USE OF BLOOD IN ELECTIVE SURGERY: AN AREA OF WASTED HOSPITAL RESOURCE

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Unavailability of blood is a common cause of canceled operations but clinicians' blood ordering habits have been shown to waste hospital resources. A prospective audit was set up in a blood bank in a teaching hospital in Saudi Arabia. Data were separately logged on blood transfusion for all surgical operations between August 1991 and December 1992. Standard terminology was employed. During the 16 months, 565 consecutive operations were logged. Only two of eight departments met the criterion of efficient blood ordering, vis-a-vis a C:T ratio (units crossmatched divided by units transfused) of 2.5:1. Similarly, in the four most frequently performed operations, the transfusion index (T_i) was <0.25, indicating that blood would have been required for <25% of these cases. The study confirms others' experience of inefficiency in blood ordering for surgical operations, plus its attendant waste of resources. It is recommended that unless written and binding guidelines are published on a nationwide basis, clinicians' inefficient methods in ordering blood are unlikely to alter rapidly. *Ann Saudi Med 1994;14(4):326-328.*

Since the introduction of blood transfusion into clinical practice, its appropriate use has been a subject for debate. Dodsworth and Dudley[1] reported that only 30% of the blood crossmatched for routine surgery was used and that many operations were being canceled, an event that the government of the United Kingdom now intends to use as an indicator of a hospital's performance. In a recent study from Saudi Arabia, Magbool et al.[2] found that canceled operations were frequent and unavailability of blood was the third most common cause.

However, surgeons' blood ordering habits are such that supplies, reagents, and technicians' time are committed and can be wasted. Thus, it has been shown from the United Kingdom,[1,3-6] the United States of America,[7-10] Australia,[11] Kuwait,[12,13] and Saudi Arabia[14] that if clinicians' blood ordering habits were rationed, savings would accrue without patients being harmed. For example, Al-Momen et al.[14] estimated that an annual savings of 312,000 Saudi Riyals (approximately US $83,000) would accrue in one hospital alone if its blood transfusion services were appropriately used. They concluded, "We are not making the most efficient use of blood bank facilities", and added, "it is most unlikely that we are alone in this regard and we urge. . . other hospitals to review their current blood ordering policies".

The purpose of this audit was to determine the efficiency of our surgeons' use of blood transfusions with particular reference to common operations for which blood is routinely ordered. We intend to use the information as a basis for revising our policies on blood ordering for surgical procedures. We also have reason to believe that our findings will be of general interest.

Patients and Methods

A prospective survey was conducted in the King Fahd Hospital of the University, Al-Khobar, Saudi Arabia. A separate logbook was opened in the blood bank in which all surgical operations were recorded. Variables logged were the number of units of blood ordered and used during or within 24 hours of the operation for which it was ordered, as well as patient's identification and the proposed operation, its date and whether the surgery was elective or emergency. The operating theater logbook was then used to verify the operation performed and by whom. The survey began on 31 August 1991 and was to be concluded after at least 500 consecutive operations had been logged.

Terminology and Definitions

Standard blood banking terms were used. C:T ratio was units crossmatched (C) divided by units transfused (T). Transfusion index (T_i) was the average number of units transfused for a given procedure. Whereas C:T ratio is an index of blood ordering efficiency, the T_i is that of blood requirements for a given procedure.[7] A C:T ratio of 2.5:1 has been recommended as the target,[4] although the ideal ratio is 1:1; similarly, 0.5 is the T_i for which to aim.[12,13]

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Accepted for publication 2 November 1993.

Results

The survey began on 31 August 1991 and concluded on 30 December 1992. During the 16 months, 565 operations were logged for which blood transfusion was ordered. Table 1 shows the distribution of C:T ratio and percentage of patients transfused in the nine departments studied. (The Department of Ophthalmology is excluded from further discussion.) Table 2 shows the distribution of C:T ratio, percentage of patients transfused and T_i for the most commonly performed operations.

Discussion

When Magbool et al.[2] discovered in their study that blood not available was the third most common reason for canceled operations in our hospital, they inquired, "Is it really necessary to have crossmatched blood actually available in the operating theater before the beginning of every cholecystectomy, thyroidectomy, diskectomy, abdominoplasty, VP shunt insertion or hysterectomy?" This triggered the prospective study reported here in which the 16 months' duration and 565 consecutive operations are considered adequate to support valid conclusions.

The results show that if a C:T ratio of 2.5:1 is the criterion for efficiency in blood ordering, then only two of our eight departments met it. But if it is the theoretical ideal of 1:1, then none did. This suggests that, as has been shown by others,[1,3-14] there is room for improvement in efficiency of our clinicians' blood ordering habits.

However, to support concrete proposals, an evaluator must provide more and better particulars in terms of blood actually consumed for specific operations (Table 2). It can be seen that regardless of how one looks at the derived data, whether as the percentage of patients transfused or as the transfusion index (T_i), four operations - cholecystectomy, cesarean section, laminectomy and thyroidectomy - stood out on two counts: they were frequently performed and had a T_i of less than 0.25. This suggests that currently, in our hospital, existing policies on blood ordering for these four operations, among others, can be reviewed with advantage.

Although there are difficulties in comparing different audits,[5] Table 3 shows such an attempt. The five procedures selected were on the basis that, in our study, they were frequent and had T_i <0.5. Thyroidectomy and transurethral resection of prostate (TURP) in particular showed wide variability in T_i, ranging from 0.25 in Al-Khobar, Saudi Arabia compared with 0.65 in Riyadh. This supports the need for each hospital to not only audit its own transfusion practices but also to mount appropriate surveillance programs because surgical staff and techniques alter with time.

To numerically define the degree of inefficiency in blood ordering is one thing. It is quite another to find a solution that can satisfy three different groups: it must be safe for patients, save hospital costs for administrators, and be acceptable to clinicians.

TABLE 1. *Distribution of 565 operations for which blood was ordered by department.*

Department	No. of Cases		Units of Blood		CTR
	Total	%T	Crossmatched	Transfused	
OB/Gyn	83	23	178	34	5.2
Gen Surgery	173	20	408	85	4.8
Neurosurgery	89	29	206	50	4.1
Urology	56	32	123	30	4.1
Ped Surgery	43	38	78	20	3.9
Orthopedics	87	48	211	78	2.7
Plastic	24	58	61	24	2.5
ENT	9	56	22	11	2
Ophthalmology	1	-	2	0	-
Total	565	-	1289	332	3.9

%T=percentage transfused; CTR=crossmatched transfused; Ped=pediatric; ENT=ear, nose & throat; OB/Gyn=obstetrics & gynecology; Gen=general.

TABLE 2. *Distribution of C:T ratio (CTR), Transfusion index (T_i) and percentage of patients transfused (%T) for the 13 most commonly performed operations.*

Operation	No. of cases (Total)	%T	No. of Units		CTR	T_i
			Crossmatched	Transfused		
Thyroidectomy	18	11	35	2	17.5	0.11
Laminectomy	35	14.3	73	5	14.6	0.14
C. Section	34	8.8	71	6	11.8	0.18
Cholecystectomy	83	9.6	173	16	10.8	0.19
TURP	8	25	15	2	7.5	0.25
Laparotomy	11	36.6	22	6	3.7	0.55
Hysterectomy	11	36.4	24	7	3.4	0.64
Craniotomy	16	37.5	48	15	3.2	0.9
K. nail	13	38.5	38	13	2.9	1.0
Int Obstruction	9	66.7	16	6	2.7	0.66
ORIF femur	20	50	58	22	2.6	1.1
Nephrectomy	8	50	25	10	2.5	1.25
Skin Graft	9	89	30	15	2	1.66
Total	275	-	628	125	5	0.46

CTR=crossmatched transfused ratio; C. Section=cesarean section; TURP=transurethral resection of prostate; K nail=Kuntscher intramedullary nail; Int=intestinal; ORIF=open reduction & internal fixation.

TABLE 3. *A comparison of blood ordering practices for procedures in which we observed T_i of 0.25 or less.*

Reference	Thyroid-ectomy CTR/T_i	Lamin-ectomy CTR/T_i	C-section CTR/T_i	Cholecyst-ectomy CTR/T_i	TURP CTR/T_i
Sowayan [present]	18/0.11	15/0.14	12/0.18	11/0.19	8/0.25
Al-Momen et al [14]	4/0.65	-	-	11/0.12	3/0.65
Jaffray et al [5]	-/0	-	-	6/0.06	7/0.3
Smallwood [3]	98/0.03	-	-	51/0.04	5/0.45

C section=cesarean section.

There is adequate evidence that preoperative antibody screening ("type and hold") combined with selective ordering with an abbreviated crossmatch is safe and cost effective.[1,3,4,7-14] But, will it find acceptance with clinicians? As pointed out by Dodsworth and Dudley,[1] among others, and indeed as is self-evident, the success of any blood transfusion policy will depend heavily on clinicians' cooperation. The policy can list operations for which blood shall or shall not be routinely crossmatched. It can be agreed upon through consensus in a hospital-wide blood utilization committee and its implementation can be monitored by the blood bank.

Having stated that, one can predict that clinicians' compliance with these recommendations will remain unchanged for as long as their perception is that medicolegal issues are involved.[2] It is therefore up to bodies that are higher and much more authoritative than merely advisory hospital-based committees to look into the matter and publish clear and binding guidelines on a nationwide basis. Until this is done, one fears that the ordering of blood for transfusion in elective surgery is likely to remain a wide route for wasting hospital resources, which can add up to thousands of dollars. However, there may be another problem: Local factors do influence the practice of blood ordering due to differences in routine.[15]

Acknowledgment

I thank our blood bank staff for maintaining the logbook, Ms Luchie Taruc, Quality Assurance (QA) Coordinator for data collection and analysis, Professor Lade Wosornu, QA Director for technical and editorial advice, and Ms Lolita Galdones-Santos for typing the manuscript.

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