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Perioperative Blood Transfusion at King Abdulaziz University Hospital, Jeddah

MOHAMMED A. AL-HARBI, FRCS (C)*
Department of Surgery, College of Medicine & Allied Sciences, King Abdulaziz University Jeddah, Saudi Arabia.

ABSTRACT. One hundred consecutive perioperative blood transfusions in non-traumatized patients were studied at King Abdulaziz University Hospital. The study found that, the crossmatched transfusion's ratio was acceptable but there were unnecessary blood transfusions especially if patients transfused only intraoperatively or post-operatively. To improve blood utilization and avoid unnecessary blood transfusions it is recommend that: initiation of peer review for blood transfusions; promotion of autologous blood transfusions; initiation of prospective study to look into indications, proper utilization (applying maximum surgical blood ordering system) and analysis of complications and hazards of blood transfusions.

Keywords: Perioperative, Autologous, Transfusion.

Introduction

It is beyond doubt that blood transfusion is a major development in medicine as it is a life-saving measure in the management of a variety of medical and surgical conditions. Since the first human-to-human blood transfusion in 1918[1], the use of blood expanded to the point that the demand of blood transfusions exceeded the available resources. At the same time the complications of blood transfusions became so apparent that many physicians and patients regard it as potentially dangerous.

About two thirds of all red blood cell transfusions are given in the perioperative period[2] and as most of the improper use of blood occurs also at that period[3].

The present study looked into the use of whole blood and blood components perioperatively to evaluate its proper use and potential danger in non-traumatic patients at

Correspondence & reprint requests to: Dr. M. Al-Harbi, P.O. Box 6615, Jeddah 21452, Saudi Arabia.
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King Abdulaziz University Hospital (KAUH).

Patients and Methods

One hundred consecutive perioperative blood transfusions in non-trauma patients were studied. Patients from different surgical sub-specialities were included. Information obtained included: age, sex, previous blood transfusion, liver and blood diseases, operative procedure, duration of surgery, blood transfusion whether pre-,intra-,or post-operative, admission and discharge. In addition, complete blood counts, serum electrolytes, liver function tests, prothrombin and partial prothrombin times were recorded.

Complications during hospitalization were evaluated and the patients' record was reviewed one year after receiving the transfusion.

For statistical analysis SPSS package was used to find out whether unnecessary blood transfusions were given and if so whether it was pre-,intra-,or post-operative and was it whole blood (WB), packed fresh red cells (PRB), frozen plasma (FFP) or platelet concentrate (PC).

Results

The age of patients studied ranged from 12 to 96 years with a mean of 48, and 59 patients were males. The ratio between the number of units requested to the of units transfused for WB, PRB, FFP and PC was acceptable (Table 1). The numbers of transfusions according to the type of blood products are shown in Table 2. Seven out of 19 patients who received FFP had prothrombin time > 1.45s or partial prothrombin time > 60 s, respectively.

TABLE 1. Crossmatched transfused ratio for blood and its different components.

Blood Transfused	Crossmatch	Transfused	Crosssmatched/Transfused	Transfusion Index
WB	353	249	1.42	0.71
PRB	233	168	1.39	0.72
			Ordered/Transfused	
FFP	282	194	1.45	0.69
PC	48	37	1.03	0.77

*WP : Whole blood; PRB: Packed red cells; FFP: Fresh frozen plasma; PC: Platelet concentrate.

TABLE 2. Type and number of transfusions.

	Number of Units						
Type	1	2	3	4	5	> 5	Total
WB	23	16	3	6	3	13	248
PRC	12	17	6	4	4	6	168
FFP	0	6	2	2	2	7	194
PC	0	0	0	3	0	4	37

There were 26 single unit blood transfusions of which 6 were pre-operative, 9 were intra-operative and 11 were post-operative.

The criteria proposed by Tartter *et al.*[3] was applied: if the pre-operative hematocrit level was > 36% and the discharge hematocrit level was 33% then the patient received at least one unit of blood unnecessarily. As shown in Table 3, 36 patients received pre-operative blood transfusions for aneamia in preparation for surgery, 18 of such patients were transfused only pre-operatively while 2 received blood pre-,and intra-operatively. Ten patients received blood pre-, and intra-operatively and 6 patients received blood pre-and post-operatively. All of these patients had pre-operative hematocrit < 36%. Eighteen patients received blood only intra-operatively; 11 of them had admission hematocrit < 36% and 12 had discharge hematocrit > 33%. Fifteen patients received blood intra-and post-operatively; 2 of them had discharge hematocrit > 33%. Thirty-one patients received blood only post-operatively and 11 of them had discharge hematocrit > 33%. So most of the unnecessary blood transfusions were apparent in two situations: patients transfused only intra-operatively and patients transfused only post-operatively.

TABLE 3. Timing of transfusion relative to surgery.

	No.	Admission hematocrit mean (number of hematocrit > 36)	Transfusions			Discharge hematocrit mean (number of hematocrit > 33%)
			Preoperative mean (range)	Intraoperative mean (range)	Postoperative mean (range)	
Preoperative	18	24.6 (0)	3.6 (I-26)			29.82 (5)
Preoperative and Intraoperative	2	26.7 (0)	2.5	1		39.5 (1)
Preoperative and Intraoperative and Postoperative	10	24.4 (0)	5.2 (1-16)	3 (1-8)	8.6 (1-62)	30.6 (2)
Preoperative and Postoperative	6	23.5 (0)	4.3 (2-8)		8.3 (2-29)	28.1 (2)
Intraoperative	18	36.7 (11)		1.9 (1-8)		34.2 (12)
Intraoperative and Postoperative	15	31.02 (4)		2.9 (1-9)	7.3 (1-59)	29.75 (2)
Postoperative	31	33.3 (12)			4.7 (1-87)	31.49 (11)

The number of patients who received transfusions pre-operatively, intra-operatively or post-operatively are shown in Table 4. Twelve patients died, 5 of whom received > 10 units of blood and their death was related to their primary disease and not to the transfusions.

TABLE 4. Blood transfusion relative to operative period.

	WB	PRB	FFP	PC
Preoperative transfusion				
No. of patients	23	13	9	3
Mean units of blood	3	2.3	4	4
Intraoperative transfusion				
No. of patients	31	14	5	2
Mean units of blood	2.1	1.6	2.2	5
Preoperative transfusion				
No. of patients	35	35	15	2
Mean units of blood	0.4	3.3	9.8	7.5

No haemolytic reactions or disturbance in electrolytes or liver function tests detected were related to transfusions. Post-operative complications included urinary tract infection (3 patients), wound infection (3 patients), tumor recurrence (15 patients) and deep vein thrombosis (1 patient).

The files of patients were reviewed after one year of their transfusions and unfortunately in most of those who did attend their follow-up, no documentation was found as to whether or not the developed complications related to their blood transfusions (like jaundice, hepatitis... etc.)

Discussion

The indications of blood transfusion are getting more and more restricted due to the many complications that may affect the transfused patients. Any infectious agent that is present in the blood of a donor at the time of donation, for example, hepatitis and acquired immune deficiency syndrome, is potentially transmissible to a susceptible recipient[4,5,6,] . There is a trend of over utilization of WB , FFP and PC that will exhaust the available resources and increase the rate of complications. To avoid unnecessary blood transfusions and their complications many major abdominal[7,8] and orthopedic[9] operations can be done without the need for blood transfusion. The relationship between transfusions and tumor recurrence is debatable but there is evidence that it has an increase recurrence rate in cases of carcinoma of colon[12,13,14] , head and neck[15], and lungs[16]. There were 5 patients with tumor recurrence in the present study, 2 with pancreatic malignancy, 2 with oesophageal malignancy and one with gastric malignancy. It was difficult to find a relationship between tumor recurrence and transfusion in such patients. Blood transfusion does increase the rate of infection post-operatively[17,18] but in the present study, no correlation was found between infection and transfusion. The need for blood should be determined by both clinical evaluation and laboratory investigations. Many units of blood, routinely ordered by surgeons are not used but are held in reserve and, thus, are unavailable for other patients. This can impose inventory problems for the blood bank like outdating and wasting of blood and its products. It is more appropriate to type and screen without crossmatching if 90% or more of patients do not require transfusions[9].

The present study shows that there was a large number of unnecessary WB transfusions while they should be used only if both PRB and FFP were indicated as this might reduce the chances of infection. Most single unit transfusions in adults are unnecessary as they result in no significant rise in haemoglobin levels. Autologous blood transfusions should be encouraged as they are not only much safer than heterologous transfusions but they also cut in the laboratory's time, and save funds spent on blood screening for infection. They also improve blood availability especially in communities where voluntary donation is not well established.

Recent experience has shown that autologous blood transfusions to be safe in children, elderly patients, patients who have cardiac disease, and pregnant women, who previously had been unable to participate[20].

The present study showed, that the crossmatch transfusion ratio was acceptable but there was unnecessary blood transfusion especially intra-operatively and post-operatively.

To improve blood utilization and minimize post transfusion complications it is recommend that: initiation of peer review for blood transfusion; promotion of autologous blood transfusions; initiation of prospective study to look into indications, proper utilization (applying maximum surgical blood ordering system) and analysis of complications and hazards of blood transfusions[21].

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نقـــل الدم قبـــل العملـــيات الجراحيـــة في مستشفى جامعـة الملك عبـد العزيز بجـدة

محمـــد الحربي
قسم الجراحة العامة - كلية الطب والعلوم الطبية - جامعة الملك عبدالعزيز - جدة - المملكة العربية السعودية

المستخلص : تم إجراء دراسة بمستشفى جامعة الملك عبد العزيز على ١٠٠ حالة متتالية من نقل الدم في نطاق العمليات الجراحية للمرضى من غير المصابين في حالات الحوادث. وقد تبين أن نسبة التوافق في نقل الدم كانت مقبولة إلا أن هناك حالات لنقل الدم لم تكن ضرورية لاسيما إذا تم نقل الدم للمرضى أثناء العمليات الجراحية أو عقب العمليات الجراحية فقط. وحتى نحسن من الانتفاع بعمليات نقل الدم ونتجنب غير الضرورى منها نوصى بالآتى: البدء في إجراء مراجعة نقدية لحالات نقل الدم. تشجيع نقل الدم الذاتي. البدء في إجراء دراسة مستقبلية في دلائل مضاعفات وأخطار نقل الدم وتحليلها والانتفاع الأنسب بمثل هذه العمليات (بتطبيق نقل الدم أثناء الجراحة بأقصى حالاته).