

BLOOD TRANSFUSION

ARRANGEMENTS AND USE OF BLOOD IN ELECTIVE SURGICAL PROCEDURES

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ABSTRACT... Objective: To evaluate Blood Ordering and Transfusion ratios for elective surgical procedures. **Study Design, Setting & Duration:** This was a prospective study carried out at Muhammad Medical College Hospital Mirpurkhas from January 2007 to December 2007. **Patients & Methods:** A total of 1032 patients were included, both male & female. All patients who underwent elective surgical procedures in Surgical Unit, Muhammad Medical College hospital, Mirpurkhas from January 2007 to December 2007 were included in this study. Blood units cross matched and units transfused intra-operatively and post-operatively were recorded apart from patient demography and hepatitis profile. **Results:** A total of 1032 patients underwent elective surgical procedures during the study period. Total 1500 blood units arranged, among these only 74 units of blood were transfused. This means only 4.9% of blood was utilized while 95.1% of blood was not utilized. Cross-match to transfusion ratio (C/T) = 20.27, Transfusion probability (Tp) = 7.1 and Transfusion index (Ti) = 0.07. **Conclusion:** For elective surgical procedures, there is no need for routine cross matching of blood. However, one must confirm the availability of blood for Hepatitis B and Hepatitis C reactive patients, and for cases, where the bleeding is inevitable like transvesical / transurethral removal of prostate.

Key words: Blood transfusion, Elective surgery, Cross match, Cross-match to transfusion ratio, Hepatitis B & C, Transfusion probability, Transfusion index.

INTRODUCTION

Transfusion of blood is often a life-saving measure in surgical patients, though uncommon in elective surgeries¹. Many a times blood units routinely ordered before elective surgery are not utilized, but as they are held in reserve, they are unavailable for other patients who might be in urgent need of transfusion. This imposes storage problems for blood bank, loss of shelf life and wastage of blood². The ready availability of blood and blood components has resulted in liberal use of blood transfusions. The increasing demand for blood and blood products, together with rising costs and transfusion associated morbidity led to a number of studies in late 1970s viewing blood ordering and transfusion practices³. For elective surgeries, over ordering of blood is a common practice. This can be decreased by simply changing the pattern of blood cross matching and ordering, in relation to the different type of surgery performed⁴. In our department, we routinely arrange one unit of blood for elective surgery and two units for HBsAg or Anti HCV reactive patients. Studies have shown that there is very little blood utilization during such surgeries

e.g. cholecystectomy⁴. The principle aim of this study was to evaluate and improve the efficacy of ordering system for elective open surgeries in order to reduce the unnecessary burden on the blood bank.

PATIENTS AND METHODS

All patients who underwent elective surgical procedures in Surgical Unit, Muhammad Medical College hospital, Mirpurkhas from January 2007 to December 2007 were included in this study. Blood units cross matched, number of units transfused intraoperative and post-operatively, and reasons for transfusion were recorded. Hepatitis profile for Hepatitis B and Hepatitis C are routinely done in all our patients as a policy. All patients underwent different elective surgical procedures. Intra-operative loss of blood was calculated by measuring the volume in the suction bottle and blood soaked swabs. Hemoglobin was routinely estimated on first post operative day. Following three indices were calculated from the data:

1) Cross-match to Transfusion (C/T ratio) ratio = $\frac{\text{No of units cross-matched}}{\text{No of units transfused}}$.

(A ratio of 2.5 is considered as significant for blood usage.)

(A value of 0.5 was considered indicative of significant blood utilization.)

2) Transfusion Probability (%T) = $\frac{\text{No. of patients transfused} \times 100}{\text{No. of patients cross-matched}}$

(A value of 30 was considered indicative of significant blood usage.)

3) Transfusion Index (Ti) = $\frac{\text{No. of units transfused}}{\text{No. of patients cross-matched}}$.

(A value of 0.5 was considered indicative of significant blood utilization.)

RESULTS

Patient’s demography and their hepatitis B and C profile is shown in Table-I. Out of total 1500 blood units arranged for 1032 patients, only 74 units were transfused in 73 patients. This means that only 4.9% of blood was utilized while 95.1% of blood was not needed (Table-II).

Cross-match to Transfusion (C/T) ratio was 20.27, Transfusion Probability (%T) 7.1 and Transfusion Index (Ti) 0.07. Seventy three patients who required blood transfusion included 24 Hepatitis B and 50 Hepatitis C positive cases. Three cases of cholecystectomies found to have marked adhesions due to recurrent attacks of acute cholecystitis, bleed more than usual and had a hemoglobin drop >1 gm%, needing bled postoperatively.

DISCUSSION

The optimal function of a surgical department depends on the efficient round-the-clock blood availability from the blood bank¹. There is a tendency to order blood in excess, either by asking for an increased number of units or as a standby precautionary measure. This places increased demands on blood banks, as it is difficult to mobilize an equal number of blood donors⁵. In our study, only 4.9% of blood was utilized out of 1500 units of blood

Table-I. Patients Demography and hepatitis profile.

Variables	No. of Patients(%)
Gender	Male 219 (21.2)
	Female 813 (78.8)
Hepatitis Profile	HbsAg +ve 55 (5.3)
	Anti HCV +ve 125 (12.1)
	Both +ve 16 (1.5)

Table-II. Blood ordering and transfusion pattern of patients.

Variables	Unit Cross-matched	Units Transfused
Patients	1032	73
Blood Units	1500	74

arranged for elective surgical procedures. This practice of ordering was probably because of the fear that blood will not be available, if needed. The use of the C/T ratio was first suggested by Boral Henry³. A C/T ratio of 2.5 was suggested to be indicative of significant blood usage. A C/T ratio of > 2.5 means that lesser number of units cross-matched were transfused.

Our study showed a C/T ratio of 20.1. This means that less than 5% units of blood were transfused for elective surgical procedures. Mead et al⁶ suggested the probability of a transfusion for any procedure (%T). A value of 30 has been suggested as significant, our figure for transfusion probability was only 0.06. The average number of units used per patient cross-matched is indicated by Ti and signifies the appropriateness of number of units ordered. Boral and Henry³ suggested that a procedure which uses <0.5 units of blood per procedure does not require a pre-operative cross-match. A value of 0.5 is indicative of significant blood usage; our study showed a value of 0.06 (Table-II).

Some reports have revealed that non-transfused blood units were cross-matched 3-10 times for different patients⁷.

When calculating the time spent performing these cross-matches, it was estimated that a technician can cross match three units per hour. This results in 54.5% wasted technician working time, leading to an average blood bank annual loss of 1,62,50,00.00 rupees for one 120-bed department of surgery⁸. In 1995 the blood bank at Queen Elizabeth Hospital, received 35203 requests for blood and blood products. Out of these 25503 (72.4%) were complied with, including all emergency requests. However, only 10303 (40.4%) requests complied with were actually utilized. The CT ratio was 3.4⁹. A ratio beyond 2.0 is indicative of excessive ordering. The CT ratio of our study was 20.1 which demonstrate an excessive blood ordering pattern. Awareness of the hazards of blood transfusion is becoming more obvious due to the expansion of various aspects of blood transfusion services and the increased understanding of transfusion science in recent years¹⁰. Serious hazards of transfusion (SHOT) are well documented which include incorrectly administered blood, early and delayed transfusion reactions, transfusion related acute lung injury, transfusion associated graft-versus host disease, post-transfusion purpura and transfusion transmitted infections¹¹. Cross matching blood only when genuinely required reduces the number of cross matches, saves the patient from an instinctive reaction on the part of the attending doctor to transfuse simply because blood is available and it is certainly cost effective.

CONCLUSION

There is no need for routine cross matching of blood, for elective surgical procedures, However, one must confirm the availability of blood for Hepatitis B and Hepatitis C reactive patients, and for cases, where the bleeding is inevitable.

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