ORIGINAL RESEARCH PAPER
Volume - 10 | Issue - 01 | January - 2021 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ANALYSIS OF BLOOD REQUISITION AND UTILIZATION PRACTICES IN MEDICAL AND SURGICAL PATIENTS AT A SOUTH INDIAN HOSPITAL

Medicine

Dr. S Venkat* Associate Professor, Department Of Transfusion Medicine, Kamineni Institute Of Medical Sciences, Narketpally, Telangana. *Corresponding Author

Dr. Pooja Veturi Junior Resident, Department of Transfusion Medicine, Kamineni Institute Of Medical Sciences, Narketpally, Telangana.

ABSTRACT

INTRODUCTION: Blood products are precious resources for hospitals with increased demands. Over-ordering of cross-matched blood is a common practice by requesting clinicians based on subjective anticipation of blood loss during elective procedures. **Aim** was to evaluate whether blood requested by various departments was in alignment with its usage followed by improving the efficacy of ordering system by formulation of MSBOS for optimum utilization of blood. **METHODS:** A hospital based retrospective study was conducted from january2017-december2018 in those patients who required blood transfusion. Details of units cross matched and transfused along with number of patients cross matched and transfused were collected from blood bank requisition forms and registers and reviewed. Blood utilization indices were calculated. **RESULTS:** A total of 5038 patients were requested to prepare 7236 units of cross matched blood. Overall blood utilization was 51%. Overall cross match to transfusion ratio (C/T ratio), transfusion index (TI) and transfusion probability (TP) was 1.95,0.51 and 46.3% respectively which were within desirable limits. MSBOS was formulated for procedures in respective departments that showed higher indices. **CONCLUSION:** Although overall blood utilization was adequate, the indices were beyond acceptable limits for certain elective surgical procedures.

KEYWORDS

CT ratio, MSBOS, Type and Screen, Transfusion Index, Transfusion Probability.

INTRODUCTION:

In the era of modern health care, blood components play an essential role in the treatment plan of various patients. In the process of ensuring patient recovery, appropriate usage of blood components in the treatment process has been overlooked with gross over ordering in elective surgical procedures. [1,2]

Substantial amount of time and effort goes into a type and crossmatch (T&CM) protocol that is practiced in anticipation of transfusion for each patient undergoing a surgical procedure. Once cross matched the blood bag is held in reserve, creating inventory problems for blood bank, loss of shelf life and wastage of unit. Introduction of Type and screen (T/S) protocol as a part of pretransfusion testing is as safe as conventional T&CM protocol.[1,3,4]

A blood ordering schedule was first published by Friedman et al which serve as a guideline to anticipated normal blood usage for elective surgical procedures. It is an easy reference to relate the ordering of blood to the likelihood that a transfusion will be required.[5]

The main objective of the study was to audit the blood utilization practice in all the surgical and medical departments by analysing transfusion indices like C/T ratio, TI and TP followed by formulating institution specific MSBOS for the surgical departments with high transfusion indices.

Subjects And Methods:

A hospital based retrospective study was conducted for the period of two years from January 2017-december 2018 in those patients who required blood transfusion. Details of units cross matched and transfused along with number of patients cross matched and transfused were collected from blood bank requisition forms and registers.

Blood utilization indices were calculated as follows:

1. Cross match to transfusion ratio (C/T ratio) = number of units cross matched/number of units transfused. A ratio of 2.5 and below was considered indicative of significant blood usage.
2. Transfusion index (TI) =number of units transfused/number of patients cross matched. A value of 0.5 or more was considered indicative of significant blood usage.
3. Transfusion probability (T%) =number of patients transfused/number of patients cross matched *100. A value of 30% and above was considered indicative of significant blood utilization.
4. MSBOS = 1.5 * T.I

Departments with transfusion indices beyond acceptable limits were identified and a list of procedures performed in the respective departments was noted to formulate a blood ordering schedule. Various elective surgical procedures were identified where type and screen(T&S) protocol can be safely recommended based on retrospective blood utilization pattern.

Algorithm to derive MSBOS included the following criteria:

1. Patients receiving transfusion >/= 5 %
2. Median estimated blood loss >/= 50ml
3. Transfusion Index >/= 0.3

Using the above criteria, it was recommended that in the absence of a risk of major bleeding and presence of one or two criteria, a T&S protocol can be implemented. The protocol changed to T&CM two units if risk of major bleeding was present along with presence of any of the above criteria.

RESULTS:

A total of 5038 patients were included in this study. 7236 units of blood were cross matched. Of these, 2336 patients were transfused 3693 units implying 51% of blood was utilized. Data for blood utilization, studied for various surgical and medical departments showed that the overall transfusion indices were within desirable limits (C/T Ratio= 1.95; TI= 0.51; T%= 46.3%).

The overall transfusion indices for medical departments were found to be within normal limits (C/T Ratio= 1.1; TI= 0.9; T%= 87.4%), while surgical departments showed higher indices (C/T Ratio= 3.5; TI= 0.3; T%= 27.4%).

Specialty wise transfusion indices were as follows [Table -1]. Highest C/T ratio for both years of study was observed for department of ENT, gynaecology & obstetrics (OBG) followed by orthopaedics.
Subsequently, MSBOS was formulated for departments with indices exceeding normal parameters.

Table-1: Specialty wise transfusion indices for the period of two years.

S.NO	SPECIALTY	C/T	TI	TP%
1.	ENT	5.5	0.2	14.0
2.	Gynaecology & obstetrics	3.8	0.3	20.2
3.	Orthopaedics	2.6	0.4	30.5
4.	General Surgery	2.1	0.5	44.8
5.	Emergency medicine	1.3	0.8	72.4
6.	General medicine	1.1	0.9	89.5
7.	Nephrology	1.1	0.9	90.1
8.	Pulmonology	1.1	0.9	91.8
9.	Paediatrics	1.1	0.9	93.4

The routine protocol of reserving 2 units of packed red cells prior to most elective procedures without significant risk of major blood loss in the department of ENT was replaced by the new T&S protocol [Table-2]. This was based on the observation that the advantage of this approach outweighed the disadvantage of emergency requirement as the reserved blood was rarely utilized. Blood ordering schedule of reserving a minimum of one unit prior to surgery were revised with the introduction of T&S protocol for various procedures in departments of OBG and orthopaedics [Table-3], [Table-4].

Table-2: Procedures With Revised Cross Matching Protocol In ENT.

PROCEDURE	REVISED MSBOS
Septoplasty	T&S
Endonasal Dacrocystorhinostomy	T&S
Functional Endoscopic Sinus Surgery	T&S
Rhinoplasty	T&S
Tympanoplasty	T&S
Mastoidectomy	T&S
Facial Nerve Decompression	T&S
Sistrunks Operation	T&S
Laryngo-Tracheoplasty	T&S

Table-3 Procedures With Revised Cross Matching Protocol In Gynaecology And Obstetrics.

PROCEDURES	REVISED MSBOS
Cystectomy/Oopherectomy	T&S
Salpingectomy	T&S
Tubal Sterilization	T&S
Diagnostic Laparoscopy	T&S
Laparoscopic Cystectomy	T&S
Simple Hysterectomy	T&S
Elective Lower Segment C-Section	T&S

Table-4 Procedures With Revised Cross Matching Protocol In Orthopaedics.

PROCEDURE	REVISED MSBOS
Laminectomy	T&S
Dissectomy Fenestration	T&S
Fracture Shaft Of Humerus	T&S
DHS -Fixation Of Proximal Femur	T&S
Open- K Nail / Plating	T&S
Closed- ILN / K Nail	T&S
Arthroscopy / Menisectomy	T&S
Harvesting Bone Graft From Ilium	T&S
Proximal Femoral Nailing	T&S

DISCUSSION:

This study was mainly an audit of packed red blood cell usage in various medical and surgical departments providing us with useful data to study use of PRBC in each department thus assisting in formulating blood ordering schedules.

In the present study it was found that majority of blood units were issued to General medicine (GM) department followed by OBG and orthopaedics. Alcantara et al[7] found Medicine department utilizing maximum number of units as well.

Maximum utilization does not necessarily mean inappropriate usage of components as was evident in the present study. Transfusion indices are one such tool to guide us about the inefficiency in our transfusion practices.

MSBOS has been in use since 1976 and has been undergoing periodic modifications since the time of implementation.[5]

The current study revealed that 49% of the cross- matched blood was unutilized. This finding was comparatively low to that of northern India study[3] (59.0%) and from various other countries like Ethiopia (74.8%), Nigeria (69.7%) and Nepal (86.4%) signifying better utilization practice at our institute.[2,9,10] This indicates that there is gross over ordering of blood in 40% to 70% of patients transfused in developing countries.[2]

Several authors used C/T ratio for evaluating blood transfusion practices. A ratio of 2.5 and below was suggested to be indicative of efficient blood usage. The overall C/T ratio in the present study (1.95) was much lower in comparison to that reported by a study conducted in Nigeria (2.2), Ethiopia (3.9) and Malaysia (5.0). In contrast, C/T ratio in the present study was widely varied and high across elective patients of OBG (3.82) and orthopaedics (2.6) departments [2,9] while the transfusion indices for all the non-surgical departments were within desirable range. Disparities in rates of transfusion in the current study are because there is a tendency of over ordering of blood due to subjective excessive blood loss estimation of a procedure.

In the present study, overall T% was adequate (46.3%) indicating appropriate utilization of PRBC units. Various studies have reported values ranging from 8.9% to 79.3%.[2]

However, in OBG (20.2%), orthopaedics (30.5%) findings were similar to an Ethiopian hospital study (23.3%).[2]

The TI reported in the current study (0.51) was similar to a study at a tertiary care hospital in Uttarakhand[6] and was considered appropriate in all non-surgical departments.

In a similar study by Vibhute *et al*,[1] the blood transfusion practices were evaluated for elective surgical cases and MSBOS was put into immediate effect after formulation resulting in the change in blood ordering pattern. The formulation of MSBOS was done using Mead's criterion (MSBOS= 1.5 * TI)

There are certain drawbacks to this approach which includes individual differences in transfusion requirements between different patients undergoing same surgical procedure.[3,6]

In conclusion, reviewing the utilization patterns from time to time, introduction of type and screen protocols as part of pretransfusion testing, formulating policies for emergency transfusions and laying down guidelines/triggers for transfusion would lead to better utilization of blood and its components. It is essential to do such studies as the information obtained can form the basis for recommendations for blood conservation strategies.

REFERENCES:

1. Vibhute, M., Kamath, S. K., & Shetty, A. (2000). Blood utilisation in elective general surgery cases: requirements, ordering and transfusion practices. *Journal of postgraduate medicine, 46*(1), 13–17.
2. Belayneh, T., Messele, G., Abdissa, Z., & Tegene, B. (2013). Blood requisition and utilization practice in surgical patients at university of gondar hospital, northwest ethiopia. *Journal of blood transfusion*, 758910.
3. Subramanian, A., Rangarajan, K., Kumar, S., Sharma, V., Farooque, K., & Misra, M. C. (2010). Reviewing the blood ordering schedule for elective orthopedic surgeries at a level one trauma care center. *Journal of emergencies, trauma, and shock, 3*(3), 225–230.
4. Subramanian, A., Sagar, S., Kumar, S., Agrawal, D., Albert, V., & Misra, M. C. (2012). Maximum surgical blood ordering schedule in a tertiary trauma center in northern India: A proposal. *Journal of emergencies, trauma, and shock, 5*(4), 321–327.
5. Friedman, B. A. (1979). An analysis of surgical blood use in United States hospitals with application to the maximum surgical blood order schedule. *Transfusion, 19*(3), 268–278.
6. Kuchhal, A., Negi, G., Gaur, D.S., Harsh, M. (2016). Blood Utilization Practices In Elective Surgical Patients In Tertiary Care Hospital Of Uttarakhand. *Glob J Transfus Med, 1*(2), 51-6.
7. Alcantara J.C, Opina A.P, Alcantara R. (2015). Appropriateness of Use of Blood Products in Tertiary Hospitals. *International Blood Research & Reviews*, 3(2), 54-65.
8. Venkatachalapathy TS, Das S. (2012). A Prospective Audit of Blood Transfusion Requests in Rl Jalappa Hospital and Research Centre for Blood and Blood Components. *J Blood Lymph*, 2, 106.
9. Olawumi, H.O., Bolaji, B.O. (2006). Blood utilization in elective surgical procedures in Ilorin. *Tropical Journal of Health Sciences, 13*(1), 15-17.
10. Basnet, R.B., Lamichhane, D., Sharma, V.K. (2009). Study Of Blood Requisition And Transfusion Practice in Surgery At Bir Hospital. *Postgrad Medical J of NAMS,* 9(2),14-19.