



A PROSPECTIVE STUDY OF RATIONAL USE OF BLOOD COMPONENTS IN TERTIARY CARE CENTER

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ABSTRACT Transfusion services are aimed to provide only those components which patients require and keep the rest for others. Blood component transfusion is critical due to lack of alternative; and therefore should be used rationally. This study were performed to find out the scenario of rational use of blood components in the patients transfused in S.G.M.H and G.M.H., a tertiary care hospital affiliated with S.S.Medical College, Rewa (M.P.). In this 3 month prospective study, a total of 1240 blood components (Packed Cell, PRP and FFP) were transfused to 738 patients, with males to female ratio of 1.29, maximum units of packed red cells were transfused (72.9%), but maximum number of appropriate transfusion were for FFP(67.1%). Overall rational use of blood components in SGMH & GMH came out to be 62.20% Present study concluded that it needs more intense educative efforts to use the blood components appropriately especially for platelet concentrates.

KEYWORDS : Rational, Component, Packed Red Cell, Fresh Frozen Plasma, Platelet Concentrates

INTRODUCTION

Half a century back, most of the blood transfused was the whole blood, after that there was a significant shift in strategy of the transfusion of allogenic blood with the concept that blood can be separated into its components, RBCs, WBCs, Platelet and Plasma^[1]. It has become a life saving measure which saved lives of millions of patients. The goal of modern transfusion therapy is to provide appropriate replacement therapy with blood components (red cells, platelets, fresh frozen plasma, cryoprecipitate etc) as opposed to whole blood for patients with specific hematologic deficiencies^[2]. Whenever needed, blood components must be used in such a manner that a patients suffer minimum exposure to the hazards of blood transfusion (like Transfusion transmitted infections etc) as well as maximum conservation of these precious resources. Despite of considerable developments and advancements in transfusion medicine, much is needed in clinical practice for appropriateness of its usage. Our study is to assess the appropriateness of the usage of blood components in our tertiary care centre so as to recommend the measures to increase the appropriate use of these precious human life saving resource.

Material Methods:

This prospective cross section study was carried out at Blood Bank, SGMH & GMH, Department of Pathology, S.S.Medical College, Rewa (M.P.) for the duration of 3 months (1st Oct 2016 to 31st Dec 2016). Approximately one thousand plus voluntary and replacement blood donors who attended the blood bank for normal routine donation and fulfilled the standard criteria of National AIDS Control Organization [NACO guidelines 2007] were recruited for the preparation of various blood components(i.e., pRBC, FFP & PRP). These components were transfused to the patients and appropriateness of its use in our institution was assessed. After proper cleaning of the cubital fossa, whole blood was collected from recruited donors via cubital venipuncture through wide-bore, siliconized needles to minimize platelet and clotting factor activation and was immediately mixed with anticoagulant in 450 ml quadruple SAGM (Saline Adenine Glucose Manitol) bags. The collected blood units were processed for preparation of components within 6 hours without storage. From quadruple SAGM bags, components (pRBC, PRP & FFP) were prepared by centrifugation and separation method. In vitro quality was assessed by swirling, volume, Haemoglobin (Hb %), Platelet count, White Blood Cells (WBC) count and pH of bag as per recommendations of BSQR 2005. Units were screened for Transfusion Transmitted Infections (TTIs) i.e. Human Immunodeficiency Virus (HIV) I & II, Hepatitis B Surface Antigen (HbsAg), Hepatitis C Virus (HCV), malaria and VDRL.

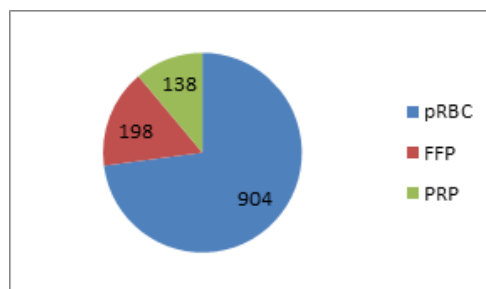
Prepared components were either issued against the requisite/ demand or stored under the optimal storage temperature and other conditions.

Storage was done for maximum period of valid and recommended days like pRBC for 42 days, FFP for 1 year and PRP for 5 days and after that unit was declared and marked expired. Compatibility test was done before issuing the unit. ABO compatible platelets were issued to the patients. For each transfusion, relevant information about the patient, type of component supplied, its indication and transfusion details were noted.

These information were gathered from; component demand form and issue card, transfusion notes and case sheet of the patient, which included – patient's Name, Age, Sex, Clinical Diagnosis, Indication (therapeutic/ prophylactic) of component transfusion, number of transfusions, any adverse event etc. Rationality was screened under the guidelines of BCSH 1992 & BCSH 2001

Results: During the study period, a total of 1664 units of blood were collected of which 1240 units of blood components were prepared and transfused. Rest of the units (444 Units, 35.8 %) were supplied as whole blood and were not included in present study.

Of the total 1240 unit transfused, maximum numbers were Packed RBC (pRBC) [n=904, 72.9%] which is summarized in Fig No. 1



Prepared 1240 component units were transfused to 738 patients with male to female ratio 1.29. No. of units supplied to single patient are summarized in Table No. 1

Table No. 1

No.of Units/Patient	No. of Patients	Percentage
Single unit /patient	423	57.3
2 units/patient	228	30.8
3 Units/ Patient	55	07.4
>3 Units/Patient	32	04.3
Total	738	100.0

Most appropriate use of Fresh frozen plasma came out to be maximum in the present study (67.1%) and least for platelet concentrates (44.2%) with overall appropriate use of our institute came out to be 62.2 % Table 2

S. No.	Components Name	No. of Units used (n)	Percentage (Used)	Rational	Percentage (Rational)
01	Packed Cells	904	72.9	555	61.4
02	Fresh Frozen Plasma	198	16.0	133	67.1
03	Platelet Rich Plasma	138	11.1	61	44.2
04	Total	1240	100	749	62.20

On department wise assessment, maximum appropriate use of pRBC came for Gynecology and Obstetrics department (68%), that for Platelet concentrates came out to be Department of Surgery and for Fresh Frozen Plasma (FFP) it was for Orthopedics Department (75%) as summarized in Table 3.

S. No	Department	Packed cells			PRP			FFP		
		Total	Rati onal	Perc enta ge	Total	Rati onal	Perc enta ge	Total	Rati onal	Perc enta ge
01	Medicine	326	182	55.8	62	26	41.9	85	62	72.9
02	Gynae& Obs.	284	194	68.3	09	05	55.5	22	14	63.6
03	Paediatrics	169	104	61.5	26	14	53.8	76	48	63.1
04	Surgery	84	49	58.3	21	12	57.1	11	06	54.5
05	Orthopaedics	41	26	63.4	20	09	45.0	04	03	75.0
	Total	904	555	61.40	138	61	44.2	198	133	67.1

Discussion;

The use of whole blood for transfusion accounted for 35.8 % of total transfusions in this study. A similar study in 1996 reported that 60% of transfusion requests by clinicians over a five year period at Ilorin, Kwara State North central Nigeria were for whole blood^[13] whereas, in another study, at 2004, it came out to be 5.7% in the same geological region^[14]. This indicate more intense effort to promote component use in our setup. Unfortunately, the increased awareness of clinicians of the need to use component transfusion as against whole blood transfusion has not been met by a corresponding enhanced capacity of our blood banks towards the provision of blood components for clinical use^[14]. An area of current debate in the area of transfusion for trauma patients relates to the management of trauma patients with massive bleeding as a result of the risk of coagulopathy^[5,6]. Platelet concentrates were the least appropriately used component in present study whereas, it was the pRBC in the study of O.P.Arewa^[14]. This can be explained as variation of awareness in different clinical setups . Most appropriate transfusion of Packed Red Cells were found to be in surgical departments / settings . The risks of bleeding in surgical and obstetric patients are determined by the extent and type of surgery, the ability to control bleeding, the actual and anticipated rate of bleeding and the consequences of uncontrolled bleeding^[4,7]. Severe anaemia (haematocrit =18%, Hb =6g/dl) is usually an indication for blood transfusion as the risk of cardiac decompensation is high^[4,7].

Platelet transfusion is usually indicated in patients with increased risk of bleeding from thrombocytopenia. Prophylactic platelet transfusion is however ineffective when thrombocytopenia is due to increased platelet destruction. Surgical and obstetric patients with microvascular bleeding usually require platelet transfusion if the platelet count is less than 50 x10⁹/l.11. Platelet component transfusion in this study is largely inappropriate like the study of O P Arewa^[14].

The institution of a pre-transfusion approval program requires that Haematologists agree on blood components indications preferably through the instrument of a consensus document on this subject.^[15] A rational approach for improvement on blood component use is the development of a framework, a working document on blood component usage which is widely accessible to clinicians. Blood is a scarce resource and ensuring its clinical effectiveness requires investment both human and financial.

Conclusion:

The present study Concludes that appropriate use of Blood and Blood – Components is the true unmet challenge for limited resource setups like ours.

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