Original Research Article

Plateletpheresis Donor Profile in a Tertiary Care Hospital

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Article History
Received Nov 16, 2017
Received in revised form Nov 25, 2017
Accepted on Dec 2, 2017

Abstract
Meticulous donor-vigilance, superior technical personnel training and experienced transfusion medicine specialists supervision will make donor's experience more pleasant thereby giving a forward thrust to the noble vision of preparing a voluntary apheresis donor pool in India.

Key Words:- plateletpheresis, donor, apheresis, plateletpheresis session

Introduction

Apheresis (or hemapheresis) is a Greek word that means to separate or remove. In apheresis blood is withdrawn from a donor or patient in anticoagulant solution and separated into components. One (or more) component is retained and the remaining constituents are returned to the individuals. Any one of the component can be removed and the procedures are specified for the component selected. The process of removing plasma from red cells is termed as plasmapheresis. Removal of other components, including platelets (plateletpheresis), red cells (erythrocytapheresis), leucocytes (leukapheresis) etc. Apheresis can be non therapeutic or therapeutic.[1]

Over decades, increased demand of platelet transfusions for patients with various medical and surgical diagnosis led to accelerated usage of "Apheresis" for platelet concentrates.[2] A decreasing blood donor pool in the presence of increasing blood transfusion demands has resulted in the need to maximally utilize each blood donor. This has led to a trend in the increasing use of automated blood collections. These collection methods share many of the same reactions and injuries seen with whole blood donation but also have unique complications due to the collection method and the frequency at which donation can occur.[3]

Apheresis procedures are usually well tolerated. Adverse Events (AEs) associated with the use of cell separators for apheresis donation or therapeutic apheresis can be due to delivery of the anticoagulant; vasovagal; allergy; venous access or machines malfunction. These can be of variable severity.[4] Hospitalization is still extremely rare; it occurred in 0.01% of donations in one study.[5]

Aims & Objective

To study the profile of plateletpheresis donors and plateletpheresis session.

Material & Methods

Retrospective observational study was conducted from January 2016 to December 2016. All 213 plateletpheresis procedures were performed on Trima Accel after taking informed and written consent from the donor. All the donors were selected according to the guidelines laid down by Director General Health Services (Figure-1).[1] All the donors were medically fit and of the

Figure-1: Criteria for Selecting Apheresis-Donor[1]

General Criteria for Selecting Apheresis

Donor undergoing an occasional apheresis procedure must meet the same criteria as a whole blood donation. As per DGHS guidelines, specific criteria for eligibility of apheresis will be as follows:

1. Donor undergoing an occasional apheresis procedure (performed not frequently than once every 4 week) must meet the same criteria as a whole blood donation.
2. Donor should be preferably repeat donor-might have given blood 1-2 times earlier.
3. Written consent of the donor will be taken after explaining the procedure in detail, time taken, and about possible hazards and benefits.
4. Adequate venous asses.
5. Donor will be screened prior to apheresis for markers of infectious diseases transmitted by the transfusion of blood and its components in the same manner as for the whole blood. Each donor will be tested prior to each apheresis unless the donor is undergoing repeated procedures, in such cases testing for the markers of diseases need be repeated at 30 days interval.
6. Tests for hemoglobin, ABO group, Rh type, and screening for unexpected antibody will be done.
7. More stringent regulations govern the donor who participate in serial apheresis programme (procedure performed more frequently than every 4 weeks).
    - i) Interval between two procedures should be at least 48 hours and the loss of red cells should not exceed 25 ml per week.
    - ii) If donor's red cells could not be reinfused during a procedure, or if the participant donates a unit of whole blood, 12 weeks should elapse before subsequent apheresis procedures.
    - iii) Careful monitoring of weight, blood cells count, serum protein levels and quantitation of immunoglobulins is required.
        - a) Age should be between 18-50 years.
        - b) Weight should be 60 kg or more.
        - c) Hemoglobin – 12.5 g/dl or more

Specific Criteria for the selection of plateletpheresis donor

1. The interval between procedures should be at least 48 hours. A donor shall not undergo the procedure more than 2 times in a week or 24 times in a year.
2. Platelet count is not required prior the first procedure or if the interval between plateletpheresis procedures is at least 4 weeks.
3. If plateletpheresis is performed more frequently than every 4 weeks, a platelet count should be done and must be more than 150,000/µl prior to performing subsequent plateletpheresis.
4. If extra plasma is collected and if the procedure is performed more than once every 4 week, the procedure should not be done if the total serum protein is less than 6.0 g/dl or if there has been an unexplained weight loss.
5. Donors who have taken antiplatelet medications that irreversibly inhibit platelet function are deferred for specific intervals before donation (48 hours for aspirin/ aspirin containing medications)

age between 18-60 years weighing more than 60 kg. Complete haemogram and ABO & Rh of donor was done. All the donors had haemoglobin level of ≥ 12.5gm/dL and platelet count of ≥ 150x10^9/L. Tests mandatory for transfusion transmitted infections (HIV, HBV, HCV, Syphilis and malaria) of donors were done prior to procedure and non-reactive donors were selected for procedure. History of non consumption of NSAIDS (non steroidal anti-inflammatory drugs) in past 72 hours was taken.

Results

In terms of donor profile, all the 213 donors were male, out of which 136 (63.84%) were voluntary and 77 (36.15%) were replacement. Maximum donors (68.07%) were of age group between 21- 30 years; (Table 1), minimum age being 19 years and maximum 60 years. Weight of Donors range from 60 kg to 115 kg, maximum donors (47.88%) were of 61-70 kg; (Table 2), the mean donor height was 170 cm. The prevalent blood type was O positive, which accounted for 35.6% of the donations (Table 3). The pre donation mean haemoglobin and hematocrit were 13.76 g/dl and 41.2% respectively.

Pre procedural platelet count of donors range from 170 - 531 x10^9/L, in maximum donors (31.92%), pre procedural platelet count was between 201-250 x10^9/L (Table 4). The mean pre procedural platelet count was 281 x10^9/L. The mean amount of platelet yield estimated for collection was 3.83 × 10^{11}. In maximum donations (114) platelet yield was 3 × 10^{11}. In 32 donations platelet yield was 6 × 10^{11}. Mean post procedural platelet count reduction was 71.09 x10^9/L.

The mean volume of blood processed by the equipment was 2362 ml and the mean volume of the product obtained was 310 ml. The mean amount of ACD used during the procedures was 258 ml. The mean duration of a plateletpheresis session was 51.04 minutes.

Table 1: Age wise distribution of Platelet-pheresis donor

Sr. No.	Age of Plateletpheresis donor (years)	Number of Plateletpheresis Donors (%)
1	≤20	10 (4.69%)
2	21-30	145 (68.07%)
3	31-40	50 (23.47%)
4	41-50	5 (2.34%)
5	51-60	3 (1.40%)

Table 2: Weight wise distribution of Plateletpheresis donor

Sr. No.	Weight of Plateletpheresis donor (kg)	Number of Plateletpheresis Donors (%)
1	60	3 (1.40%)
2	61-70	102 (47.88%)
3	71-80	75 (35.21%)
4	81-90	24 (11.26%)
5	91-100	7 (3.28%)
6	>100	2 (0.93%)

Table 3: Blood group (ABO & Rh) wise distribution of Plateletpheresis donor

Blood Group	Number of Plateletpheresis Donors (%)	Number of Plateletpheresis Donors (%)
ABO	Rh Positive	Rh Negative
A	32 (15.02%)	5 (2.34%)
B	73 (34.27%)	4 (1.87%)
O	76 (35.6%)	4 (1.87%)
AB	18 (%)	1 (0.46%)

Table 4: Pre procedural platelet count of Plateletpheresis donor

Sr. No.	Pre procedural platelet count (x10^9/L)	Donors *n(%)*
1	150-200	16 (7.51%)
2	201-250	68(31.92%)
3	251-300	54(25.35%)
4	301-250	44(20.65%)
5	351-400	24(11.26%)
6	401-450	4(1.87%)
7	451-500	2(0.93%)
8	>500	1(0.47%)

Discussion

The potential donor has to meet several requirements to be accepted as a suitable candidate for blood component donation[6]. Criteria such as hematocrit or hemoglobin levels, age, weight and minimum platelet count are important for the safety of the donor[7].

In this study, all the donors were male. Females did not fulfill the criteria for selection of apheresis donors. Most of the females were either anaemic, underweight or had poor veins. Several studies show a similar profile for donation, with a larger number of male donors.[8, 9, 10, 11.12]. Some studies also show that men have lower rates of adverse events compared to women in plateletpheresis donation[13]. Another study also points out those only women were associated with complications related to venipuncture[5].

Weight or body mass is indicated as criteria to maximize the donation of plateletpheresis, because larger donors have higher platelet yields due to the higher volume of blood. [9] In present study, in donors with low platelet count, the mean volume of blood processed, the mean amount of ACD used and duration of run is more as compared to donor with high platelet count with same platelet yield. This is due to the fact that machine has to process more blood volume with more infusion of ACD to donor to achieve the same platelet yield in patients with low platelet count, thus more adverse events. These findings are consistent with a study that shows that donors who undergo the procedure repeatedly or for prolonged periods are susceptible to an accumulation of citrate as levels exceed the amount that can be metabolized by the body[14]. Another study revealed that adverse events occurred in apheresis procedures which took more time (mean 77.1 min), and had a higher infusion of ACD (mean 301.5 mL) compared to those without adverse events.[10]

Conclusion

Meticulous donor-vigilance, superior technical personnel training and experienced transfusion medicine specialists supervision will make donor's experience more pleasant thereby giving a forward thrust to the noble vision of preparing a voluntary apheresis donor pool in India.

Conflict of Interest None

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