

## Research Article

# Platelet audit: To weigh the rationality between requirement and uses in blood transfusion

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## ABSTRACT

**Background:** Blood transfusion especially the transfusion of blood component is an important part for better patient management than whole blood transfusion. Despite various approved guidelines, non-compliance regarding rational use prevails in transfusion services.

**Methods:** In the present study; retrospective audit was conducted for a period of six months in the department of Transfusion Medicine, SCB Medical College and Hospital revealed on 3871 number of platelets prepared.

**Results:** Out of 3757 units of platelet issued, there was 10.9% group nonspecific platelet transfusion, 31% inappropriate platelet transfusion and 1.99% wastage.

**Conclusions:** The goal of transfusion service is to provide adequate number of safe blood components to the patient requiring this transfusion as per clinical guideline. This can be achieved by platelet audit which plays an important tool to reduce the inappropriate transfusion in patients, by improving the practice, in adherence to guidelines and focusing the areas of pitfall.

**Keywords:** Audit, Blood, Platelet, Transfusion

## INTRODUCTION

Blood transfusion is considered to be the most important treatment protocol and at times act as the life saving measure. Being a precious product and the demand for blood exceeding the supply, it should be transfused with great caution keeping in mind the adverse effects like introduction of donor antigen to recipient causing transfusion reaction, transmission of various transfusion transmitted diseases (TTDs).

Whenever required, blood components should be always preferred to whole blood transfusion. Random donor platelet (RDP) is a type of blood component prepared either by PRP (platelet Rich plasma) or buffy coat method. Though various international and national guidelines have been set up for platelet transfusion therapy, still noncompliance have been reported

frequently.<sup>1-3</sup> The awareness among the clinicians has to be enhanced regarding the fact that the risk factors for the blood transfusion should always be weighed to the clinical benefits.

The indication for ordering blood should be justified to avoid misuse of this precious product. Unnecessary platelet transfusion can enhance threat to transfusion transmitted infections (TTI), allo-immunisation and platelet refractoriness.

Platelet transfusion audit play an important role to reduce inappropriate transfusion in patients, improve the practice guideline, encourage the consultation with clinicians, thus identify the areas need to be focused for improvement.

This study was conducted retrospectively to audit platelet transfusion to assess the preparation, appropriate

utilization and wastage of platelet in our Government Medical College.

## METHODS

A retrospective platelet audit was carried out from September 2015 to February 2016 for a period of six months in the Department of Transfusion Medicine, Sriram Chandra Bhanja (SCB) Medical College and Hospital, Cuttack, in the state of Odisha, India. In the year of 2015 we prepared 7,575 units blood components, issued 7,371 units to cater our patients need and discarded 163 units of blood and its components. As per BCSH (British committee for standards in haematology) guideline we followed the platelet transfusion policies of issuing out-of-group platelet to the patients.<sup>4</sup>

Audit was performed in all the requisitions coming for RDP. RDPs were stored for a period of 5days at 20-24°C with continuous horizontal, gentle agitation of 70±5 oscillations/minute in a platelet incubator-cum-agitator. Patient's information regarding their age, gender, platelet count, clinical disease, ABO and Rh type and request for

group specific or nonspecific were recorded from the requisitions form.

**Table 1: Current prophylactic platelet transfusion thresholds.**

Type of patient	Platelet
All patients	10,000/ $\mu$ l
Stable patients	5,000/ $\mu$ l
Patient with fever or recent haemorrhage	10,000/ $\mu$ l
Patient with coagulopathy, on heparin, or with anatomic lesion; Likely to be bleed	20,000/ $\mu$ l

The datas regarding platelet wastage (undesirable physical appearance, leaks/bag rupture, TTI reactive) and expiry were analysed from the records to estimate the wastage rate and expiry rate. One percent of the platelet prepared per month was subjected to quality control parameters like volume, pH, platelet count, Red Blood Cell, White Blood Cell content and culture. Appropriateness of platelet transfusion was assessed according to the guideline shown in Table 1 and utilization pattern for various clinical wards was noted (Table 2).

**Table 2: Group wise platelet requisition from different ward during six months.**

Month	No of patients	No of requisition	O+ve	A+ve	B+ve	AB+ve	All Neg. Gp	CHW	AHRCC	Dengue	Medicine	Paediatrics	Others
Sep	229	328	128	68	104	25	03	93	53	80	40	338	24
Oct	246	384	142	68	143	22	09	144	70	74	27	41	28
Nov	259	396	110	114	138	27	07	140	112	48	44	31	21
Dec	150	263	91	70	80	20	02	133	29	12	27	31	31
Jan	130	275	85	83	99	04	04	152	51	01	16	41	14
Feb	151	267	85	56	110	16	00	139	57	00	28	21	22
Total	1165	1913	641	459	674	114	25	801	372	215	182	203	140

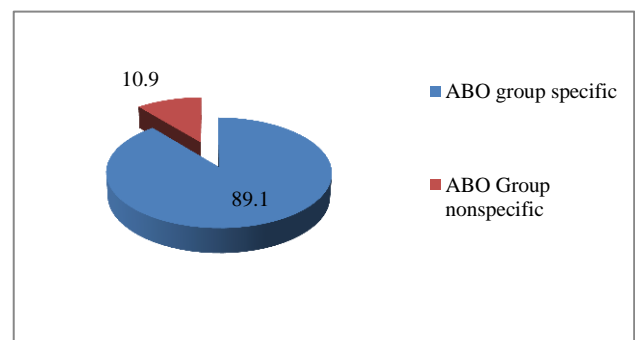
NB: Neg-Negative; CHW-Clinical Hematology Ward; AHRCC-Acharya Harihara Research Center for Cancer.

## RESULTS

During six month study period 3871 units of platelets were prepared. Out of these, 3757 platelets were transfused to 1165 number of patients constituting 735 numbers of males and 433 numbers of female in 1913 episodes of transfusion. Out of 3757 units of transfusion, 3351 (89.1%) units were ABO & Rh group specific and 406 (10.9%) were group nonspecific (Figure 1).

Among ABO group nonspecific platelets issued, 149 units were issued to group-'A' patients followed by 120 units to group-'B', 64 units to group-'O', and 34units to group-'AB' (Figure 3). Out of 31 units platelet issued to Rh D negative patients, 27units of B-positive platelet concentrate (PC) were issued to B-negative patients and two units each to 'A'-negative and 'O'-negative patient. In this study period 1,913 numbers of requisitions for PC were requested from various specialties, among which maximum (801) requisitions were received from Department Of Clinical Haematology followed by

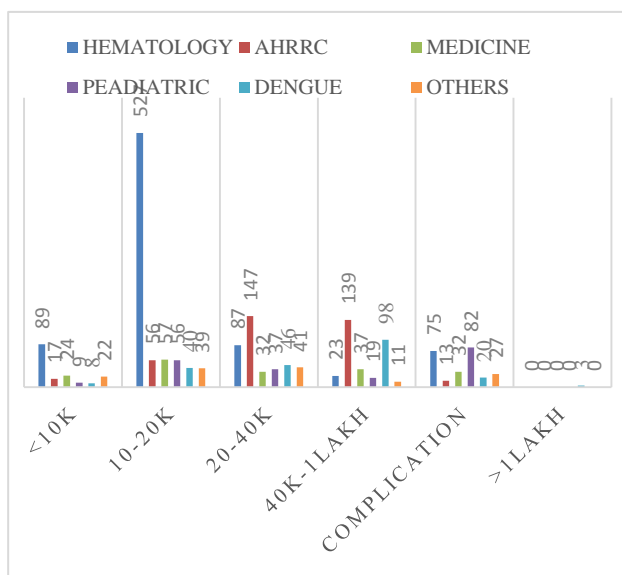
AHRCC (Acharya Harihara Research Centre for Cancer) (372) with maximum supply of 1652 (43.9%) units of RDP to Clinical Haematology and 20.4% to AHRCC. The request for PC was found to be maximum for the patients having platelet count between 10,000-20,000/ $\mu$ L constituting 775 in numbers (Figure 2).



**Figure 1: Percentage of abo group specific and non-specific platelet transfused.**

86.6% of platelet were transfused prophylactically to patients either with platelet count less than 10,000/ $\mu$ L without additional risk factor or platelet of <20,000/ $\mu$ L with additional risk factors (fever, sepsis, concurrent use of antibiotics on chemo/radiotherapy or other abnormalities of haemostasis) and >20,000/ $\mu$ L up to 1,00,000/ $\mu$ L undergoing chemotherapy.

69% of prophylactic platelet transfusions were appropriate as per the recommendation from BCSH guideline. However from platelet audit, out of 3254 number of prophylactic platelet transfusion 1007(31%) were inappropriately transfused mostly in Dengue ward. Only 13.4% of PC were therapeutically transfused.<sup>5</sup>



**Figure 2: RDP requisitions coming from different department according to the total platelet count of the patient.**

Out of 3871 PC prepared, 77 units were not utilized and 24 units were subjected to quality control. 42 units were found to be TTD reactive, 03 units were contaminated with RBC, 01 units was discarded due to rupture and 07 units got expired due to non-utilization during storage period.

## DISCUSSION

Internal audit form an integral part of the quality control in a blood bank. The aim of the quality assurance is to provide safe and effective blood component to the patients. For this the blood component preparation should be able to meet the demands of transfusion. In India, only 20% of the blood bank are preparing blood components which is inadequate to meet the demand of the growing patients need.<sup>5</sup>

Like other component, PC is also considered as a drug by food and drug administration (FDA) as its use is meant to produce therapeutic benefit to the patients. Thus FDA

emphasizes on the quality of PC to be maintained by improving the procedures from the collection to the testing, preparation, storage and supply of safe blood.<sup>6</sup> Via internal audit, it is important for the blood bank to fulfil the demand of PC as life saving measures as well as to evaluate and assess the existing trend of blood demand. It is important to prevent the misuse of PC transfusion which may lead to shortage of blood availability and delaying supply of blood to someone in life threatening situation.

Platelet utilization has increased more than any component in the last two decades all over the world.<sup>1,2,7</sup> The availability of platelet concentrate has been very useful in the intense regimen for haematological or other malignancy.<sup>8</sup>

The total number of transfusions carried in our hospital during that period was 1913 and males required more number of transfusions than females. Out of 3757 units of transfusion, 89.1% was ABO and Rh D group specific and 10.9% was group nonspecific when group specific platelets were not available in the inventory. The non-acceptance by clinicians in transfusing platelet across the ABO barrier contributed to the expiry of 07 units of PC.

In present study, 69% of the platelet was utilized appropriately with hemato-oncology departments being the major user. 1007(31%) number of PC were transfused inappropriately mostly to the Dengue patients, which could have been reduced if we could have educated the residents of the corresponding Department by direct interaction and release of educational materials in the form of Resident Manual.

PCs are the most perishable blood component because of its short expiry with storage at room temperature which in-turn raises the risk of bacterial growth. But in our study, the rate of expiry was low, 07 units only were not utilised. This minimum rate of wastage related to expiry was due to utilisation of group nonspecific PC. Though out-of-group PC transfusion is permissible, but it is recommended to transfuse ABO group specific PC.<sup>1</sup>

ABO non-identical PC transfusion has been associated with poor platelet count increment in few studies.<sup>9,10</sup> But this is usually clinically insignificant in term of hemostatic effectiveness of platelet transfusion. In our study only 10.9% of PC were transfused out-of-group especially when there was therapeutic indication and group specific PC were in short in our inventory.

The retrospective audit on PC in our centre has enlightened us regarding platelet preparation, utilization and discard along with the transfusion policies. Continuous education of clinicians and nursing staffs regarding appropriate indication of platelet transfusion, utilization of group nonspecific PC will reduce the misuse of the precious blood component and the inventory would avail the PC for the needy patient.

## CONCLUSION

Regular audit on platelet concentrate is a must to ensure appropriate and judicious utilization for the patients requiring it the utmost. It will lead to maximum platelet count increment following PC transfusion, and reduce the incidence of platelet refractoriness.

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*Ethical approval: The study was approved by the Institutional Ethics Committee*

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