

Blood ordering habits for elective surgery: time for change

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Summary

A prospective study was carried out for 6 months to determine the efficacy of blood ordering routines for elective surgery. It was found that only 23% of procedures needed preoperative crossmatching of blood (transfusion index 'TI' >0.5). There was an excessive over-ordering of blood for 77% of the operations (crossmatch/transfusion ratio >2.5). In addition, the transfusion index for the latter group showed that there was no need to prepare blood preoperatively (TI <0.5).

A transfusion tariff is worked out which abandons crossmatching for the majority of procedures (cholecystectomy, thyroidectomy and surgery for duodenal ulcer excluding gastrectomy). Instead a 'group and screen' policy is suggested.

Introduction

There is a great tendency in most departments of surgery to request more units of blood for elective procedures than is actually required. This over-ordering of blood is more often guided by habits and 'hospital routines' rather than clinical needs. This attitude is defended by the simple excuse that it provides a safety measure in the event of excessive unexpected blood loss during surgery. In practice, such incidences are rare, and when they occur one or two crossmatched units would not suffice.

Smallwood¹ showed that 66% of surgeons and 81% of anaesthetists did not require blood to be prepared for their patients; yet over 70% of the junior staff reserved two or more units. By doing so, they did not realize the magnitude of work, the time lost and the blood wastage which results from this practice.

Recently, we found that only 28.3% of crossmatched blood for elective surgery was actually transfused. In addition, we documented a monthly wastage of 45 ± 13 units due to the absence of a blood ordering policy in our department.

Reports from different parts of the world have clearly shown that great savings in effort and money can be achieved by implementing policies for requesting blood without compromising patients' safety²⁻⁷.

In order to evaluate objectively our practice, and to plan a policy, we prospectively studied our blood ordering habits in the department of surgery at Amiri Teaching Hospital. In this report, analysis and discussion of the collected data is presented and a transfusion tariff is worked out.

Material and methods

A prospective study of blood ordering routines for elective surgical cases was carried out for 6 months in the department of surgery, Amiri Teaching Hospital, Kuwait. Every day during the study period, the following data were recorded:

- (1) The number of blood units crossmatched (C).
- (2) The number of patients transfused (nT).
- (3) The crossmatch to transfusion (C/T) ratio. This ratio is used as an index of the efficiency of blood ordering practice^{2-4,7,9}. A ratio of more than 2.5 indicates excessive crossmatching of blood for a certain procedure.
- (4) The transfusion index (TI). This is the average number of units transfused for a given procedure. A transfusion index of more than 0.5 is taken as indication that blood needs to be cross-matched preoperatively for that procedure^{2,5,6}. This index can be influenced by an occasional large transfusion⁸.
- (5) Mead's criterion (average units of blood used for a procedure $\times 1.5$) is used as a guide to the number of blood units which need to be crossmatched preoperatively for each procedure^{3,8}.

Results

The elective operative procedures performed in the department during the study period were divided into eight groups (Table 1).

Table 2 shows that the C/T ratio for procedures in group I to IV was below 2.5, indicating that the right number of blood units were crossmatched preoperatively for these patients. The TI for the same groups was more than 0.5 which confirmed the need for preparing blood preoperatively for these procedures.

There was excessive crossmatching of blood for procedures in groups VI to VIII (C/T >2.5). Moreover, the data seem to indicate that there was no need for preoperative preparation of blood for these patients (TI <0.5).

Group V procedures gave different results. Though their TI was just above 0.5, their C/T ratio was well above 2.5. This indicated that preoperative cross-matching of blood was necessary, but more units than actually needed were prepared.

Whereas very few patients needed transfusion in groups VI to VIII; most patients in groups I to V were transfused during and in the first 24 h of surgery (Figure 1).

According to these data, the operative procedures performed in the department can be divided into two major groups.

Groups I to V

These are operations for which blood needs to be crossmatched and prepared preoperatively. This group formed 23% (71/308) of the operations.

Groups VI to VIII

These constituted 77% (237/308) of the operations performed in the department. For these procedures

Table 1. Elective procedures performed in the department

Group	Procedures
I	Procedures for GI malignancy: Whipple's operation, radical gastrectomy, oesophago-gastrectomy, colectomy
II	Major vascular procedures: aortic aneurysm, aorto-bifemoral by-pass
III	Major gynaecological procedures: hysterectomy, radical hysterectomy for ovarian carcinoma
IV	Gastrectomy for ulcer disease: polya, Billroth I
V	Mastectomy and axillary clearance
VI	Procedures for duodenal ulcer (excl. gastrectomy): HSV, vagotomy and drainage (pyloroplasty, gastro jejunostomy).
VII	Cholecystectomy ± CBD exploration
VIII	Thyroidectomy (for benign and malignant disease)

Table 2. Blood transfusion data for elective surgery in 6-month period

Group	n	nT	CT	TI
I	38	31	1.4	2.2
II	6	5	1.7	3.3
III	13	7	1.7	1.7
IV	9	9	1.1	1.7
V	5	2	3.3	0.6
VI	29	5	6.2	0.3
VII	163	12	14.8	0.1
VIII	45	0	—	0
Total	308			

C/T >2.5, over crossmatching of blood
Transfusion index >0.5, need to crossmatch blood preoperatively

Table 3. Recommended blood units to be crossmatched preoperative

Group	Mead's criterion	Recommended units
I	3.3	
II	4.5	
III	2.5	3-4
IV	2.5	
V	0.9	1
VI	0.4	
VII	0.06	0
VIII	0	

Mead's Criterion, average number of units used × 1.5 = no. of units to be crossmatched

no blood needs to be crossmatched preoperatively. A group and screen policy would probably suffice.

Transfusion Tariff (Table 3)

The data resulting from this study were used to work out a transfusion tariff. Using Mead's criterion^{3,8} it would seem that crossmatching three or four units of blood is indicated for procedures in groups I to IV, one unit for group V and no blood to be prepared for groups VI to VIII (77% of the operations).

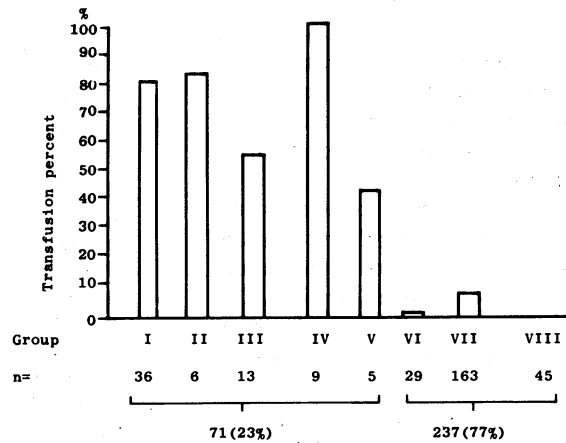


Figure 1. Percentage of patients transfused in the different groups

If this policy is to be adopted, we would expect a 77% reduction in the workload of the blood bank, resulting in savings in technicians' time, reagents, blood units and money.

Discussion

Many hospital routines are carried out without ever being questioned, they seem to continue merely by 'force of habit'. Addressing such issues may disclose many defects and some unintentional unnecessary practices. If provisions are made to free ourselves from such practices great savings in cost and better delivery of high quality services would ensue.

In this report we have addressed one such issue, ie blood ordering habits. We have identified procedures for which blood was regularly requested but rarely used and others where more blood than required was ordered. Analysis of the data indicated that the majority (77%) of operations in our department will need no preoperative preparation of blood.

Many hospitals have stopped crossmatching blood for similar procedures. Instead, only grouping and antibody screening of the recipient and donor sera are performed. This technique proved to be 99.99% efficient in preventing transfusion of incompatible blood^{2,5,6,9,10}.

Applying this policy in our department would mean that only 23% of our elective surgery cases would need preoperative crossmatching. However, it would not be feasible to use the 'group and screen' method without a clear blood ordering tariff, which would serve as a guideline for requesting blood for elective procedures.

We used Mead's criterion to work out a transfusion tariff for our department. Accordingly, patients in groups I to V will have specific number of units prepared rather than leaving the decision to the individual surgeon. Other procedures, ie groups VI to VIII will require only grouping and antibody screen.

This policy is simple, practical and if implemented, will avoid holding blood 'out of circulation' for patients who may not require any transfusion.

Great savings have been achieved when such tariffs were put into practice. A total of 60% saving in budget⁵ and a 44% reduction in the number of crossmatchings¹¹ were reported recently. Successful

implementation of such policy, however, is very much dependent on the full understanding and complete cooperation of all concerned (surgeons, anaesthetists and blood bank personnel) and on its flexibility, by making allowance for the recommended tariff to be over-ruled by a special request from a senior member if difficulties are anticipated.

This paper may encourage others to audit their blood ordering routines, to discover for themselves the shortcomings in their practice and to plan a more efficient utilization of their blood bank services. The policy outlined here may provide the basis for such plans with a few modifications to suit individual needs.

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