Conserving blood in preparation for elective surgery

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Summary
A prospective study was carried out for a period of 6 months (September 1987 to 28 February 1988) to evaluate the possible misuse of blood transfusion service in the department of surgery, Amiri Teaching Hospital, Kuwait. There was a monthly wastage of 45±13 units of blood. Five hundred and eleven units of blood were crossmatched but never transfused. The time taken by the blood bank technicians in crossmatching blood which was never used amounted to 54.4% of the normal working hours. An annual loss of about US$25000.00 was calculated to have occurred.

Introduction
The optimal function of a department of surgery is related to an efficient round-the-clock blood dispensing service by the blood bank. Reports from different parts of the world have revealed an unintentional misuse of the blood bank services, causing a great burden on its resources, namely the wastage of blood, reagents and technician's time[1-6]. A review of our practices in this context seemed appropriate. We studied prospectively the use of blood and work undertaken by the blood bank in the Amiri Teaching Hospital following requests for blood for elective surgical procedures.

Materials and methods
A prospective study was carried out for a 6-month period (1 September 1987 to 28 February 1988). The study involved:
(a) Recording daily the number of unused blood units (crossmatched and uncrossmatched) which were time expired and discarded.
(b) Recording daily the number of blood units crossmatched for elective surgical procedures. After 24 h, the number of units which were actually transfused were noted.
(c) A simple calculation made at the end of the study to find out the time used up by the blood bank technicians during the normal working hours (0700 h to 1300 h, ie 6 h per day) in crossmatching blood which was never transfused.
(d) Calculating the cost-effectiveness of this practice. There were 156 working days available for analysis during the 6-month period (after deducting the weekends and holidays).

Results
Wastage of blood
Table 1 shows that a total of 271 units of blood (crossmatched and uncrossmatched) were time expired and thrown away during the 6-month period. The monthly wastage was 45±13 units (mean±SD).

Table 1. Wasted blood units during the study

Month	*Crossmatched*	*Uncrossmatched*	*Total wasted*
September 1987	29	21	50
October 1987	28	26	54
November 1987	30	8	38
December 1987	34	33	67
January 1988	11	18	29
February 1988	27	6	33
Total	159	112	271

Monthly wastage 45±13 (mean±SD)

Wastage of uncrossmatched blood
The policy of our blood bank unit is to have a daily stock of about 30 units of unassigned blood composed of an assortment of the different blood groups (Rh D +ve: A, B and O, 8 units of each and 2 units of AB; Rh D−ve: one unit of A, B and AB and 2 units of O). As the daily requests arrive in the blood bank for crossmatching for elective surgical procedures, most of the units in the bank's stock are crossmatched and therefore cannot be used for other patients. Accordingly the blood bank unit of the hospital calls for more blood from the central blood bank to replenish its reserves in order to cover any urgent needs. If no such need ensues, the shelf-life of this blood gets shorter as the days pass, ultimately becomes out-dated and hence is wasted. This type of wastage has been documented by others[1].

Blood preparation for elective surgical procedures
Seven hundred and thirteen units were crossmatched during the study period. Of these, 511 units (71.7%) were crossmatched but never transfused. This clearly indicates that far more units of blood were requested for elective cases than were actually needed.

Wastage of technician time
All crossmatching for elective surgical procedures were performed during the morning shift. The total number of hours worked by each technician during the study period was 936 hours (6 h per day for 156 days).

The blood bank data showed that each of the 511 units of untransfused blood has been recrossmatched between 3 and 10 times (average 3 times) for different patients. This means that the blood bank technicians had performed about 1533 (511×3) crossmatches on units which were not used.

To calculate the time spent performing these crossmatches, we considered that the technician could

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crossmatch 3 units per hour. Therefore, the time spent performing 1533 crossmatches was 511 hours (1533/3). This amounted to 54.5% (511/936) of the technician's working hours during the study period. This time was wasted in crossmatching blood which was not transfused.

Cost-effectiveness of crossmatching blood for elective surgical procedures

The average salary of one blood bank technician is about KD.250/- (approx. US $893.00). Usually, four technicians worked during the morning working hours. The total salaries paid to them during 6-month period of the study was about KD.6000 (approx. US $21432.00). As 54.5% of the working time of each technician was wasted, the cost of this time was about KD.3270 (approx. US $11680.40). If we consider the laboratory materials and reagents used for crossmatching the 511 units of untransfused blood, the cost comes to approximately US $12500.00, leading to an annual loss of about US $25000.00 in one blood bank serving one department of surgery of 120 beds. Assuming that the wastage of blood is similar in the 10 Government hospitals then the Ministry of Public Health would lose approx. US $250 000.00 annually for crossmatching blood which is never used. This calculation did not include the cost of collecting, processing, storing and transporting these units by the central blood bank, which is substantial.

Discussion

Reports from different parts of the world have shown that there is excessive over-ordering of blood for elective surgical procedures in most departments where this issue was addressed[1-7]. The magnitude of work, the time spent and the wastage of blood which emanates from this, is usually not appreciated. Though a few studies have pointed out these shortcomings, to date we could not find in the literature a critical study of the cost effectiveness of such practices.

This study showed that only 28.3% (202/713) of crossmatched blood was actually transfused. This is not very different from the 30% reported from St Mary's Hospital, London[7]. Consequently, the technicians spent less than half of their working hours crossmatching blood which was used. Moreover, a substantial number of blood units were thrown away every month (45±13).

The financial repercussions of such practice is extravagant and not possible to justify. These data reflect a true representation of any hospital where no guidelines for requesting blood have been implemented. Urgent action is needed by all those involved to review their routine of ordering blood for elective surgical procedures and to take appropriate measures to regulate this practice[7].

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