
3	151	Procedure aborted due to repeated hematoma formation	
4	173	2.9	Nil
5	158	2.1	Nil
6	153	2.3	Nil
7	158	2.4	Nil
8	150	2.4	Nil
9	173	2.7	Nil
10	165	2.7	Nil
11	157	2.2	Nil
12	161	2.4	Nil
13	163	2.6	Nil
14	164	2.4	Nil
15	174	3.0	Nil

[Table/Fig-3]: Characteristics of apheresis donors who underwent Procedure with platelet count in the range of 1.5-1.8 lac/µl

DISCUSSION

In the present study, the plateletpheresis donor deferral rate was 25.4%, which is comparable to Tondon et al., [5] who reported a rate of 27.5%. On the contrary, Pandey et al., [6] observed a lower deferral rate of 10.6%. Most of the deferrals were temporary in nature accounting for around 90% of all the donor deferrals. Out of these, the most common causes of donor deferral were a low platelet count (< 1.5 lac/µl) (43.5%) followed in frequency by a low hemoglobin (27%). These causes are similar to those observed by Tondon et al., [5] and Pandey et al., [6], while Lazarus et al., [7] found a deferral rate of 9% for low platelet count.

In a prior study conducted at our institute to study the donor deferral characteristics of whole blood donors, anaemia was the most common cause accounting for 32.9% of deferrals [8]. However, the corresponding deferral rate for apheresis donors regarding low hemoglobin is lower (27%). In most of these cases, Mean corpuscular volume (MCV) and Red cell distribution width (RDW) were in the normal range, varying from 77 to 85fl and 12.9 to 17% respectively.

Among the donors deferred for anaemia, 15 out of 23 (65.2%) had hemoglobin in the range of 11.5-12.4gm%, representing 17.2% of all deferrals. Fraser et al., [9] studied the effect of lowering the hemoglobin cutoff from 12.5 to 11.5 gm% for female plateletpheresis donors and did not report any deleterious effect on the donors. Moreover, Tondon et al., [5] also advocated that applying the whole blood donation cutoff of > 12.5gm% for plateletpheresis is not justified. This is in view of the minimal red cell loss during the apheresis procedure due to the advent of newer devices, minimal loss in tubing at the end of procedure and rarely because of incomplete procedure. Relaxing the donor selection criteria for hemoglobin from 12.5 to 11.5 gm% along with normal MCV and RDW values could have enabled the reentry of 7.5% of all deferrals. If this was applied to our study, the re entry rate would have been 17.2%, which is quite welcome in an already limited apheresis donor pool.

DGHS guidelines regarding donor selection for apheresis state that a platelet count is not required prior to the first procedure for an apheresis donor. However, it is also stated that some advocate the platelet count may be done before all plateletpheresis procedures, so that donors' health is not compromised [10]. Moreover, the yield of apheresis platelets also depends on the pre procedure platelet count. Due to these reasons, it is our policy to select donors with

a platelet count> 1.5 lacs. We evaluated the apheresis donors with platelet counts in the range of 1.5-1.8 lac/µl, who underwent plateletpheresis procedure. None of these donors developed any adverse reaction. Rogers et al., [11] also demonstrated that plateletpheresis procedure is safe in donors with low platelet counts (150–180 x 109/L) even after extending the collection time to 120–140 min while maintaining the adequacy of yield. Moreover, group non specific SDPs can be transfused to patients in rare/ emergency circumstances, this could narrow down the apheresis deferrals to some extent.

CONCLUSION

In developing countries like India, there is a major reliance on replacement blood donations rather than voluntary donations. So, there is always a shortage of apheresis donors. Taking into account these factors and the findings of the present study, we would like to suggest that the selection criteria for plateletpheresis donors should be revised. The criteria regarding minimum pre-procedure platelet count (above1.5 lac/µl) and hemoglobin (above 12.5 g/dl) need to be lowered so as to suit the Indian scenario. Moreover, instead of donors being deferred on the basis of a one time platelet count, they should be followed up and repeat platelet counts performed, so as to reduce the deferral rates. If these points are adhered to, deferral rate for apheresis can be drastically lowered as temporary deferrals account for majority of the causes of deferral.

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