

A Retrospective study of analysis of reasons for discard of blood and blood components

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Abstract

Introduction: Blood transfusion is an essential element in modern health care. Transfusion of blood and blood components has become an integral part of patient management in modern medicine. Human blood till date has no substitute. Demand of blood and its components always outpace its supply. This emphasizes the need for proper utilization of blood and its components with preferably “NO” or minimal wastage. **Materials and methods:** A Retrospective study of analysis was carried out at Sri Siddhartha Medical College Hospital Blood bank from 1st January 2017 to December 31st 2017. **Results:** Out of 1806 whole blood bags, 371 (5.21%) were discarded. 137 (36.9%) units were discarded because of transfusion transmitted infections (TTIs). Out of 11809 components prepared, 1027 (8.6%) were discarded. Most common component discarded was platelet (40.7%) and reason for discard was date of expiry due to non-utilization. **Conclusion:** Blood being irreplaceable source, discard rate can be reduced by proper counseling of blood donors and adhering to strict donor deferral criteria. Discard rate of platelet concentrate can be minimized by preparing platelet concentrate on request and also by using modern technique like Apheresis.

Keywords: Discard rate, Packed red cells (PRC), Fresh Frozen plasma (FFP), Platelet concentrate (PC), Transfusion transmitted infections (TTIs), Hepatitis C virus (HCV)

Introduction

Blood transfusion is an essential element in modern health care [1]. Transfusion of blood and blood components has become an integral part of patient management in modern medicine [2]. The aim of blood transfusion service should be to provide effective blood and blood products, which are safe as possible and adequate to meet the patients need [3]. Requirement of blood is there in every two second [4]. One third of all patients admitted to intensive care units (ICUs) in the developed world receive a blood transfusion [5]. Human blood till date has no substitute. Demand of blood and its components always outpace its supply. This emphasizes the need for proper utilization of blood and its components with preferably “NO” or minimal wastage [5]. The aim of present study is to analyze the reason for discarding of whole blood and blood components so that they can be used judiciously and to minimize the number of discarded blood and blood components.

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Materials and methods

A Retrospective study of analysis was carried out at Sri Siddhartha Medical College Hospital Blood bank from 1st January 2017 to December 31st 2017. Blood donations were taken from voluntary and replacement/family donors as well as in blood donation camps according to selection criteria defined by WHO [7].

Blood components such as packed red cells (PRC), fresh frozen plasma (FFP) and platelet concentrate (PC) were prepared from 450 ml blood bags under all aseptic conditions according to Food and Drug Administration (FDA) guidelines as per demand and manpower available in the blood bank [7]. The blood bags were discarded according to standard operating procedures laid down by National AIDS control organization (NACO)[8]. Blood bags included in the present study were screened for transfusion transmissible infections (TTIs). Blood bags tested positive for infections, blood bags in which inappropriate amount of blood was collected, blood bags with hemolysed blood and blood bags damaged during centrifugation were discarded.

Results

Among 7109 total donors in present study (74.73%) were voluntary donors and (25.26%) were replacement donors. Table 1 gives the source of blood bags as per type of donors

Table-1: source of blood bags as per type of donors.

Type of donors	Total	Percentage (%)
Voluntary	5313	74.73
Replacement	1796	25.27
Total	7109	100

Out of total 7109 blood bags collected during the study period, 1806 units were collected in a 350 ml blood bags and 371(5.21%) bags were discarded. Amongst the 371 whole blood bags discarded, testing positive for TTIs was the most common cause (36.9%) followed by expiry of date due to non utilization (30.1%). Other reasons for discarding of whole blood bags were less volume collected in (28.8%) and hemolysis (4%). Table 2 gives analysis for reason of discarded whole blood bags.

Table-2: Analysis of reason for discard of whole blood bags.

Reason for discarding	Total number	Percentage (%)
Positive for TTIs	137	36.9
Date expired	112	30.1
Less volume	107	28.8
Hemolysis	15	4.0

Hepatitis B infection was the most common reason for discarding whole blood accounting for 64.9% cases, followed by syphilis in 16.7%, HCV 13.1% and HIV in 5.1%. Table 3 gives analysis of reason for discarding whole blood bags testing positive for transfusion transmissible infections (TTIs).

Table-3: Analysis of reason for discarded whole blood bags tested for TTIs

Transfusion transmitted infection (TTI)	Total number	Percentage (%)
Hepatitis B	89	64.9
Syphilis	23	16.7
HCV	18	13.1
HIV	07	5.1
Malaria	-	-

A total of 1027 (8.69%) blood components were discarded against 11809 blood components prepared during present study period. Out of 1027, most common component discarded was platelet and discard rate was 40.7%, followed by fresh frozen plasma (6.6%) and packed red cells (3.2%). Table 4 gives analysis of discarded units of blood components against total prepared components

Table-4: Analysis of discarded units of blood components against total prepared components.

Component	No of components prepared	No of units discarded	Discarded rate Percentage (%)
Packed red cells	5287	170	3.21
Fresh frozen plasma	5287	354	6.69
Platelets	1235	503	40.7
Total	11809	1027	8.69

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Most common reason for discard of blood components was expiry due to non utilization and testing positive for TTIs. Table 5 gives analysis of reason for discarding blood components

Table-5: Analysis of reason for discarding blood components

Blood components	Date Expired	Leakage	Positive for TTIs
Packed red cells	21	-	149
Fresh frozen plasma	198	07	149
Platelets	487	-	16
Total (1027)	706	07	314

Discussion

The need for blood and blood components is presently increasing due to improved and accurate diagnosis of complex diseases requiring transfusion [2].

Proper blood management at blood bank will reduce unnecessary wastage of blood and blood components. A self audit of whole blood and blood components discarded over a period of time gives an idea about various reasons of discard [2].

Whole blood- In present study discard rate for whole blood was (5.21%), which is slightly higher compared to Sharma et al [6](4.46%) and Bobde V et al [9](6.63%). In a study by Suresh et al [10] 5.7% whole blood bags were discarded.

Most common reason for discard of whole blood in present study was TTI positive status of donors accounting for (36.9%) followed by date of expiry in 30.1%. In a study by Kumar et al (74.30%) of whole blood bags were discarded for TTIs followed by date of expiry in 11.84% [11].

In present study, Hepatitis B infection was the most common reason for discard in 64.9% as comparable to study by Suresh et al in which study, 64.4% units were discarded for Hepatitis B infection [10].

Other reasons for discard of whole blood included less quantity collected 28.8% and hemolysis in 4%. Reason for less quantity collected was due to donor reaction such as vomiting and fainting during donation.

Blood components- A total of 1207 (8.69%) blood components were discarded against 11809 components prepared in present study. In a study by Suresh et al 24847 blood components prepared and 7% of units were discarded. Discard rate was slightly lower compared to present study [10]. Reasons for discard of blood components in present study were date expired (67%), testing positive for TTIs (30.5%), less volume

collected due to donor adverse reaction in (1.3%) and leakage of blood bags damaged during component separation in (0.8%)

Out of 314 (67.1%) tested positive for TTIs, Hepatitis B infection was positive in 70.5% units, followed by Hepatitis C virus infection (14.8%) syphilis (9.1%) and HIV (4.7%). In a study conducted by Thakare MM et al [12] Hepatitis B (49.82%) was most common TTI followed by HIV (10%) and HCV (8.97%).

The most common blood components discarded were platelets (40.7%) followed by fresh frozen plasma (6.69%) and packed red cells (3.21%) as shown in table no 4.

Discard rate for platelets in present study was slightly lower (40.7%) as compared to studies by Sharma et al [6] (43.6%). In a study by Ghaflez M Bet al [13] discard rate for platelets was high (61.11%). Table 5 gives analysis of reasons for discarding blood components.

Most common reason for discard of platelets was date of expiry due to non utilization. Similar findings were observed in studies conducted by Kumar et al [11] and Deb et al [14]. High discard rate of platelets was due to short shelf life of days.

So their chance of expiry due to non utilization was highest among blood components. To minimize high discard, platelets should be prepared on request and using modern techniques like apheresis [15].

Discard rate for fresh frozen plasma (FFP) was 6.69% in present study. In a study by Sharma et al [6] discard rate of FFP was 6.2% and slightly higher discard rate of (7.6%) was reported by Bobde V et al [9].

Most common reason for discard of FFP was testing positive for TTI followed by non-utilization after issue and leakage. Reason for non-utilization was excess of

FFP units requested against requirement. Leakage of FFP bags can be minimized by putting FFP bags in a cardboard polystyrene protective container that minimizes the risk of breakage of product during storage, handling and transportation [2].

In present study, discard rate for packed red cells (PRC) was 3.21% as comparable to studies by Sharma et al [6] (3.2%) and Suresh B et al [10] (3.3%).

Discard rate for PRC was higher (6.76%) in a study conducted by Patil P et al [15] and most common reason for discard of PRC was TTI positive status of donors followed by date of expiry.

Proper donor screening and strict adherence to donor selection guidelines would decrease the collection of such units from donors, thereby avoiding discard of such units [15].

Wastage of blood components can be minimized by proper handling of blood bags, adhering to stringent storage conditions of refrigerators in blood bank to prevent hemolysis and bacterial contamination [15].

Conclusion

Proper utilization of blood and blood components with minimal wastage is of utmost importance in saving life. Blood being irreplaceable source, discard rate can be reduced by proper counseling of blood donors and adhering to strict donor deferral criteria. In present study, platelet concentrate was the most common blood component discarded and discard rate can be minimized by preparing platelet concentrate on request and also by using modern technique of platelet preparation by apheresis.

During manuscript preparation other authors contributed to preparation of manuscript by helping in analysis of data and providing relevant articles.

What this study add to existing knowledge? In present study of analysis for reason of discard of blood and blood components, discard rate of blood and components can be reduced by collection of blood from voluntary blood donors and preparation of platelets by apheresis technique.

Sri Siddhartha Medical College is located in a rural area in Tumkur district of Karnataka and we have to motivate and educate people to donate blood voluntarily.

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