

An Audit of the Pattern of Blood Transfusion at a Tertiary Care Centre

Renuka Gahine¹, Aditi Das^{2,*}, Pratima Kujur³, Chandrakala Joshi⁴

¹Professor and Head, ^{3,4}Associate Professor, Dept. of Pathology, Pt. J.N.M. Medical College, Raipur (C.G.), India

²Senior Resident, Dept. of Pathology and Lab Medicine, All India Institute of Medical Sciences (AIIMS), Raipur (C.G.), India

***Corresponding Author:**

Email: mdmedico09@gmail.com

ABSTRACT

Background and objectives: Due to increased requirement of blood, it is necessary to formulate action plans for its prudent use. This study had been conducted to evaluate ongoing transfusion services at a tertiary care centre.

Method: This had been a prospective study of 7 months duration (June 2013 - December 2013). The data obtained, regarding the utilization of 10,203 units of blood component during that period, was compiled and analyzed further.

Results: Total 10,203 units were cross matched and 9431 units were issued. The overall C/T ratio (Units crossmatched/ Units transfused) was 1.08:1. The transfusion probability & transfusion index obtained were 67.44 % and 1.17 respectively. Of 7328 units demand for whole blood and red cell concentrate, red cell concentrate demand was 43% (n= 3154) and whole blood demand was 57% (n= 4174). The maximum demand was received from Obstetrics & Gynaecology department (n= 1450) followed by Paediatrics (n=1434). Maximum utilization of blood units was noticed in Trauma unit (C/T ratio= 1.00:1) and minimum was observed in department of Surgery (C/T ratio= 1.20:1). Of 2875 units demand for fresh frozen plasma (FFP) & platelets, FFP demand was 42% (n= 1206) and platelet demand was 58% (n= 1669). 1206 units demand for FFP resulted in transfusion in 1084 patients (average 1.11 units/patient) with maximum demand from department of Surgery (36.3%) followed by Pediatrics (22.4%) and the commonest indication being burns followed by full term acute fetal distress (FTA/DF)/ sepsis.

Conclusion: This study highlights that every health care institute must develop distinct transfusion guidelines based on the nature of routine & emergency services and implement them through the institutional transfusion committee to assure effective blood utilization.

Keywords: Audit, C/T ratio, Transfusion.

INTRODUCTION

The blood and its components are pivotal in patient's care. The clinicians should cautiously assess the appropriateness of indication before requesting various components, thereby preventing misuse and unnecessary exposure to various infectious and non-infectious complications. The determinants of transfusion include many factors like differences in opinion regarding the hemoglobin threshold for transfusion, technical differences in surgical and anaesthetic management, cancellation or postponement of transfusion, differences in treatment protocols for correction of anaemia, and non availability of standard transfusion protocols. Transfusion audit analyzes transfusion data & utilization trends. It identifies the issues that need to be addressed through interventions designed to change transfusion practice followed by continuous monitoring and assessment of the effectiveness of interventions. Transfusion audits thus help to formulate guidelines for improvement of transfusion services. This audit was undertaken to ensure effective blood utilization and to analyze the trend of blood component utilization.

MATERIALS AND METHOD

We conducted an audit over a period of 7 months from June 2013 to December 2013 at the Department of Pathology of our institute. The data

obtained, regarding the utilization of 10,203 units of various blood components i.e. red cell concentrate, whole blood, platelets 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. The ethical clearance was obtained from ethical committee and informed consent was taken from patients' relatives and clinicians prior to the commencement of study. Requisition forms were analyzed and the data obtained was then evaluated for various transfusion indications, appropriateness of indication & 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 crossmatched/ Units transfused), transfusion probability (Patients transfused×100/ Patients crossmatched) and transfusion index (Units transfused/ Patients crossmatched) 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.^[1]

RESULTS

Total 10, 203 units were cross matched and 9431 units were issued with overall C/T ratio 1.08:1. The transfusion probability and transfusion index obtained were 67.44% and 1.17 respectively. Of 7328 units demand for whole blood and red cell

concentrate, red cell concentrate demand was 43% (n= 3154) and whole blood demand was 57% (n= 4174).

Maximum demand was received from Obstetrics & Gynaecology department (n= 1450) followed by the department of Paediatrics (n=1434) and the department of Medicine (n=1350). Maximum utilization of blood units was noticed in the Trauma unit with C/T ratio 1.00:1 and minimum utilization in Surgery department with C/T ratio 1.20:1, as summarized in table 1.

Of total 2875 units demand for FFP & platelets, FFP demand was 42% (n= 1206) and platelets demand was 58% (n= 1669). 1206 units demand for FFP resulted in transfusion in 1084 patients (average 1.11 units/ patient) with maximum demand from the department of Surgery (36.3%) followed by the department of Pediatrics (22.4%) and the commonest indication was burns followed by full term acute fetal distress (FTA FD)/ sepsis. Total 1570 units of platelet were transfused and the most common indication was acute leukemia (ALL/ AML) as summarized in table 2.

Table 1: Department Wise Utilization of Various Blood Units

Department	Units cross matched (n)	Units transfused (n)	C/T Ratio
Obstetrics & Gynaecology	1450	1287	1.15:1
Pediatrics	1434	1380	1.03:1
Medicine	1350	1274	1.05:1
Surgery	974	811	1.20:1
Orthopedics	807	698	1.15:1
Radiotherapy	574	525	1.09:1
Trauma	335	332	1.00:1
Others	504	470	1.07:1
Total	7328	6777	1.08:1

Table 2: Department Wise Utilization of Fresh Frozen Plasma and Platelets

Department	Fresh Frozen Plasma			Platelets		
	n	%	Indications	n	%	Indications
Obstetrics & Gynaecology	209	19.3	Severe anemia/ PPH*	56	3.5	PPH/ APH [†]
Pediatrics	243	22.4	Full Term Acute Fetal Distress (FTA FD/ Sepsis)	1061	67.6	ALL/ AML^{‡‡}
Medicine	166	15.3	Liver Disease	270	17.2	Thrombocytopenia
Surgery	394	36.3	Burn	34	2.2	Thrombocytopenia
Radiotherapy	12	1.2	-	130	8.3	Thrombocytopenia
Others	60	5.5	-	19	1.2	Thrombocytopenia
Total	1084	100		1570	100	

*PPH: Post-Partum Hemorrhage

† APH: Ante Partum Hemorrhage

‡‡ ALL/ AML: Acute Lymphoid Leukaemia/ Acute Myeloid Leukaemia

DISCUSSION

Various indices have been described to evaluate transfusion services. In 1975, Boral Henry suggested the use of crossmatch to transfusion ratio (C/T ratio) for the first time.^[2] Ideally, this ratio should be 1.0, but a ratio of 2.5 and below was suggested to be indicative of efficient blood usage.^[3] In 1980, Mead JH *et al* described the transfusion probability.^[4] A value of 30% and above has been suggested as appropriate.^[3] The average number of units used per patient crossmatch is indicated by the transfusion index (TI) and signifies the appropriateness of number of units crossmatched. A value of 0.5 or more is indicative of efficient blood usage.^[2-3]

We obtained overall C/T ratio of 1.08:1, which indicates efficient blood usage. This had only been possible by the combined efforts of treating physicians/ surgeons and our departmental faculty. Our institutional policies have been formulated to avoid over ordering of blood units as much as possible. At the blood bank of our institute, we avoid multiple number of arranged or cross matched units especially for the patients planned for elective surgeries and for the conditions demanding multiple transfusions. We conduct regular CMEs in the form of inter-departmental seminars, inter-departmental clinicopathological meets and lectures regarding transfusion guidelines for the resident doctors and

clinicians. By all these ways we try to emphasize on minimizing unnecessary blood unit requests. We have also developed strict protocols to scrutinize each requisition for appropriateness of indication prior to cross match. Requesting multiple number of whole blood and various blood component units, that remain unutilized, ultimately increases the reserved blood stock that couldn't be utilized for transfusion and results in expiration of blood products along with financial loss.

In this study, transfusion probability was found to be 67.44% and transfusion index 1.17, indicating efficient blood usage. Kaur P *et al.*^[1] have reported transfusion probability 41.8% & transfusion index 0.7. Transfusion probability as reported by various authors have been 4.9 to 8.8 % & transfusion index 0.06 to 0.1.^[5-6] Maximum demand as observed in Obstetrics & Gynecology department followed by the department of Pediatrics and the department of Medicine was similar to the findings of Kaur P *et al.*^[1] Maximum utilization as noticed in Trauma unit with CT ratio 1.00:1, suggests best utilization; however minimum was observed in the department of Surgery with CT ratio 1.20:1 as summarized in table 1.

We observed that average utilization of 1.11 units of FFP per patient is much below the recommended dose & burn cases constituted the commonest indication (n= 394, 36.3%) as summarized in table 2, whereas Kaur P *et al.*^[1] noted liver disease as the commonest indication. This discrepancy might be the result of differences in the patient referral and the geographical distribution of the various ailments.

CONCLUSIONS

This audit indicates the efficient blood usage at our institute. However, awareness is still needed amongst the clinicians and residents to ensure the appropriate usage of blood and the various components in the future as well. Every health care institute must develop distinct transfusion guidelines based on the nature of emergency & routine services and the subsequent implementation of such guidelines, through the institutional transfusion committee to assure effective blood utilization is must.

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