VOLUME-8, ISSUE-1, JANUARY-2019 • PRINT ISSN No 2277 - 8160

Original Research Paper

Pathology

A RETROSPECTIVE ANALYSIS OF THE CAUSATIVE FACTORS FOR DISCARDING BLOOD AND BLOOD COMPONENTS IN A BLOOD BANK OF A TERTIARY CARE HOSPITAL OF METROPOLITAN CITY OF WESTERN INDIA.

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ABSTRACT

INTRODUCTION: Each unit of blood is precious and its judicious use is important to minimize its losses. The aim of this study was to analyse the reasons for discarding the blood bags and components in the current set up and optimize the use.

MATERIALS & METHOD: A retrospective study was carried out over 36 months in the blood bank of a tertiary care hospital and the data collected and analysed was number and types of blood and blood products generated and discarded and reasons for discarding bags.

RESULTS: Total 6554 blood and component bags were collected and the total discard rate was 7.67%. Packed cell volume, Platelets, Fresh frozen plasma and Whole blood were discarded at the rate of 48%, 32%, 11% and 9% respectively. Expiry of the product (58.3%) was the commonest cause of discard followed by transfusion transmissible infections (28.4%); HBV and HCV being the major components. Other causes were leakage, insufficient quantity, icterus, lipaemia and clotting.

CONCLUSION: The rate of discard has already dropped by 46.8% from 2016 to 2018. Better selection of donors, training and evaluation of the staff would help us to further reduce the wastage due to non-utilization of components.

KEYWORDS : Blood donors, Wastage, Seroreactivity, Expired products.

INTRODUCTION:

In a metropolitan city the demand of blood and blood products is ever increasing. Vast number of surgeries conducted in thousands of government and private hospitals, accelerated incidents of road traffic accidents, increasing number of cancer patients and exploding population of patients of malaria, dengue put an unrelenting demand of blood and blood products on the health system.[1,2] The blood banks face a constant strain of furnishing these demands night and day. Though blood donation drives have been conducted all over the medical facilities, it is still insufficient to bridge the gap between the demand and the supply. In such scenario wasting of blood and blood products is unpardonable. Also the process of blood collection, component generation and their storage is tedious, time consuming and expensive process. Wasting of a single unit of blood costs significant loss to the health care system. Thus, it is important to investigate the reasons for wastage of blood and blood products and take corrective measures to minimize the losses and optimize the health care delivery.[3]

AIM & OBJECTIVES:

1. The aim of this study was to observe and analyze the reasons for discarding the blood bags and components in the current set up
2. Optimize the use of these products by minimizing their wastage.

MATERIALS & METHOD:

Locus of the study: The study was carried out in a blood bank of a tertiary care hospital of metropolitan city of western India.

Type of study: A retrospective study

Study period: 36 months (January 2016 to December 2018)

Study material: The sources of the blood bags in this blood bank are the voluntary blood donation camps conducted by this institute on regular intervals and voluntary donors visiting blood bank. Following all the norms and after taking medical history and complete physical examination, the blood is collected from these donors. It is immediately sent for basic mandatory investigations and then storage and fractionation if required. The following investigations are done:

1. HIV
2. HBV
3. HCV
4. VDRL
5. Malaria antigen

For the study the data was collected from the blood bank over a period of 36 months. The following data was collected and analysed to study the trend of rejection of blood bags.

1. The demographic data.
2. Bag types: - Whole blood (WB), Packed cell volume (PCV), Fresh frozen plasma (FFP) and Platelets (Plt)
3. Reasons for discarding bags

Results:

A total of 6554 units of blood was collected during the study period of 36 months from January 2016 to December 2018, out of which 5579 (85%) from voluntary donors attending camps and 975 (15%) from donors attending blood bank (Figure 1). Figure 2 shows gender wise distribution of the donors which states that voluntary blood donation among females is low.

Figure 1: Sources of blood nags

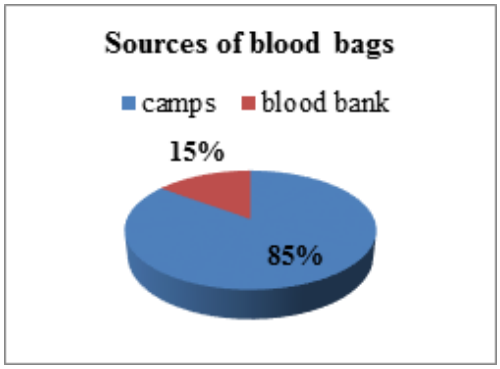


Figure 2: Gender wise distribution of donors

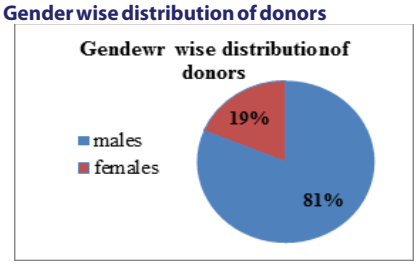
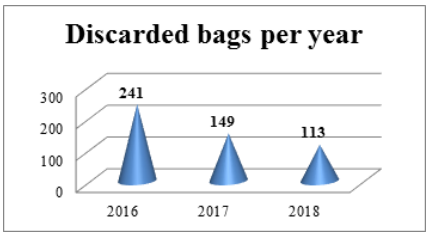


Figure 3: Year wise distribution of discard of blood bags



Out of this total collection 503 units of blood / components (7.67%) were discarded during the study period. Figure 3 shows year wise distribution of discarded bags. From 241 bags in 2016 the rate of rejection of bags reduced to 113 bags in 2018. Table 1 shows analysis of the type of blood bags or components discarded during the study period. Packed cell volume followed (48%) by platelets (32%) constitutes the maximum number of discarded products over these years.

Table 1: Analysis of types of blood bags discarded

Year	2016	2017	2018	%
PCV	112	75	52	48
Plt	92	34	38	32
FFP	22	20	13	11
WB	15	20	10	9
Total	**241**	**149**	**113**	**100**

Table 2: Reasons for discarding blood / components

Year	2016	2017	2018
Expired	172	55	40
Leakage	22	20	13
Insufficient quantity	8	16	11
HBSAg positive	13	21	16
HCV positive	15	21	14
HIV positive	9	6	9
VDRL positive	2	3	4
Icteric	0	6	2
Clotted	0	1	1
Lipaemic	0	0	1
Icteric + HCV positive	0	0	2
Total	**241**	**149**	**113**

The commonest cause of discarding of the blood bags was expiry of the blood and blood products (53.8%). From 2016 to 2018, as we can see in Table 2, there is considerable decline in the number of discarded products which very well can be attributed to the decrease in the number of expired products.

Transfusion transmissible infections namely Hepatitis B virus positivity, HCV infection, HIV infection and VDRL positivity form the second leading cause of discarding the blood bags (28.4%). HBV and HCV infections have been found in equal numbers in the patients. Icteric plasma was seen in few instances leading to rejection of PCV.

Table 3: Analysis of the reasons of discarded whole blood and components

Reasons for discarding	Expired	Insufficient quantity	Clotted
WB	14	30	1
PCV	90	5	1
Plt	163	0	0
Total	267	35	2

The analysis of the discarded whole blood bags and bold components shows the most common cause of discarding platelets and packed cell volume is expiry of the product, while that of whole blood is insufficient quantity followed by expiry.

The frequency of discarding fresh frozen plasma (FFP) was less (10%); the major cause of its rejection being leakage of the product.

DISCUSSION:

In our study the rate of discarding blood and blood components was 7.67% which is comparable to the other studies done by Sharma N et al[4], Chitnis et al[5], and Kumar et al[1]. Many other studies shows rate of discarding blood and blood components from 4 to 12 %.

The commonest cause of discard was expiry of the products in our study, which is similar to the studies done by other researchers.[4,6] But most of the studies claim it as second common cause. In studies done by Nayana Lakum et al[7], Suresh B et al[8], Puneet Kaur et al[9] and Smita Mahapatra et al[10] maximum discard of blood or blood components is because of transfusion transmissible infections (TTI).

As observed in our study the common contaminant of blood and blood products was HBV followed by HCV, HIV and least was VDRL. A similar trend is seen in other studies. [1,3,7,8,11] Insufficient quantity and expiry of the bag were the major causes of discarding whole blood. Many studies claim TTI to be major reason for discard of whole blood followed by expiry of the product.

The discard rate of platelets in our study was 32.0 %; the main reason being expiry due to short shelf life. The rate is much lower than the studies done by Parikshit Patil[2] Nikita Sharma[4], and Puneet Kaur[9].

The internal audit done periodically in our blood bank brought it to the notice of the policy makers that expiry of the products is an important and avoidable cause of loss of blood and components. Thus, new policies were planned and implemented in our blood bank. The changes made were:

1. De-reservation of the whole blood and blood products – Initially in our institute, surgeons could reserve the blood and components bags for any surgery for a period of 7 days. But it amounted for significant expired products list. Thus, the reservation period is now limited to 2 days. Then the unit is de-reserved and utilised for other patients.
2. Export of the blood and component bags – In view of minimising the losses, the blood and component bags were made available to other hospitals and blood banks to be used before their expiry.
3. Better technical approach for collection and storage of the bags.

All the above efforts resulted into a fruitful outcome of the decline in the rate of expired products from 71.3% in 2016 to 35.3% in 2018 and will continue to drop further.

CONCLUSION:

In our study we could cut down on the losses of blood and blood components due to expiry but still a significant loss exists due to TTI. Thus, it is important to implement strategies like more rigorous scrutiny and evaluation of the donors before acceptance of the blood, notification of permanently differed donors, training of technical staff to prevent and minimize losses due to TTI.

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