

Blood Discard - Is Seroreactivity the Only Reason?

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ABSTRACT

Background- Effective utilisation of available blood supply is the need of the hour. One important way for effective utilisation is to minimise discarding of blood components which will contribute to efficient management of blood inventory. Blood is discarded due to reasons like seroreactivity for viral markers HIV, HBV, HCV, detection of malarial parasite and VDRL reactivity, improperly managed blood inventory resulting in expiry of blood components and logistic difficulties in blood collection and processing.

Materials and Methods- A retrospective study conducted to analyse the data of all the blood and blood components discarded over the last decade at the blood bank services of tertiary care hospital in South India. The details of blood discard were obtained from Blood Bank records

Aim-Analysing blood discard rate and the reasons for discarding blood

Results- The average number of donors in a year was 11648 in 11 years (2008-2018). The average number of components prepared in a year was 41,096. The reasons of blood products discard due to collection ranged from 5.1- 37%. Seroreactivity of the blood products ranged from 32.8% to 53% in which hepatitis B reactivity ranged from 12-38%. Processing causes accounted for 26.6%

Conclusion-The review of blood discard rate and the reasons for blood discard is one of the important quality indicators in the blood bank. Careful supervision of the technical activities at all stages from donor selection with suitable veins, blood collection and component separation, appropriate storage as defined and testing with appropriate guidance will help to reduce wastage of blood components during collection and processing

Keywords: blood components discard, seroreactivity, quality indicator

INTRODUCTION

The transfusion of blood and blood components is an integral part of patient management. In our country, there is mismatch between availability and demand of blood supply. Effective utilisation of available blood supply is the need of the hour. One important ways for effective utilisation is to minimise discarding of blood components and this will contribute significantly to efficient management of blood inventory. Blood is discarded due to various reasons like seroreactivity for viral markers HIV, HBV, HCV, detection of

malarial parasite and VDRL reactivity, improperly managed blood inventory resulting in expiry of blood components and logistic difficulties in blood collection and processing.

The American Association of Blood Banks defines quality indicators as the specific performance measurements designed to monitor one or more processes during a defined time and are useful for evaluating service demands, production, adequacy of personnel, inventory control and process stability. The efficiency of processing and preparation of blood

components can be monitored by the quality indicators that reflect these activities. One of the quality indicators is blood discard rate.

The present study is aimed at Analysing blood discard rate and the reasons for discarding blood.

Aims & Objectives- Analysing blood discard rate and the reasons for discarding blood

Materials & Methods-This is a retrospective study conducted to analyse the data of all the blood and blood components discarded over the last decade at the blood bank services of tertiary care hospital in South India. The details of blood discard were obtained from Blood Bank records

Statistics- Descriptive study. Data compiled and analysed in Microsoft excel

prepared were 3,63,944. The average number of components prepared in a year was 41,096. The percentage of components discarded which ranges from 9.1 in the year 2008 to 3.4 which was the lowest discard rate in 2014 and is 4.3 in the year 2018 is shown in Figure 1.

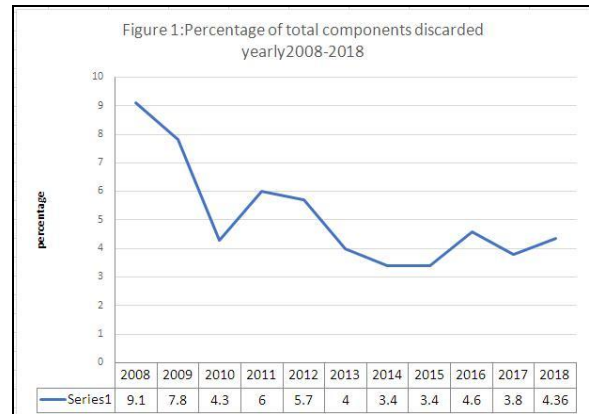


Figure 1: Percentage of total components discarded yearly (2008 -2018)

RESULTS

A total of 128135 donors donated in 11 years (2008-2018) at the blood bank of a tertiary care hospital in south India. The average number of donors in a year was 11648. The total numbers of components

Among the various blood components discarded platelet concentrate units that were discarded were more than the other components and this is reflected in Figure 2.

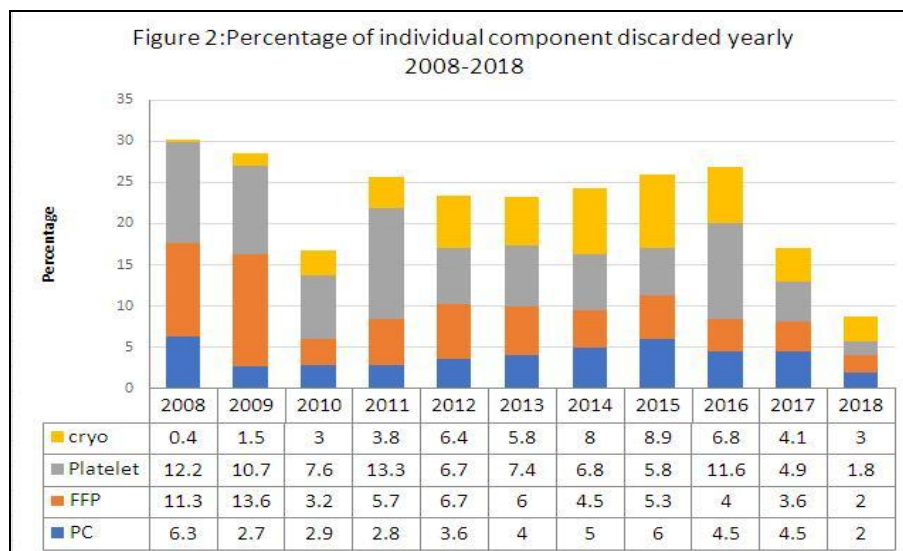


Figure 2: Percentage of individual component discarded yearly (2008-2018)

The various reasons for discard in the present study were classified on the basis of collection, processing, testing and storage related causes that was responsible for the discard of blood. The reasons related to collection included discard due to difficult collection and adverse reactions in

the donor during blood collection (like vomiting and giddiness). Processing related reasons include breakage of bags during preparation of components, contamination of platelets and plasma with RBCs, highly lipemic plasma and leakage during component preparation. The reasons related

to testing includes seroreactivity to transfusion transmitted diseases like HIV, Hepatitis B & C, syphilis and malaria which make the blood component unsuitable for transfusion. Expiry of blood components and broken units during thawing fresh frozen plasma were the reasons of discard during storage. The discard rate due to reasons related to collection ranged from 5.1-37% of the total discard of blood components. Seroreactivity to one of the transfusion transmitted infections is one of the leading causes for the discard of blood

and blood products. It ranged from 32.8% to 53% of the total discard of blood and components. Among the transfusion transmitted infections, Hepatitis B reactivity accounted for 19-61% of total TTD. HIV reactivity ranged from 8-21%. Hepatitis C reactivity ranged from 12-38%. VDRL reactivity accounted for 3-15%. No units were discarded due to malaria which is one of the tests performed routinely on donated blood. The discard rate due to the transfusion transmissible infections is shown in Figure 3.

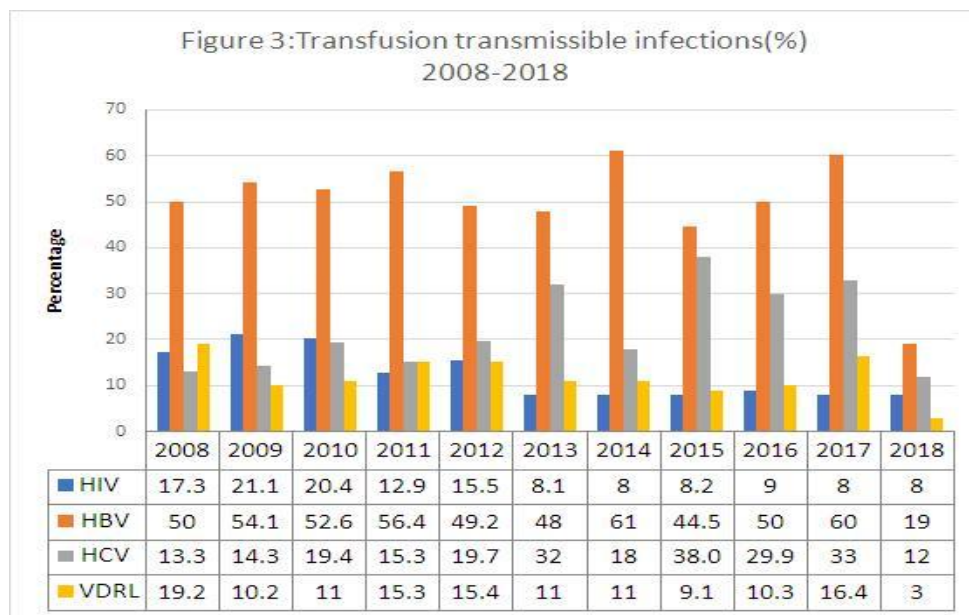


Figure 3: Transfusion transmissible infections % (2008-2018)

Processing causes included broken Fresh frozen plasma and cryoprecipitate during processing and storage which was the second leading cause of discard. Also discarding due to contamination of platelet bags and FFP bags with RBC during processing, lipemic component, leakage of the bag during processing all together accounted for 26.6% (ranged from 16.6 to 44%)

Expiry of blood components was the second most common cause for discarding blood components (21.5%) (ranged from 11.4 to 36%) of which platelet concentrates contributed to 52 to 94% of the total discard of blood components due to expiry. This is due to short half life of platelet concentrates.

DISCUSSION

A total of 3,63,944 units of components were prepared from the year 2008 to 2018 with an average of 41,096 components per year. Among these components prepared, average 2095 units of blood components were discarded per year. There were many reasons for discarding the blood and blood components, Reactivity to transfusion transmitted diseases as detected by screening tests, damage to the units during preparation of the components, difficulty in blood collection leading to collection of inadequate volumes and expiry of blood components especially platelet concentrates with short shelf life are the common reasons

Transfusion transmitted diseases remained as a major reason of discard and accounted for 42% (ranged from 32.8-53%) of discard, mainly due to hepatitis B reactivity (45.7% of total TTD) followed by Hepatitis C (20.8% of total TTD), HIV (11% of total TTD) and VDRL (10.3%). Similar study conducted by Suresh et al [1] in a tertiary care teaching hospital in South India showed that the TTD accounted for 49% of the total blood discarded of which hepatitis B reactivity contributed to 64.4%, HIV and HCV reactivity 19% and 21% respectively. Another similar study by Vedita Bobde [2] in Central India showed discarding due to hepatitis B was 41% followed by HIV (30%) and HCV (29%).

Expiry of blood components was the second most common cause for discarding blood components. Expiry of blood and blood products is another contributing factor for discarding blood components. It accounted for 11.4-36%. Among the blood components discarded due to expiry, platelet concentrate which have the shortest shelf life accounted for 4.9 to 13.3% of the total components discarded and packed red blood cells accounted for 2.7 to 6.3%. Fresh frozen plasma accounted for 3.2 to 13.6% of the total components discarded.

A study of blood discard by Mohammad Morish et al [3] showed that the platelet discard rate was 6.7%. A large-scale study conducted in 17 blood centres in 10 European countries from 2000 to 2002 reported that the mean platelet discard rates were from 6.7% to 25%. Various other studies [4,5] done showed that the platelet discard rate ranged from 6% to 43.6%. The main reason is due to short life span of platelets.

Broken units amounted to 19% (10-37.5%) of the total discard rate. Fresh frozen plasma and cryoprecipitate were the main components in this category. A study done by Morish et al [3] showed the discard rate was 43% for fresh frozen plasma and 27% for cryoprecipitate. Mishandling of blood bags during collection, processing and storage resulting in broken units and leakage

of the bags were the common causes. The integrity of plastic bags is essential, and precautions should be taken to prevent leakages. The bags may be damaged during the centrifugation. The defect in the bag resulting in leakage at any part of the plastic blood bags can be detected by visual inspection during the processing, before freezing, and after thawing of the fresh frozen plasma unit. FFP should be stored in cardboard or polystyrene containers, which could minimize the risk of breakage of brittle frozen product during storage, handling and transportation.

Discontinuation of the blood collection procedure resulting in inadequate volumes collected accounted for 10 % (ranged from 4.4 to 20.5%) of the blood components discarded. The discontinuation of the procedure in our study were due to adverse effects experienced by the donors during donation like giddiness, vomiting, sweating, and rarely convulsions. A small percentage of discards in this category were due to improper venepuncture.

The other causes were due to contamination of fresh frozen plasma and platelet concentrate with red blood cells and highly lipemic plasma. This accounted for 9% (ranged from 4.3 to 13.7%) of total discard rate. Table 1 shows the comparison of the discard rates reported by other authors and the present study.

Table 1: showing % discard in various studies and TTI %

Study	% discarded	Discard due to TTI%	Discard due to other reasons
Kumar et al [6]	3.25	74.3	25.7
Suresh [1]	5.7	49	51
Thakare [7]	3.58	68.86	31.14
Present study	6.95	37.1	62.9

CONCLUSION

The review of blood discard rate and the reasons for blood discard is one of the important quality indicators in the blood bank. While it is important to realise that reactivity to any of the TTI screening tests is an unavoidable cause for discarding blood, other causes like difficulty in blood collection and mishandling of blood components during processing and storage can be minimised by providing appropriate

training to the technical personnel and close monitoring of these activities. The challenges encountered in these activities are recruitment of technical personnel with inadequate experience and lack of proper training. It is also customary to post fresh technical graduates in the area of blood screening, collection and component separation. Careful supervision of the technical activities at all stages beginning from donor selection with suitable veins, blood collection and component separation, appropriate storage as defined in the standard operating procedures and testing with appropriate guidance will help to reduce wastage of blood components during collection and processing.

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