Hospital Topics

Use of blood in elective general surgery: an area of wasted resources

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Abstract

A prospective audit of the blood bank was carried out in Portsmouth to examine how efficiently blood was used in elective general surgery. The routine crossmatching of blood was found to be unnecessary for certain procedures such as cholecystectomy, thyroidectomy, mastectomy, and vagotomy. The most effecient use of blood was seen in vascular surgery despite the greater risk of severe haemorrhage. Completed detailed questionnaires returned by members of surgical teams in Wessex supported the Portsmouth data as being fairly typical and confirmed that substantial and unintentional overordering occurred, apparently due to poor communication, lack of discussion, and "force of habit." The place of a "half hour crossmatch" as a substitute for many routine orders has been explored and seems to be acceptable to most anaesthetists and surgeons. This study, by showing how inefficiently blood is used, has underlined the value of local audit. It also supports the general experience of centres throughout the world who have invoked similar methods and achieved considerable savings without harm to patients.

Introduction

Recently there has been a growing demand for blood and its derivatives. This demand has often exceeded the resources of the local blood bank and thereby disrupted both the planning and nature of surgical lists.

Elective surgery, by demanding large quantities of blood each day of which little is ultimately used, commits valuable supplies and resources both in technician time and reagents. The criteria for ordering blood are often vague, and established policies where they exist may be outdated since the amount transfused for a given procedure has fallen since the 1950s.[1 2]

It has become clear from studies in the United States,[2-7] Australia,[8] and Israel[9] that great savings may be made from rationalising blood ordering habits without harm to patients. Such schemes necessarily include blood bank audit, interdisciplinary participation, and a wider use of the "group and antibody screen" in low risk surgery. These tests have been used to replace routine crossmatching on the basis that a half hour crossmatch is immediately available in a crisis; should blood be needed more urgently then the type and screen assures that uncrossmatched ABO+Rh (D) type specific blood may be transfused with a high degree of safety (99·99%).[10 11]

In the absence of similar studies from Britain an investigation was set up to examine blood ordering habits in elective surgery in the Wessex Region.

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Patients and methods

The study was divided into two parts: firstly, an audit of the local blood bank was performed which covered a range of elective surgical procedures in the Portsmouth group of hospitals and, secondly, a wider analysis of blood ordering habits and viewpoints was determined by questionnaires sent to members of the "surgical team" in five Wessex hospital groups.

BLOOD BANK AUDIT

The audit of the blood bank was prospective, collecting data on consecutive cases undergoing a range of elective operations under six consultant surgeons. This was continued on a monthly basis until 50 of the less common and up to 150 of the most common procedures had been collected.

For each operation the number of units of whole blood ordered was compared with the number used during or within 24 hours of surgery. The results were expressed as the number of units crossmatched divided by the number transfused (C/T index), and the average number of units transfused for a given procedure (TI, transfusion index). The C/T is often used as an index of blood ordering efficiency and the transfusion index as an index of blood requirement for a given procedure.[2] The range of units transfused is also given as an indicator of potential severity of haemorrhage.

QUESTIONNAIRES

Questionnaires were sent to the consultant surgeons, anaesthetists, and house surgeons of five hospital groups in Wessex. Details of their respective ordering requirements were collected for a group of elective operations and additional questions were posed to investigate the following:

(1) The extent to which blood ordering "policies" or standard orders exist.

(2) The level of discussion between the various disciplines in deciding blood orders.

(3) The place of the "group, antibody screen, and half hour crossmatch" in modifying routine demands.

Results

BLOOD BANK AUDIT

Twelve elective procedures were examined, and although the results showed a wide range of C/T ratio and transfusion index, four main groups may be identified (table I). Of the large quantity of blood

ordered in group 1, very little was required, and none was required in the 100 consecutive vagotomies, for which 234 units were held in reserve. In those cases where blood was given not one indication or reason could be found on inspection of the operative, anaesthetic, and postoperative records.

Although the two procedures in group 2 commanded the same (or smaller) amounts of blood, the C/T ratio was considerably reduced to 10 with a transfusion index of 0·2. In group 3 the C/T dropped to 5 with a transfusion index of 0·5-1·5. The most efficient use of blood was seen in the vascular procedures comprising group 4, where the transfusion index of 0·2 falls well below the arbitrary figure of 0·5 set by most centres who have used the half hour crossmatch with safety, below which a type and screen is recommended. Forty per cent of surgeons and 75% of anaesthetists would agree to a type and screen for group 2 on the same basis.

Groups 3 and 4 (vascular) showed the most efficient use of blood with a C/T below 5 and a transfusion index in excess of 0·5. Many surgeons and anaesthetists requested the same quantity of blood for these cases where over 0·5 units were on

TABLE I—*Results of the blood bank audit*

Group	Procedure	Case No	Units X-matched	Units Average	Units used	C/T	Transfusion index	Range
1	Vagotomy ± drainage	100	234	2·3	0	234	0·00	0
	Simple mastectomy	150	305	2·0	8	38·1	0·053	0–1
	Cholecystectomy	150	303	2·0	6	50·5	0·04	0–2
	Thyroidectomy	75	196	2·6	2	98·0	0·026	0–2
2	Hemicolectomy	100	196	2·0	19	10·3	0·19	0–2
	Abdominal hysterectomy	150	304	2·0	30	10	0·20	0–4
3	Anterior resection	50	178	2·5	37	4·8	0·74	0–4
	Excision of rectum	50	224	4·5	62	3·6	1·24	0–4
	Partial gastrectomy	75	215	2·9	42	5·1	0·56	0–4
	Transurethral resection of prostate	120	246	2·0	54	4·5	0·45	0–2
4	Aortic graft	50	292	6·0	158	1·9	3·16	2–8
	Femorodistal graft	50	196	4·0	67	2·9	1·34	1–4

C/T = Number of units crossmatched divided by the number transfused.

C/T ratio had fallen below 3 despite there being the widest range of units required in any one case.

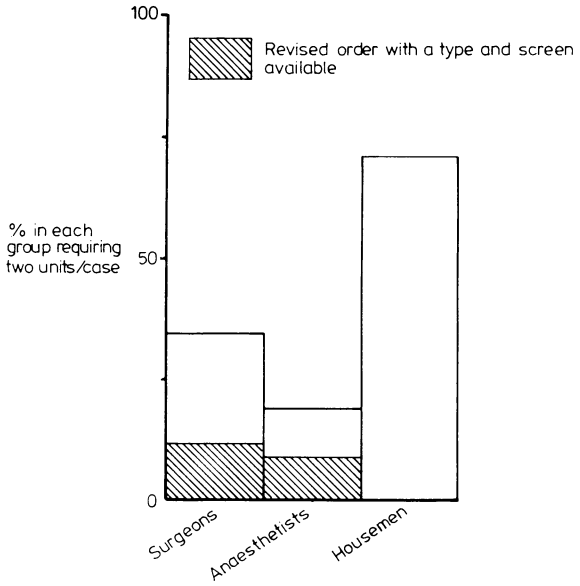
The overall C/T for the 12 procedures was 36·25—that is, 36 units crossmatched for every one transfused.

QUESTIONNAIRES

Of 86 questionnaires distributed, 73 were returned. The first 70 were processed to give equal representative groups; 20 replies from each of the three members of the surgical teams and all 10 of those from blood bank haematologists. The individual blood ordering requirements followed a pattern with housemen reserving most and anaesthetists the least (figure). Of 12 instances where the house officer or consultant was known, on only two occasions was there agreement on blood orders. Succeeding housemen also differed.

Both surgeons and anaesthetists reduced their demands when a half hour crossmatch was immediately available. In group 1 (figure) demands fell by 60% (surgeons) and 54% (anaesthetists). In groups 2 and 3 combined reductions were 29% (surgeons) and 56% (anaesthetists). For the vascular operations of group 4 where the use of blood was the most efficient, demands fell the least—7·5% and 1% respectively.

Table II gives the results of the answers to the remaining questions. Although 65% of surgeons thought that their firms had some type of policy for ordering blood, this was supported by only 20% of their housemen. This figure is further supported by the high proportion of housemen (70%) who admitted to overordering for "safety" sake, an impression underlined by the haematologists (90%). Most of the disciplines agreed on the need for better communication and the potential value in the wider use of a type and screen arrangement.



Blood ordering requirements for group 1 procedures.

Discussion

The audit suggests that for group 1 procedures the routine crossmatching of blood is inappropriate (1038 units crossmatched, 16 used). The questionnaires showed that although most surgeons (66%) and anaesthetists (81%) did not require blood in this group, over 70% of their junior staff reserved two or more units, apparently through lack of communication and a formal "ordering policy." As few surgeons and anaesthetists still required blood with a readily available half hour crossmatch routine crossmatching in many centres might be abandoned for group 1 procedures.

The operations in group 2 often commanded as much blood as those in group 3 despite greater use of blood in the latter.

TABLE II—*Percentage of affirmative answers to further questions on blood transfusion*

Question	Consultant surgeon Yes (%)	Consultant anaesthetist Yes (%)	Consultant haematologist Yes (%)	House surgeon Yes (%)
Is there a blood ordering policy for routine procedures?	65	55	40	20
Is there a tendency for housemen to overbook to be on the safe side?	—	—	90 (overbooking generally)	70
Would better communication help to reduce orders and save resources?	60	—	90	60
Is there interdisciplinary discussion on blood ordering?	5	5	70	40
Would a wider use of the half hour crossmatch reduce demands and lead to savings?	60	65	50	—

average transfused as they did for cases in groups 1 and 2. This inconsistency, highlighted by the audit, is probably the result of habit rather than design but further illustrates the need for a critical review of ordering requirements.

The overall C/T for an audit should be viewed with care.[8] It applies uniquely to that audit and comparisons made with C/Ts of audits elsewhere are invariably meaningless as the circumstances will be different. Nevertheless, the figure of 36·25 in Portsmouth shows inefficiency somewhere, and when individual C/Ts are analysed this is seen mainly in group 1 procedures. The most important application of C/T is in continuing audit, where it provides an index of blood use efficiency both overall and when applied to individual surgeons, operations, etc.

The questionnaires indicated that the pattern of ordering seen in the Portsmouth audit is not purely a local phenomenon. This is further supported by comparable data from a smaller audit performed by the Bournemouth Hospital group (P Green, unpublished data), the results of which have since led to a much lower return to stock figures. This necessarily depended on greater interdisciplinary cooperation, and in this respect it is encouraging that most doctors thought that better communication was needed.

Since the original observations of Mintz *et al*[7] and Boral *et al*[11] that rationalising the use of blood can be both financially expedient and safe many centres, including the Veterans Administration[3] and the New York State Department of Health,[12] have adopted similar guidelines. This is all the more poignant as we now have to import factor VIII concentrate from the United States at a cost of £3m a year and spend £10m overall on imported blood products.[13] It is hoped that with a wider use of local audits and further discussion, such as that currently underway in Portsmouth, areas of wastage may be eliminated and this anomaly corrected.

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12 Henry J, Mintz PD. Waste not, want not—improved blood utilization through realistic hemotherapy. *Quality Revue Bulletin* 1977;**3**:7-10.
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Aspirin in small doses raises the serum urate concentration and is therefore contraindicated for gouty subjects. Does paracetamol or any of the other mild analgesics have the same disadvantage?

Paracetamol does not increase the serum urate concentration but the mild analgesics related to aspirin may do so and should be avoided in patients with gout. They include salsalate (Disalcid), benorylate (Benoral), choline magnesium trisalicylate (Trilisate), and sodium salicylate (Entrosalyl). The narcotic analgesics used for mild to moderate pain, such as codeine and dextropoxyphene, have no effect on serum urate concentration. Many of the non-steroidal anti-inflammatory drugs are used to treat mild pain, and there is no evidence that any of them increase the serum urate concentration. On the contrary, some—for example, diflunisal[1] and fenoprofen—have uricosuric activity at therapeutic doses, and many of them are used to treat acute gout.—LINDA BEELEY, director, drug and therapeutic unit, Birmingham.

1 Dresse A, Fischer P, Gerard MA, *et al*. Uricosuric properties of diflunisal in man. *Br J Clin Pharmacol* 1979;**7**:267-72.

In a case of primary carcinoma of the prostate with secondaries in the pelvic bones is it possible after two years' treatment with stilboestrol with regression of both the primary and secondaries to stop taking stilboestrol without chance of recurrence?

There is always a natural reluctance to change any treatment that is achieving a good clinical response. If, however, the side effects are such that a feasible alternative needs to be found then there are several possibilities. All patients taking stilboestrol have a variable degree of gynaecomastia, but if they are forewarned then the patient usually accepts it. They can be told that any discomfort accompanying the enlargement usually subsides within a few months of starting treatment. The more serious problem in the age group usually encountered with metastatic carcinoma of the prostate is that of associated cardiovascular disease. The increased risk of developing serious cardiovascular problems in the form of coronary artery disease, strokes, and venous thrombosis with pulmonary embolisation is well recognised.[1] If the patient develops any of these problems and survives then treatment with stilboestrol should be discontinued in favour of orchidectomy. It would be unwise not to offer this alternative as all urologists concerned with the management of this common malignancy have encountered patients who have "relapsed" on treatment when in fact the patient has not been taking the prescribed stilboestrol. To start taking stilboestrol again under these circumstances does not necessarily bring the patient back under control, presumably as hormone resistance has been allowed to develop. Bilateral orchidectomy performed by the more cosmetic subcapsular operation is as effective as total orchidectomy in reducing the plasma testosterone concentration.[2] Consent for this procedure is more readily given by the patient when told that only the contents or lining of the testicles need to be removed. The alternative to subcapsular orchidectomy in the patient in question would be that of treatment with cyproterone acetate, which is an antiandrogen, in the dose of 300 mg daily, taken as two 50 mg tablets three times a day.—J C GINGELL, consultant urologist, Bristol.

1 Byar DP. VACURG studies on prostatic cancer and its treatment. In: Tannenbaum M, ed. *Urologic pathology: the prostate*. New York: Lea & Febiger, 1977:241-67.
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Is there any effective treatment for brittle thumb nails with persistent cracks in the upper parts in elderly men? The nail beds appear to be healthy.

Unfortunately little can be done to help brittle nails. The nails should be kept trimmed as short as possible and hand cream, such as salicylic acid ointment and glycerin of starch in equal parts, applied all over the finger tips each night may help a little. If there is any impairment of the local circulation this may be partly responsible for the brittleness and cracking and may be improved by taking small doses of inositol nicotinate 250 mg (half tablet) three times daily during the cold weather.—P D SAMMAN, honorary consultant physician (dermatology), London.