Research Article

An Analysis of Donor Deferral in Plateletpheresis at a Tertiary Centre in Lahore

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Abstract|

Background: Platelets donors are an important milestone for multiple hematological conditions. There is a rising trend in platelet donor through the procedure of apheresis in present medical scenario. The criteria of platelet pheresis donor selection is of key importance in collection of platelets.

Objective: To determine the frequency of donor postponement for plateletpheresis in a referral center of tertiary, and also to determine the frequency of common contributing factors of this donor deferral.

Method: A cross-sectional survey design was opted for this study. Hematology department of the Chughtai Lahore lab, was selected as venue for the research work. The duration was scheduled between July 25, 2020 to January 25, 2021. A sample of 227 blood donors were included in the study. The serological testing including (haemoglobin status and platelet status) of the donor were performed. The probation of vascular access for the donor was accessed. The acceptance or the deferral of the donor was decided after completion of all these steps. If deferred, then contributing factors were noted as per operational definition. Statistical analysis was done using the latest version of SPSS 25-V. The segregation of data was done for gender bias, BMI, age and the socio-economic status. The stratification of the data was done using testing of CHI-SQUARE. The level of significance was minimized at a value of ≤0.05

Results: The research study included total sample number of 227 blood donors. Among the total sample patients with number of 227, 225(99.1%) were male and only 2(0.9%) were female. Among blood donors, 64(28.2%) were in 18-30 years age group, while 126(55.5%) and 37(16.3%) were ranged between 31years and 45years and 46 years and 60years respectively. Among 227 blood donors, 56(24.7%) were donor deferral. According to contributing factors of donor deferral distribution, 15(6.6%) had low platelet count followed by low hemoglobin as 15(6.6%) and poor venous access as 26(11.5%).

Conclusion: The rejection or deferral score of our study was high. So, to revert the deferral rate it is decided that all such deferral cases should be counseled and should be motivated to pursue sampling with vast information and knowledge regarding the procedure so the deferral rate can be brought down.

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Keywords Blood Donor, Donor Deferral, Contributing Factors.

Introduction

The blood donation has been of primary importance. And the blood donation is very much dependent on the donor Blood.[1] the process of apheresis requires donation blood or patient blood to be sent into a machine which segregates the whole blood into multiple components like plasma, platelets and leukocytes. Thus, the desired components are collected while the rest are passed back into the circulation. [1]

Apheresis by definition is divided into three different components. The type of apheresis in which the donor donates blood is called donor apheresis. The apheresis in which disease provoking element from the blood are removed is called therapeutic apheresis. And lastly there we have stem cell

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apheresis of peripheral type. The mechanism of separation of platelets from the blood given by doner is called platelet apheresis.[2] This blood containing platelets segregated by platelets apheresis is the utilized by patients with low platelet counts. The blood collected by platelet apheresis is used for controlling bleed in patients with low platelet count.[3] The platelet transfusion requires same blood group matching for both donor and the recipient. The platelet concentrate can be collected either through platelet apheresis or direct blood. Platelet apheresis is a new innovation for collection of platelets. An extra amount of 3 to 13 units of whole blood is required to get an equal amount of platelet concentrate collected through direct apheresis. The consumption of Platelet consumption is on an ever-increasing trend in the new world of medical science. The concept of donor platelet from single domain (SDP) is ideally preferred over getting platelet from random domain.[3-4] The application of single donor platelet is not feasible owing to much stern and un compromising selection criteria in single donor platelet selection. This results in high rate of deferment for single donor platelets.[4] Recruitment of plateletpheresis donors is additionally challenging as the donor selection criteria not only comprises all those that are followed for routine blood donation but also have to consider several other parameters.[5] Plateletpheresis is different from whole blood donation, the donor must have greater commitment and zeal on his part for platelet donation. Since the interval of collecting platelet concentrate is much time consuming on part of the donor. Furthermore, for collection of platelets concentrate to a value of 3×10^{11} per bag and keeping the safety measure for donor, the measure of selection criteria is stringent and strict. Meticulous standards for acceptance of donor and high financial value per bag unit, is the leading cause of deferral among donors.[6] The paucity in literature regarding plateletpheresis donor deferral is a further addition to the dilemma[7,8].

Methods

A cross-sectional method of survey was done at Hematology Department, Chughtai Lahore Lab, Lahore from July 25, 2020 to January 25, 2020. 227 donors who presented at the regional center of Chughtai Lahore Lab, during the given six months of the study period. The donor bio data acquiring his/her age and sex with acceptance for plateletpheresis was filled in a donor questionnaire form. The donor underwent tests to access his/her (haemoglobin status and platelet status).

All the donor who was fit to undergo blood donation were segregated. Through a well screened evaluation either the donor was accepted or due to certain short comings the donor was deferred. If deferred, then contributing factors were noted as per operational definition. The following qualitative parameters like (sex and adequate venous access) and quantitative parameters like (age, platelet levels and haemoglobin level) were gathered in a prescribed proforma (attached).

Table 1: *Gender Distribution*

Gender	Frequency	Percent
Male	225	99.1
Female	2	0.9
Total	227	100%

Table 2: *Age Distribution*

Age groups	Frequency	Percent
18-30 years	64	28.2
31-45 years	126	55.5
46-60 years	37	16.3
Total	227	100.0

Table 3: *Donor Deferral Distribution*

Donor deferral	Frequency of Defferal	Percent (%)
Yes (DEFFERED)	56	24.7
No (ACCEPTED)	171	75.3
Total	227	100%

Table 3: *Stratification of Donor Deferral with Respect to Contributing Factors*

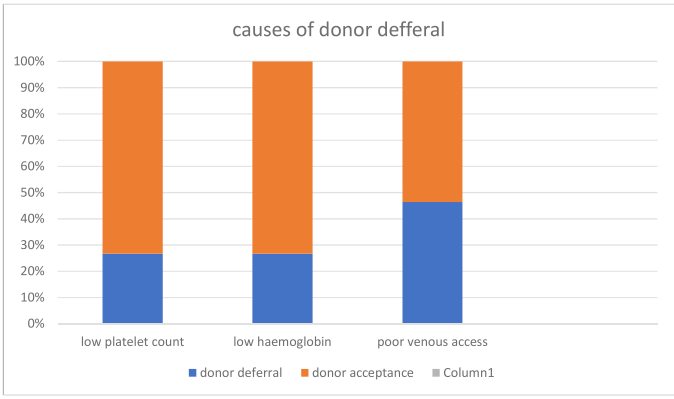
Contributing factors		Donor deferral		Total	p-value
		Yes	No		
Low platelet count	Yes	15	0	15	0.000001
		100.0%	0.0%	100.0%	
	No	41	171	212	
		19.3%	80.7%	100.0%	
Low hemoglobin	Yes	15	0	15	0.000001
		100.0%	0.0%	100.0%	
	No	41	171	212	
		19.3%	80.7%	100.0%	
Poor venous access	Yes	26	0	26	0.000001
		100.0%	0.0%	100.0%	
	No	30	171	201	
		14.9%	85.1%	100.0%	

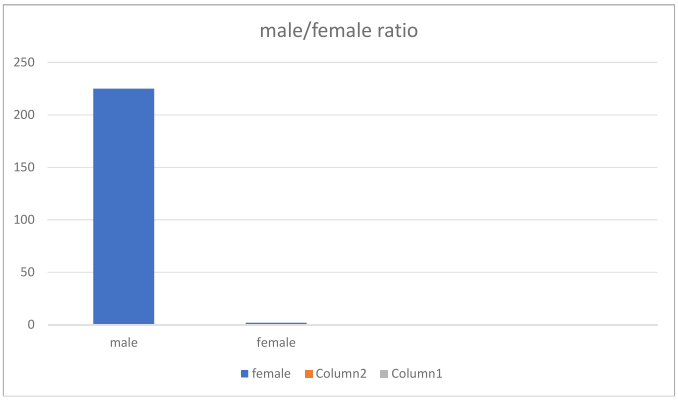
Data Analysis:

The results of the study were analyzed. The version V-25 of SPSS was used. The variables including age, hemoglobin level and platelet count were expressed as quantitative and were presented by standard deviation. The variables like gender, deferred donors and contributing factors were expressed as qualitative and presented by using frequencies and percentages. Stratification of the data was carried out. Testing was performed using Chi-Square. The value of significance was opted below ≤0.05.

Results:

Total 227 blood donors were included in this study. Among 227 patients, 225(99.1%) were male and only 2(0.9%) were female. Among blood donors, 64(28.2%) were in 18-30 years age group, while 126(55.5%) and 37(16.3%) were in adjusting in age groups between 31years to 45years and 46 years to 60years respectively According to body mass index distribution, 8(3.5%) were underweight, while 169(74.4%), 48(21.1%) and 2(0.9%) had normal BMI, overweight and obese respectively. According to socio-economic status dis-





tribution, 33(14.5%) had low income, while 142(62.6%) and 52(22.9%) had middle income and high-income status respectively. Among 227 blood donors, 56(24.7%) were donor deferral. According to contributing factors of donor deferral distribution, 15(6.6%) had low platelet count followed by low hemoglobin as 15(6.6%) and poor venous access as 26(11.5%).

Discussion

The sample of patients who receive the platelets includes a category of patients who either have a history of chemotherapy induction for various blood disorders such as leukemia, anemia of aplastic type, enlarged spleen, shock of septic variety and myeloma of multiple type. There are certain conditions in which the platelet transfusion should be avoided such as thrombocytopenia purpura. Platelet transfusion in patients with thrombocytopenia purpura can lead to drastic morbid conditions like renal failure and thrombus formation.[9] Patients having <10,000/ul value of platelets, or patients with <20,000/ul platelet with central venous line are candidates who require platelet transfusion.[10,11,12,13] Platelet transfusion is an important therapeutic procedure to prevent catastrophic results of bleeding in patients with thrombocytopenia. The requirement of this sample group is platelet transfusion from single group. These after platelet transfusion have better yield and less allo-immunization. This category of patients ideally requires the transfusion of platelet from one single domain. The beneficial effect of this category of single domain platelet donor transfusion is having an expanded duration interval of transfusion.[14] The donor deferral rate of our study was 24.7%. as indicated, in international studies done by Arora et al (28.03%)[15]. Similar results were analyzed in studies done by Tondon et al[16] and Pujani et al[17] with value of deferral relating to 27.5% and 25.4% respectively. However, there are studies where the platelet deferral rate is very less like Pandey et al (10.6%)[18]. Syal et al (44%) has a very high deferral rate. Our study had a sample age of young patients in majority (45 years mean age), (83.7%). The study done by Arora et al had a similar mean age group of 35 years (82.9%). Coinciding results were obtained by Pujani et al and Syal et al[15,17,19]. The females of our study showed a low Hemoglobin rate. However, the commonest factor of platelet transfusion deferral in our study was poor access to venous line (11.5%), low Hemoglobin (6.6%) and low platelet count (6.6%). Almost similar findings were observed by Seema et al[20], Pujani et al[17] and Dogu et al and Hacioglu et al[21]. The donor deferral because of low platelets was advised to come again after correction of their platelet count. Patients with low Hemoglobin were advised counselled and educated for improvement of hemoglobin levels. Such an observation was noted by Kusumgar et al[22]. Fraser et al[22] showed good donor deferrals when keeping Hemoglobin levels at 11.5%g. This study of donor deferral in plateletpheresis is very important as here in Pakistan the blood banks depend on family donation of blood. By identifying the factors of deferral, we can manage the donor deferral rate. The low platelet count, low haemoglobin value and poor venous access are all those manageable variables that can bring down the deferral rate. However, the limitations of the study were that it is a single center study. The sample size and duration of study was also restricted.

Conclusion

Platelets donors are an important milestone for multiple hematological conditions. There is a rising trend in platelet donor through the procedure of apheresis in present medical scenario. The criteria of platelet pheresis donor selection is of key importance in collection of platelets. Our study showed donor deferral of temporary types. These donor deferrals having less Hemoglobin, less platelet count was educated,

counselled and advised to return for platelet donor transfusion after removal of the said conditions. Donor who was deferred due to poor venous access were encouraged to donate random platelet donation by donating whole blood.

Conflict of Interest: The study bears no conflict regarding interests.

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Study Ethical Approval: Given

Authors Contribution: The authors contributed equally in accordance with ICMJE guidelines.

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