

## Original research article

## An Audit of the Pattern of Blood Transfusion at a Tertiary Care Centre of Middle Gujarat, India

Dr Krishna Kant Shiromani<sup>1</sup>, Dr Poojaba Jadeja\*<sup>2</sup>, Dr Harsh Pandya<sup>3</sup>

1 Associate professor, Department of Pathology, Parul institute of Medical science and Research, Parul University Vadodara, Gujarat, India

2 Assistant professor, Department of Pathology, Parul institute of Medical science and Research, Parul University Vadodara, Gujarat, India

3 Tutor, Department of Pathology, Parul institute of Medical science and Research, Parul University, Vadodara, Gujarat, India

**Corresponding Author:** Dr. Poojaba Jadeja

Address: Assistant professor, Department of Pathology, Parul institute of medical science and research, Parul University Vadodara, Gujarat, India

E Mail: pathology22222@gmail.

### ABSTRACT

**Background:** Medical audit forms a component of quality assurance and quality improvement in health care delivery. It is very important for a transfusion service to know exactly how many blood products it issues, as well as the disposition of every unit. In many countries, it is a legal mandate for the transfusion service to be able to account for every unit that it issues, from donor to recipient.

**Objective:** To evaluate ongoing transfusion services at a tertiary care centre.

**Methodology:** We have conducted an audit over a period of 12 months from Oct 2020 to Sept 2021. The data obtained, regarding the utilization of 5034 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.

**Results:** Maximum demand was received from Intensive care unit (n= 2500) followed by the department of Medicine (n=590) and followed by Surgery (n=587). Maximum utilization of blood units was noticed in the Medicine unit with C/T ratio 1.10:1. Of total 1995 units demand for FFP & platelets, FFP demand was 56.44% (n= 1126) and platelets demand was 43.56% (n= 869). 1206 units demand for FFP resulted in transfusion in 1084 patients (average 1.11 units/ patient) with maximum demand from ICU (26.36%) followed by the department of Medicine (12.46%). Total 869 units of platelet were transfused and the most common indication was thrombocytopenia.

**Conclusion:** 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. The Transfusion practice of the Blood bank is 100% Blood component. The practice of whole blood transfusion is abandoned.

**Key Words:** Transfusion, Audit, C/T ratio,

### INTRODUCTION

Blood bank audit or better perhaps, transfusion medicine audit, is part of the larger field of medical audit, yet clearly also involves questions of resource audit and management, and audit of product

quality. <sup>[1,2]</sup> Theoretically, bloodbank or transfusion medicine audit embraces all procedures from blood procurement to the long term consequences of transfusion. The scope of this brief review is largely confined to the clinical practice of transfusion and resource management in the hospital blood bank.

The question may be raised-are audits necessary? Without belabouring the point, a small number of examples will illustrate the desirability of audit. Kelly and Kellie, <sup>[3]</sup> in a brief but extensively referenced review, indicated that a substantial but not clearly defined proportion of medical services are superfluous, advocated the active development of practice guidelines, and concluded that, so far, such efforts have had little influence on practice. <sup>[4]</sup>

Like platelets, transfusion of fresh frozen plasma (FFP) has been subjected to review and guidelines have been produced for its use. In spite of these statements, excessive transfusion of FFP probably persists for largely inappropriate indications. Guidelines for transfusion of FFP have been reviewed elsewhere. <sup>[5]</sup>

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.

## **MATERIAL AND METHODS**

We have conducted an audit over a period of 12 months from Oct 2020 to September 2021 at Blood Bank, Department of Pathology, Parul Sevashram hospital, Parul institute of medical science and research, Parul University Vadodara, Gujarat, India

The Data obtained, regarding the utilization of 5034 units of various blood components i.e. red cell concentrate, whole blood, platelets and Fresh 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 & 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. <sup>[1]</sup>

## **RESULTS**

Total 7550 units were cross matched and 5034 units were issued with overall C/T ratio 1.49:1.

The transfusion probability and transfusion index obtained were 65.44% and 1.07 respectively. Of 5034 units demand for whole blood and red cell concentrate, red cell concentrate demand was 59.9% (n= 3019) and whole blood demand was 40.10% (n= 2015).

Department	Units cross matched (n)	Units transfused (n)	C/T Ratio
Pediatrics	115	83	1.385542169
ICU	2500	1342	1.862891207
Labour	190	146	1.301369863
SICU	187	152	1.230263158
NICU	245	196	1.25
PICU	340	256	1.328125
MICU	390	294	1.326530612
CARDIAC	220	127	1.732283465
DIALYSIS	200	124	1.612903226
MMW	590	536	1.100746269
MOW	450	337	1.335311573
FMW	407	332	1.225903614
FOW	240	233	1.030042918
MSW	330	242	1.363636364
FSW	70	52	1.346153846
RECOVERY	90	46	1.956521739
OT	60	35	1.714285714
CASUALTY	26	17	1.529411765
COVID WARD	189	127	1.488188976
SPECIAL WARD	50	35	1.428571429
ISOLATION	50	12	4.166666667
AYURVEDIC	61	19	3.210526316
DELUXE WARD	70	38	1.842105263
EXT,HOSPITAL	100	88	1.136363636
GYNEC &OBS	380	165	2.303030303
<b>Total</b>	<b>7550</b>	<b>5034</b>	1.49:1.

**Table 1: Department Wise Utilization of Various Blood Units**

Maximum demand was received from Intensive care unit (n= 2500) followed by the department of Medicine(n=590) and followed by Surgery (n=587)

Maximum utilization of blood units was noticed in the Medicine unit with C/T ratio 1.10:1 and minimum utilization in isolation ward with C/T ratio 4.10:1, as summarized in table 1

Department	WB	RCC	FFP	PC	CRYO
Pediatrics	0	53	5	25	0
ICU(Intensive care unit)	0	541	526	245	30
Labour	0	100	8	38	0
SICU(Surgical Intensive care unit)	0	56	51	45	0

NICU(Nenatal Intensive care unit)	0	37	64	95	0
PICU(Pediatic Intensive care unit)	0	108	63	95	0
MICU(Medical Intensive care unit)	0	120	82	92	0
CARDIAC	0	96	15	16	0
DIALYSIS	0	124	0	0	0
MMW(Male medicine ward)	0	302	149	85	0
MOW(Male Orthopedic ward)	0	302	10	25	0
FMW(Female Medine ward)	0	262	35	35	0
FOW(Female Orthopedic ward)	0	210	0	20	0
MSW(male surgical ward)	0	166	46	30	0
FSW(Female surgical ward)	0	52	0	0	0
RECOVERY	0	36	10	0	0
OT(Operation theater)	0	33	2	0	0
CASUALTY	0	17	0	0	0
COVID WARD	0	21	2	12	0
SPECIAL WARD	0	35	0	0	0
ISOLATION	0	12	0	0	0
AYURVEDIC	0	7	12	0	0
DELUXE WARD	0	84	38	8	0
EXT,HOSPITAL	0	77	8	3	0
GYNEC &OBS	0	165	0	0	0

**Table 2: Department Wise Utilization of Various Blood components**

Of total 1995 units demand for FFP & platelets, FFP demand was 56.44% (n= 1126) and platelets demand was 43.56% (n= 869). 1206 units demand for FFP resulted in transfusion in 1084 patients (average 1.11 units/ patient) with maximum demand from ICU (26.36%) followed by the department of Medicine (12.46%) and the commonest indication was burns followed by full term acute fetal distress (FTAFD)/ sepsis. Total 869 units of platelet were transfused and the most common indication was thrombocytopenia as summarized in table 2.

## 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. Ideally, this ratio should be 1.0, but a ratio of 2.5 and below was suggested to be indicative of efficient blood usage.<sup>[6]</sup> In 1980, Mead

JH et al described the transfusion probability.<sup>[7]</sup> A value of 30% and above has been suggested as appropriate.<sup>[8]</sup>

One area where audit has been difficult to pursue and for which little information is available is that of long term follow-up and we know little of the frequency of adverse long term consequences and outcomes of transfusion of blood and blood products.

In supplying feedback on audit in general to physicians, the information should be precise and clinically relevant, and should have a high chance of producing change in practice, as the information is expensive to accumulate. Furthermore, for an optimal response the information is best presented close to the time of decision making. A number of reports indicate success of education programmes and pretransfusion consultation in reducing the use of FFP and platelets. However, these are time-consuming activities which are not readily sustained and the durability of the response remains uncertain.

Toy has summarised the determinants of the success of education in transfusion practice as significant inappropriate use, timely audit and individual physician education.

The introduction and expansion of autologous surgical predeposit programmes, partly stimulated by increased awareness of transfusion hazards, have been associated with changes in red cell transfusion practices.

The use of audit for management purposes is a byproduct of the medical audit; it defines practice in an institution and permits both comparison with other institutions and data banks, and establishment of a routine blood order schedule appropriate to the individual institution. Such measures contribute to more efficient use of inventory and decreased wastage. Using carefully compiled blood order schedules, agreed to by surgeons, unnecessary cross matching can be reduced and in a general hospital a cross match to transfusion ratio of less than 2 to 1 should be readily achievable. Use of audit to reduce unnecessary transfusion and outdated of blood, and make more efficient use of inventory will become more important, as we face, on both sides of the Atlantic, diminishing supplies of blood.

Surgenor D M, 2001<sup>[9]</sup>, personal communications) resulting from increasingly stringent donor requirements and declining public interest in donating blood. It has recently been shown that, in practice, implementation of audit with monitoring can significantly reduce the use of allogeneic blood products with considerable cost savings and decreased reliance on conventional blood donation

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=287, 33.76%) as summarized in table 2, whereas Kaur P et al <sup>[10]</sup> 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.

## CONCLUSION

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. The Transfusion practice of the Blood bank is 100% Blood component .The practice of whole blood transfusion is abandoned.

**REFERENCES**

- 1) Fifer WR. Integrating quality assurance mechanisms. In: Luke RD, Krueger JC, Modrow RE, eds. Organization and change in health care quality assurance. Rockville, MD: Aspen Systems Corp., 1983:217-30.
- 2) 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.
- 3) Khoshrang H, Madani AH, Roshan ZA, Ramezanzadeh MS. Survey on blood ordering and utilisation patterns in elective urological surgery. *Blood Transfus*. 2013 Jan;11(1):123-7.
- 4) Couture DE, Ellegala DB, Dumont AS, Mintz PD, Kassell NF. Blood use in cerebrovascular neurosurgery. *Stroke* 2002;33:994-997.
- 5) Nelson AH, Fleisher LA, Rosenbaum SH. Relationship between postoperative anemia and cardiac morbidity in high-risk vascular patients in the intensive care unit. *CritCare Med* 1993;21:860-6.
- 6) Stehling L, Simon TL. The red blood cell transfusion trigger. Physiology and clinical studies. *Arch Pathol Lab Med* 1994; 118:429-34.
- 7) Mead JH, Palepu A, Paterson WG. Evaluation of red blood cell transfusion practices with the use of preset criteria. *Can Med Assoc J* 1994;150:1449-54.
- 8) National Institutes of Health Consensus Conference. Platelet transfusion therapy. *JAMA* 1987;257:1777-80.
- 9) Surgenor D M, et L. British Committee for Standards in Haematology. Guidelines for platelet transfusions. *TransfMed* 1992;2:311-18.
- 10) 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.