



An Audit of Pattern of Transfusion in Tertiary Care Hospital

Authors

**Dr Vijay Kapse¹, Dr Shruti Shrivastava², Dr Renuka Gahine³
Dr Mukesh Kumar Bharti⁴**

¹Associate Professor Department of Pathology Pt. Jawaharlal Nehru Memorial Medical College, Raipur (C.G.) India, 492001

²Associate Professor Department of Pathology, Govt. Medical College, Rajnandgaon (C.G.) India, 491441

³Director Professor and Head of the Department Pathology, Pt. Jawaharlal Nehru Memorial Medical College, Raipur (C.G.) India, 492001

⁴PG, Resident Department of Pathology, Pt. Jawaharlal Nehru Memorial Medical College, Raipur (C.G.) India, 492001

Abstract

Background: *Blood Transfusion Services is the important part of modern healthcare system without which efficient medical care is not possible. Every hospital/blood transfusion centre is expected to develop a system of audit that is appropriate to its needs. Aim of our study is to formulate some action plan to improve blood transfusion services and also change clinicians approach regarding appropriate transfusion and to determine pattern of transfusion and utilization trends.*

Materials and Method: *6 months (April 2017 to September 2017) retrospective audit of all processed blood requisition forms were evaluated for indications, hematological values and number of requisitions received from different specialities done in Model Blood Bank associated with Dr. BRAM Hospital and Pt. J.N.M. Medical College Raipur (C.G.) All collected data were evaluated to know utilization trends and appropriateness of the indication.*

Results: *Total 18699 units of blood components (RCC+ WB+ FFP+ Platelets) were cross matched and out of them 14681 (74%) units were transfused. Overall C/T ratio is 1.27:1. RCC & WB- Maximum demands of 3013 (21.5%) units of RCC/WB received from department of Obstetrics & gynecology and most common indication was for surgery of obstetric cases followed by department of Surgery (n=2331= 16.6%) and most common indication for surgical procedure for different indications.*

Conclusion: *A review of the pattern of blood and components utilization can be of help to determine probability of transfusion and to formulate guidelines for usage*

Keywords: *audit in blood bank, Pattern of transfusion, C/T ratio of RCC/WB, FFP, Platelets, indications of transfusion of blood components, transfusion probability, transfusion index, utilization of blood components.*

Introduction

The primary responsibility of blood transfusion services is to provide safe, sufficient and timely supply of blood and blood products. At the same

time the blood transfusion services should ensure the blood donation is safe and causes no harm to the donor.^(1,2)

There is increasing need for appropriate utilization of blood and its component. An audit of pattern of transfusion in hospital setup can be of help to identify key areas where there is need to change policies and thus help to formulate guidelines for improvement of transfusion services. Audit of pattern of transfusion is important tool to improve our transfusion services. A retrospective audit can scrutinize combined transfusion data and utilization trends. These audits were undertaken to ensure effective blood utilization and to analyze.

This audit was undertaken to ensure effective blood utilization and to analyze the trend of blood component utilization. All patients requiring transfusion should have a reliable access to safe blood products, including whole blood, labile blood components and plasma-derived medicinal products, appropriate to their clinical needs, provided in time and administered safely. Data on the use of blood products are limited, but studies suggest that blood products are often overprescribed in both developed and developing countries⁽³⁾.

Blood component transfusions play a vital role in the resuscitation and management of both medical and surgical patients. Each year, the demand for blood components in hospitals far exceeds the collection of blood-by-blood banks. Statistics and studies by various agencies have revealed that there is a inclination on part of treating doctors to over-order blood components in surplus of utilization^(4,5).

Materials and Method

We conducted an audit over a period of 6 months from April 2017 to October 2017 at the Department of Pathology of our institute. The data obtained, regarding the utilization of 18699 units of various blood components i.e. Red Cell Concentrate (RCC), Whole Blood (WB), Platelet Concentrates (PC) and Frozen Plasma (FFP) during that period, was compiled and analyzed further to evaluate the transfusion services, the pattern of blood component request and utilization.

Requisition forms were analyzed and the data obtained was then evaluated for various transfusion indications, appropriateness of indication and component requested as well as the utilization trend. The department wise use of blood and its components, cross match to transfusion (C/T) ratio (Units Cross Matched/ Units Transfused), Transfusion Probability (Patients Transfused \times 100/ Patients Cross Matched) and transfusion index (Units Transfused/ Patients Cross Matched) were calculated. A C/T ratio of 2.5, transfusion probability of >30 and transfusion index more than 0.5 was considered indicative of significant blood usage.⁽⁶⁾

Formulas for Calculation

For C/T ratio:

$$\frac{\text{Total Units Cross Matched}}{\text{Total Units Transfused}}$$

Probability of transfusion:

$$\frac{\text{Total units transfused} \times 100}{\text{Total units cross matched}}$$

Transfusion index:

$$\frac{\text{Total patients Transfused}}{\text{Total Units Cross Matched}}$$

Aims and Objectives

Formulate some action plan to improve Blood Transfusion Services and also change clinicians approach regarding appropriate transfusion. To determine pattern of transfusion and utilization trends in our institute.

Results

Total 18699 units of blood components (RCC+ WB+ FFP+ PC) were cross matched and out of them 14681 (74%) units were transfused. Overall C/T ratio is 1.27:1

Maximum demands of 3013 (21.5%) units of RCC/WB received from department of Obstetrics & Gynecology and most common indication was for Surgery of obstetric cases and this was followed by department of Surgery with demand of 2331 units (16.6%) and most common

indication for surgical procedure for different indications department wise usage of RCC/WB as described in Table 1.

For WB+RCC C/T ratio is 1.35:1, Transfusion Probability is 74% and Transfusion Index is 1.21.

Table 1: Department Wise Utilization of RCC+WB

Department	Units Cross Matched	Units Transfused	C/T Ratio	Tansfusion Probability	Transfusion Index
Obs& Gyn	3013	2019	1.49:1	67%	1.13
Surgery	2331	1352	1.72:1	58%	1.28
Medicine	2309	1986	1.16: 1	86%	1.31
Paediatrics	1944	1851	1.05:1	95%	1.06
Orthopedics	1943	991	1.96:1	51%	1.13
Radiotherapy	1381	1243	1.11:1	90%	1.36
Renal	909	773	1.17:1	85%	1.12
Other Dept	150	130	1.15:1	86%	1.3
Overall Utilization	13980	10345	1.35:1	74%	1.21

Platelet Concentrates (PC)

Total 2542 demands were received for Platelet concentrates and 2297 units of PC were transfused. C/T ratio was 1.1.:1. Maximum demands of 1354 (53.2%) units was received from Paediatric dept and most common indication was ALL under chemotherapy.

Fresh Frozen Plasma (FFP)

Total 2177 demands were received for FFP and 2039 units were transfused. C/T ratio was 1.06:1. Maximum demands of 1047 units received from department of Paediatric and most commonly indicated for sepsis in new born.

Table 2 Department Wise Utilization of FFP and PC

department	FFP N=	Percentage %	Total Units Transfused	C/T ratio (FFP)	Platelets N=	Percentage %	Total Units Transfused	C/T ratio (PC)
Paediatric	1047	48.1	998	1.04	1354	53.26%	1217	1.11
Obs & gyn	359	16.5	330	1.08	244	9.6%	211	1.15
Medicine	471	21.6	435	1.08	351	13.8%	321	1.09
surgery	242	11.1	221	1.09	43	1.7%	33	1.3
Radiotherapy	-	-	-	-	456	18%	423	1.07
Other dept	58	2.7	55	1.05	94	3.7%	92	1.02
Total	2177	100%	2039	1.06	2542	100%	2297	1.11

Table 3: Most common indications of transfusion

DEPARTMENT	RCC/ WB	FFP	PLATELETS
PAEDIATRICS	THALASSEMIA & HAEMATOLOGICAL MALIGNANCY	SEPSIS ENCEPHALOPATHY UGI BLEED	ALL AML PTAFD/LBW
MEDICINE	SEVERE ANAEMIA US SCD GI BLEED	CLD/ALD GI BLEED ENCEPHALOPATHY	APLASTIC ANAEMIA THROMBOCYTOPAENIA
OBS & GYN	FOR SURGICAL OT ANAEMIA ANC/PNC PPH	POST OP CASES ECLAMPSIA SEPSIS	BLEEDING OT PPH
SURGERY	FOR SURGIACAL OT BURN/ WOUND DIABETIC FOOT	MALIGNANT MASS FOR SURGICAL OT SPLENECTOMY	HYPERSPENISM SURGICAL OT FOR MALIGNAT MASS
ORTHO	FOR SURGICAL OT RTA/CRUS INJURY	-	SEPSIS
RADIOTHERAPY	HAEMATOLOGICAL MALIGNANCY CHEMOTHERAPY	MALIGNANT MASS ALL AML	AML CML CHEMOTHERAPY
RENAL	FOR DIALYSIS IN CRF/ ARF	-	-

Discussion

There are various methods for evaluating Blood Transfusion Services by several indices. In 1975, Boral Henry suggested the use of cross match to transfusion ratio (C/T ratio) for the first time.⁽⁴⁾ Retrospective audits are effective in identifying areas requiring interventions to change or improve transfusion practice. Such measures are effective in reducing the total number of unit transfused, number of units transfused per patient and the number of inappropriate transfusions. The utilization of blood is 74% for overall all blood components in our study. In recent study by Dexter et al, the author have validated a method to determine procedures on the Maximum Surgical Blood Order Schedule (MSBOS) for which Type and Screen was not indicated⁽⁷⁾. Henry and Boral introduced the C/T ratio and Transfusion index (TI). If C/T ratio is <2.5 is indicative of significant utilization of blood⁽⁴⁾. Transfusion index denotes average number of units used per patient and is considered significant if more than 0.5 units used per patient⁽⁹⁾. Mead et al described the transfusion probability of more than 30 % as significant requirement of blood⁽⁸⁾. Our present study shows

the overall C/T ratio was 1.27:1. In previous study done in same institute in 2015 showed C/T ratio 1.08:1. Transfusion probability was 78% and Transfusion index was 1.21 in our study which indicates significant utilization. 26% of cross matched bloods were not transfused to patients. Maximum C/T ratio 1.96:1 observed in the department of Orthopedics followed by 1.76:1 C/T ratio seen in department of Surgery. Demanding large quantity of blood, of which little is transfused ultimately specially in surgical departments can increase the reserve blood that is unavailable for transfusion. This may even contribute to ageing and outdated of blood components. Moreover it increase work load in blood bank and also adds to financial burden to the institute. This audit indicates the efficient blood component usage at our institute. However improvement and awareness for clinicians is still needed. Every health care institute has to develop distinct guidelines according to their need.

Conclusion

A review of the pattern of blood and components utilization can be of help to determine probability

of transfusion and to formulate guidelines for their usage revising of blood ordering pattern and steps to minimize over ordering. Implementation of a type and screen policy and estimation of MSBOS (Maximum Surgical Blood Order Schedule) for each procedure can be rationale and save valuable time and resources. We need to conduct regular workshop and CME for residents, consultants and other staff regarding improvement in blood bank transfusion services.

Bibliography

1. Patel P, Patel S, Patel M. Study Of Blood Donors Characteristics At Teaching Hospital, Western India. *NJIRM* 2015; 6(4) 56- 62.
2. Reiss R.F. blood donor wellbeing: a primary responsibility of blood collection agencies. *Annal of clinical and laboratory science* 2011; 41(1):3-
3. World Health Organization, Blood Transfusion Safety, Safe and rational clinical use of blood, URL:http://www.emro.who.int/programme_areas_bloodsafety.htm
4. Friedman BA, Oberman HA, Chadwick AR, Kingon KI: The maximum surgical blood order schedule and surgical blood use in the United States -*Transfusion* 1976; 380–387.
5. Bhutia SG, Shrinivasan K, Ananthkrishnan N, Jayathi S, Ravishankar M: Blood utilisation in elective surgery requirements, ordering and transfusion practices - *Natl Med J India* 1997; 10:164- 168.
6. Kaur P, Basu S, Kaur G, Kaur R. An Analysis Of The Pattern Of Blood Requisition And Utilization In A Tertiary Care Center. *NJIRM*. 2013;4(2): 123-127.
7. Dexter F, Ledolter J, Davis E, Witkowski TA, Herman JH, Epstein RH. Systematic criteria for type and screen based on procedure's probability of erythrocyte transfusion. *Anesthesiology* 2012 Apr;116(4):768-78 [Medline] [Free Full Article] doi: 10.1097/ALN.0b013e31824a88f5.
8. Mead JH, Anthony CD, Sattler M. Hemotherapy in elective surgery. An incidence report, review of the literature, and alternatives for guideline appraisal. *American Journal of Clinical Pathology*. 1980;74(2):223–227.
9. Ho O, Bo B. Blood utilization in elective surgical procedures in Ilorin. *Tropical Journal of Health Sciences*. 2006;13:15–17.