Blood Utilization In Elective Surgical Procedures In Ilorin.

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Abstract

Blood utilization was evaluated in elective surgical procedures over a period of 6 months using different indices such as crossmatch to transfusion ratio(C/T ratio), transfusion probability (%T), and transfusion index (TI).
Out of 436 units of blood crossmatched for 207 patients, only 132 were transfused with no utilization of 69.7% of crossmatched blood. In wound debridement, split thickness skin grafting (STSG), open reduction internal fixation (ORIF), mastectomy, and prostatectomy all the 3 indices showed significant blood utilization whereas in all ENT surgery utilization of blood provided was nil.
This study showed that there was excessive crossmatching of blood and changing the blood ordering pattern can minimize this.

Keywords: Blood utilization, elective surgery.

Introduction

The increasing demand for blood and blood products together with rising cost and transfusion associated morbidity led to a number of studies in the late 1970s reviewing blood ordering and transfusion practices [1]. These studies showed gross overordering of blood much in excess of anticipated needs.
Many units of blood routinely ordered by surgeons are not utilized but are held in reserve and these are unavailable for other needy patients, This imposes inventory problems for blood banks, loss of shelf life and wastage of blood [2].
In South Africa for example 7-10% of blood is wasted annually because of overordering of blood [3].
Developing a blood ordering schedule, which is a guide to expected normal blood usage for elective surgical procedures, can decrease overordering of blood. It also enables the identification of procedures that can be accommodated by the group and screen or the group and save procedure thereby reducing unnecessary compatibility testing, returning of unused blood and wastage due to outdating. It also allows for a more efficient management of blood inventory [4].
A number of indices are used to determine the efficiency of blood ordering system. The use of crossmatch to transfusion ratio (C/T ratio) was first suggested by Boral Henry in 1975 [1]. Subsequently a number of authors used C/T ratio for evaluating blood transfusion practices. Ideally this ratio should be 1.0 but a ratio of 2.5 and below was suggested to be indicative of efficient blood usage.
The probability of a transfusion for a given procedure is denoted by %T and was suggested by Mead et al in 1980 [5] A value of 30% and above has been suggested as appropriate. The average number of units used per patient crossmatched is indicated by the transfusion index (TI) and signifies the appropriateness of numbers of units crossmatched. A value of 0.5 or more is indicative of efficient blood usage [1].

This paper is aimed at determining the efficacy of blood ordering system for surgical procedures in a tertiary hospital using the 3 indices mentioned above and also to emphasize the need for every hospital to develop a blood ordering schedule for surgical procedures.

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Materials and Methods

The patients included in this study are adult patients who underwent elective general surgical procedures for which grouping and crossmatching was requested over a period of 6 months (January – June 2003).
A study of blood ordering and utilization was done retrospectively. These patients were identified and the type of surgical procedure each underwent was obtained from the theatre records. The number of units crossmatched and the number issued and transfused were obtained from blood bank records.
For each surgical procedure, the number of patients, units of blood crossmatched and units of blood transfused were recorded and the following indices were calculated for each procedure

1. C/T ratio = $\frac{\text{Number of units crossmatched}}{\text{Number of units transfused}}$

2. $\%T = \frac{\text{Number of patients transfused x 100}}{\text{Nu mber of patients crossmatched}}$

3. $TI = \frac{\text{Number of units transfused}}{\text{Number of "patients" crossmatched}}$

Table 1: Comparison between crossmatch and transfusion.

Procedures	No. of "patients" cross-matched	No. of units cross-matched	No. of units transfused	No. of patients transfused
Wound debridment	8	17	9	6
STSG	5	12	7	3
ORIF	18	39	16	6
Mastectomy	8	18	11	6
Prostatectomy	9	20	11	6
Exploratory laparotomy	64	134	48	27
Thyroidectomy	25	46	5	3
Neurosurgery	11	31	8	4
Tumour excisions	6	12	3	4
Other orthopedic surgeries	17	33	4	3
ENT surgery	13	20	0	0
Other GS	4	10	10	4
Miscellaneous	19	44	0	0
Total	207	436	132	71

Other GS- other general surgical cases in which blood utilization was 100%.
Miscellaneous- general surgical cases, endoscopies and urethral dilatation in which blood utilization was nil.

We used these indices to determine the significance of blood utilization for each surgical procedure.

Table 2: Indices determining significance of blood utilization.

Procedures	C/T ratio	%T	TI
Wound debridment	1.8	75	1.0
STSG	1.7	60	1.4
ORIF	2.4	33	0.9
Mastectomy	1.6	75	1.4
Prostatectomy	1.8	71	1.3
Exploratory laparotomy	2.8	42	0.75
Thyroidectomy	9.2	12	0.2
Neurosurgery	3.9	36	0.7
Tumour excisions	4	50	0.5
Other orthopedic surgeries	8.3	18	0.2
ENT surgeries	Infinity	0	0
Other GS	1.0	100	2.5

Results

The number of adult patients who had elective surgery for which requests for grouping and crossmatching were made was 207, 127 of them were males while 80 were females. The age range was 17-100 years.

A total of 436 units of blood was crossmatched for these patients but only 132 units was transfused i.e. only 30.3% of blood crossmatched was utilized, leaving 69.7% unutilized.

Table 1 shows the procedures with the number of cases, number of units crossmatched, number of units transfused and number of patients transfused while Table 2 shows the results of the 3 indices calculated i.e. C/T ratio, %T and TI.

All the 3 indices showed significant blood utilization in wound debridement, split thickness skin grafting (STSG), open reduction internal fixation (ORIF), mastectomy, prostatectomy and other general surgical cases which consist of one each of splenectomy, nephrectomy, varicose vein excision and A-V fistula.

In exploratory laparotomy, neurosurgeries and tumour excisions only 2 of the 3 indices showed significant blood utilization. In thyroidectomy and other orthopaedic operations none of the 3 indices showed significant blood utilization.

In all ENT surgeries blood utilization was nil i.e. no patient was transfused.

Discussion

Blood transfusion no doubt plays a major role in the resuscitation and management of surgical patients, but surgeons most of the time overestimate the anticipated blood loss thereby over ordering blood.

In this part of the world where it is not the culture of people to donate blood voluntarily, patients' relatives are often asked to donate blood. Even in a place like South Africa where the percentage of voluntary donors is much higher, the demand for blood has increased by 4%while supply has decreased by 2% [3].

The demand for large quantity of blood for elective surgeries of which little is utilized causes wastage of valuable supplies and resources both in technician time and reagents.

A number of studies in many countries of the world have shown over ordering of blood by surgeons with utilization ranging from 5-40% [2, 6]. Even in trauma patients, utilization is less than 50% [7]. This study has also shown excessive crossmatching of blood for elective surgeries with only 30.3% of blood utilized.

There was significant blood utilization by all 3 indices in wound debridement, split thickness skin grafting (STSG), open reduction internal fixation

(ORIF), mastectomy, and prostatectomy. In nephrectomy, splenectomy, A-V fistula and varicose vein excision blood utilization was 100% as shown on table 1. In all ENT surgeries none of the blood requested was utilized indicating that request for grouping and crossmatching for these procedures was just a culture rather than a necessity.

In conclusion, we recommend that:

1. Over ordering of blood should be minimized by changing the blood ordering pattern.
2. In surgical procedures where none of the 3 indices showed significant blood utilization, only blood grouping of patients should be done and the serum saved for emergency crossmatching should the need arise. Better still, patients may be grouped and antibody screened if possible. In that case group compatible red cells can be issued without crossmatching in emergency. However in this "group and save" cases the availability of group compatible blood must be ensured for emergency situations before starting the surgeries.
3. In surgical procedures where at least 2 of the 3 indices showed significant blood utilization blood should be grouped and crossmatched but the number to be crossmatched should be based on the ordering schedules of the hospital.
4. Finally, maximum surgical blood order schedules must be formulated for selected cold surgical procedures for every hospital. This is usually the function of the hospital transfusion committee on which both blood providers and blood users must be adequately represented.

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