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Corresponding Author
Gaurav Kumar,
Department of IHBT DY Patil Medical College, Navi Mumbai

Author Designation
[1]Associate Professor
[2]Prof and HOD
[3,5,7]Junior Resident
[4]Assistant Professor
[6]Professor

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Return of Unused Blood Components With its Impact on Inventory Management: A Retrospective Study

[1]Prasad P. Kulkarni, [2]Seema Gupta, [3]Melvin Mathew, [4]Mukta Jain, [5]Masum Reza, [6]Vaishali Thakare and [7]Gaurav Kumar
[1,2,3]Department of Immunohematology and Blood Transfusion
[4,5,6]Department of Pharmacology
[7]Department of IHBT DY Patil Medical College, Navi Mumbai

Abstract
One of the quality indicators for blood transfusion services is blood component wastage. Blood bags may get discarded for number of reasons, including after their expiration date, seropositive units, are not within QC limits, leakages, or are returned with unused component units. The easily avoidable amongst these is the return of unused components. This typically occurs when requests for blood products are made without completing a patient investigation and pre transfusion preparedness. Therefore, blood is requested without assessment of its requirement. This causes wastage of blood units, making it difficult to maintain blood inventory. We analysed returned blood components from different clinical departments retrospectively for a period of 18 months i.e. from January 2022 to June 2023. Total of 113 units were returned, out of which 53 (46.9%) were discarded as they didn't fulfil the criteria for reuse. The most common reason for return was change in plan of transfusion (28 out of 113, 24.77%) followed by fever prior transfusion (22 out of 113, 19.46%). Maximum no. of return blood units were received from surgical wards (38 out of 113, 33.62%) followed by ICU (35 out of 113, 30.97%). Maximum component units discarded from the total returned bags received were from Surgical departments (21 out of 53, 39.6%) followed by ICU (13 out of 53, 24.5%). The total discard rate due to return components were 0.53%.

INTRODUCTION

Wastage of blood component is one of the quality indicator in blood transfusion services. There are various reasons for wastage of blood bags such as expiry of the component, seropositive units, quantity not sufficient (QNS), leakage, not within QC limits and return of unused component units.

Out of these reasons most logical and preventable cause is return of unused components. Most of the time this happens when blood products are requested without patient's investigation work up and lack of preparedness for transfusion. Due to lack of training of hospital staff about rational use of blood and its components sometimes they are issued without indication. This leads to wastage of important blood units leading to difficulty in maintaining the blood stock.

In case of rare blood group, wastage of a single safe blood component is very much crucial for other patients in emergency situations like RTA, peripartum haemorrhage and other unexpected operative blood loss. So, there is a need to implement policy changes with respect to its utilization so as to avoid irrational use of blood components.

Objectives:

Primary Objective:

- To analyse number of return of unused blood component units and its reasons
- To access its impact on blood inventory

Secondary Objective:

- To prepare protocol guidelines for its prevention
- To estimate financial implication of unused blood component units

MATERIALS AND METHODS

Setting: D.Y. Patil Hospital Blood Centre, Navi Mumbai

Study Design: Retrospective Study.

Duration of Study: 18 months

Study Subjects: Secondary data

Sample Size: 113

Procedure for Analysis:

- Returned blood component unit form filled by the treating physician
- Analysis of quality of component at the time of return
- Calculate the duration between issue and return of unused products
- Check the possibility of reissuance
- Analysing reason for return

Criteria to Be Fulfilled for Reissue of PRBC Unit[1]:

- Return within 30 minutes of issue
- Temperature maintained (not more than 10°C)
- **Visual inspection:** absence haemolysis, no leakage or broken seal

Criteria to Be Fulfilled for Reissue of Platelet Unit[1]:

- Return within 30 minutes of issue
- Temperature maintained i.e 22-24°C
- **Visual inspection:** swirling appearance, absence of leakage or broken seal

Criteria to Be Fulfilled for Reissue of FFP Unit[1]:

- Return within 6 hours of issue
- Temperature maintained i.e it should be kept at 2-6°C
- Visual inspection: no leakage or broken seal

RESULTS AND DISCUSSIONS

Maximum no. of return blood bag (overall) received from surgical wards (33.6 %) followed by ICU (30.9%).

Maximum issue of components overall received from surgical departments followed by medicine department.

While managing blood transfusion services, every effort is taken to implement rational utilization of blood products[2]. A single unit wasted is loss of resources as well as possibility of unavailability of blood component in case of emergency and rare blood group patient. Due to lack of awareness about transfusion triggers and less attention to estimate blood loss there are incidences of return of blood

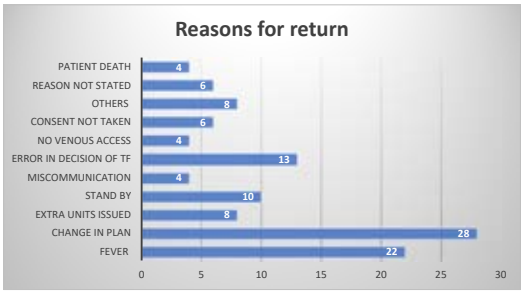

Fig 1: Most common reason for return was change in plan of transfusion {28/113} mainly due to adequate haemoglobin level and low blood loss during operation followed by fever prior to transfusion

Table 1:

Component	PRBC	Platelet	FFP	Total
Total returned	74	23	16	113
Discarded	35	7	11	53
Discard percentage	47.29	30.4	68.75	46.90

Table 2: Department wise return units of each component

Return bags	PRBC	Platelet	FFP	Total
Medicine	8	5	4	17
Intensive care units	19	7	9	35
Surgical wards	28	10	0	38
Paediatrics	5	1	1	7
Casualty	2	0	0	2
Orthopaedics	5	0	2	7
Obsterics and gynaecology	7	0	0	7

Table 3: Table 3: Maximum component units discarded from total returned bags were from Surgical departments (21 out of 53, 39.62%) followed by ICU (13 out of 53, 24.52%)

Discard units/ department	PRBC	PLT	FFP	Total
Medicine	2	1	4	7
Intensive care units	9	0	4	13
Surgical wards	15	6	0	21
Paediatrics	2	0	1	3
Casualty	1	0	0	1
Orthopaedics	2	0	2	4
Obstertrics and gynaecology	4	0	0	4

Table 4: Department wise issue of blood components

Issue	PRBC	Platelet	FFP
Pediatrics	1158	245	782
Medicine	2375	873	1450
Orthopaedics	342	2	55
Obsterics and gynaecology	643	126	321
SURGERY	3942	1650	3045
Casualty	47	6	9
Total	8507	2902	5662

Table 5: Comparison of present study with Hassan *et al*

Reason for return	Hassan *et al*	Present study
Stand by purpose	294	10
Patient death	97	4
Adequate Hb level	47	28
Fever prior transfusion	39	22
No venous access	24	4
No consent	4	6

products without utilization.

In a blood centre, wastage of units is of major concern and considered as quality indicator with its benchmark of less than 1%[3]. So, there is a definite need of analysing reasons, also its possibility for salvage to receive so as to re-issue for the same or other patients.

In a similar study conducted by Hassan *at al*[4] in a teaching hospital Malaysia, the most common reason was due to 'stand by' purpose (47.4%) followed by patient death (15.6%) and adequate hemoglobin level (7.6%). In the present study, predominantly units were returned without utilization due to change in plan (28 out of 113,24.7%). This was interpreted as ordering components without proper pretransfusion work up[5] as in PRBC transfusion haemoglobin level was not verified, for platelets[6] without prior exact platelet count, also for FFP issue without considering PT INR level before issuing. This can be avoided if there is a communication between treating physician and other team members. There should be a set protocol for pretransfusion work up with respect to specific component to be administered and these values to be mentioned on request form. There should be proper communication between blood transfusion services and ward staff managing the patient.

Estimation of blood loss[7] can be done by operative team of surgeons and anaesthesia department prior to surgery. In current study 28 out of 113 components (24.77%) where returned due to change in plan. To avoid this wastage the team should set a protocol as per diagnosis and type of surgery. There is a trend of requesting blood by operative team without documenting its indication. If this becomes a routine practice to complete request form with indication, transfusion trigger and laboratory parameters the blood transfusion service department may become alert to avoid inappropriate transfusions. During Minimal invasive surgeries which don't require transfusion, operative team may consider availability of blood stock and request them on urgent basis if any rare possibilities of adverse situation.

Fever[8] in a patient can be managed with routine medication however in a critical patient if its associated with transfusion episode it should be managed as per type of fever pattern. In present study, there are 22 out of 113 incidences (19.46%) where blood component was returned because of fever, this could have been avoided if patient would have been properly assessed before ordering itself. In other patients, dyspnoea, bradycardia, tachycardia were other reasons for return. Pretransfusion clinical assessment should be a part of routine exercise so that such wastage can be avoided.

In critically ill patients, maintaining intravenous access[9] is a difficult task for ward staff due to repeated administration of fluids and medication. If blood transfusion is planned ward staff should confirm IV access before requesting blood unit so that it would be administer to the patient in requisite time after it is issued from blood transfusion service. In the present study, this resulted in return of 4 out of 113 components (3.53%) which could have been avoided. Death of the patient is an unfortunate situation. This should be managed with due care so has to avoid arguments between the relatives and Hospital staff about billing for unused units. Current study had 4 returned units (3.5%) due to death of the patient while the comparative study had 97 out of 620 such units (15.6%).

Written consent[10] should be taken from patient or relatives whenever a blood transfusion is planned, with the exception of emergency situations in which consent cannot be requested and a blood transfusion is necessary to save the patient. This study had 6 out of 113 such units (5.30%) that were returned due to issue of blood unit as consent was not possible.

Wastage in blood centres from returned blood bags reflects inefficiency. The percentage of wastage of blood products due to return were 0.53% in the current study. Meticulous inventory management and communication can minimize surplus. Implementing stringent protocols, enhanced communication channels, updating on appropriate utilization of blood products and latest guidelines could reduce wastage Collaboration between blood transfusion service and clinical units is pivotal to optimize usage and reduce unnecessary disposal, preserving life-saving resources. The financial loss to the organization cannot be neglected. As per SBTC guidelines[11], a single unit of PRBC costs Rs. 1550, platelets and FFP Rs 400 each. Therefore with the discard of 53 components out of 113 returned units (46.90%), a sum total of Rs 61,450 could have been saved.

CONCLUSION

- Pre transfusion workup as well as consent should be taken prior to transfusion including CBC parameters
- There should be alertness about transfusion triggers and BTS staff and patient care staff
- There should be communication among OT staff and proper coordination with BTS to avoid untimely issue of blood products
- Although percentage of unused bags is less compared to discard, it is very crucial when it comes to rare blood group
- Considering every unit is precious there is a possibility of salvage of blood components
- Training about appropriate usage of blood components and prevention of avoidable causes of return
- Preciousness of single safe unit that should be made aware to each hospital staff associated with patient care
- Financial loss can be minimized with collective efforts from hospital staff managing patients and blood transfusion services

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