

Routine Cross-match ordering practices, an unnecessary step in routine cholecystectomy

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Abstract

Objective: To evaluate Blood Ordering and Transfusion ratios for elective cholecystectomy.

Setting and duration: Surgical Unit I and II of Jinnah Medical College Hospital from May 2009 to April 2011.

Patients and Methods: All patients who underwent elective cholecystectomy in Surgical Unit I and II of Jinnah Medical College Hospital, during two years period were included in this study. Blood units cross matched and units transfused intra-operative and post-operatively were recorded apart from patient demography and hepatitis profile.

Results: Out of total 387 blood units arranged for 164 patients, only 18 units were transfused in 16 patients. This means that only 4.9% of blood was utilized while 95.1% of blood was not needed. Cross-match to Transfusion (C/T) ratio was 20.1, Transfusion Probability (%T) 6.06 and Transfusion Index (Ti) 0.06. Sixteen patients who required blood transfusion included five Hepatitis B and three Hepatitis C positive cases. Six patients with marked adhesions due to recurrent attacks of acute cholecystitis, bled more than usual and had a hemoglobin drop >1 gm%, needing blood postoperatively.

Conclusion: For elective cholecystectomy, 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 with recurrent acute cholecystitic attacks.

Keywords: Blood transfusion, Elective Cholecystectomy, Cross-match to transfusion ratio

Introduction:

In surgical patients transfusion of blood is often a life-saving measure. While injudicious preoperative over ordering of blood can burden the resources.¹ Ordering for blood transfusion is frequently based on subjective expectant waiting of blood loss instead of evidence based estimates of average requirement in a particular procedure.² Many times blood units routinely ordered before elective surgery are not utilized, this imposes storage problems for blood bank, loss of shelf life and wastage of blood.³

With growing quickly medical care costs and steadily rising populations, streamlining the healthcare delivery process to maximize effi-

ciency has become a priority. Clinicians look to improve the effectiveness and quality of care delivered by minimizing the unnecessary consumption of resources. In many institutions, the protocol for elective surgical procedures, specifically cholecystectomies, appendectomies, and hernia repairs, mandates that the surgeon order preoperative type and screen testing.⁴ The rationale behind this is the possibility of a significant vascular injury during surgery. However, previous studies draw a conflicting conclusion, showing that the incidence of these major vascular injuries during these procedures is 1/2 of 1% (0.11%).⁵ Studies have shown that there is very little blood utilization during cholecystectomies (open / laparoscopic).⁶ Such data lead us to

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question whether there is sufficient evidence to support the routine acquisition of a baseline pre transfusion blood sample for type and screen testing in these patients.

In our setting, we routinely arrange one unit of blood for elective cholecystectomy patients. The principle aim of this study was to evaluate and improve the efficacy of ordering system for elective chole cystectomy in order to reduce the unnecessary burden on the blood bank.

Patients and Methods:

All patients who underwent elective cholecystectomy in Surgical Unit I and II of Jinnah Medical College Hospital, during a two year period of May 2009 to April 2011 were included in this study. Blood units cross matched, number of units transfused intraoperative and post-operatively, and reasons for transfusion were recorded. Patients with pre-operative suspicion of malignancy and those with intra-operative findings of any pathology other than cholelithiasis, were excluded. All patients underwent open cholecystectomy. Intra-operative loss of blood was calculated by measuring the volume in the suction bottle and blood soaked swabs. Hemoglobin measured was routinely done on first post operative day.

Following indices were calculated from the data:

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

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

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

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

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

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

Results:

Our of total 387 blood units arranged for 164 patients, only 18 units were transfused in 16 patients. This means that only 4.9% of blood was utilized while 95.1% of blood was not needed (Figure 1). Cross-match to Transfusion (C/T) ratio was 20.1, Transfusion Probability (%T) 6.06 and Transfusion Index (Ti) 0.06. Sixteen patients who required blood transfusion included five Hepatitis B and three Hepatitis C positive cases. Six patients with marked adhesions due to recurrent attacks of acute cholecystitis, bled more than usual and had a hemoglobin drop >1 gm%, needing blood postoperatively.

Discussion:

These results show that in the absence of a Maximum Blood Ordering Schedule, there is a high resulting in additional costs to the patient. These findings highlight the need for a Maximum Blood Ordering Schedule. We recommend that the procedures with Transfusion Index less than or equal to 0.5 should not have a routine cross-match (antiglobulin): instead the sample which is sent to the blood bank well in advance, preferably one day before surgery, should have ABO grouping and antibody screening after grouping has been done (G and S). If the antibodies are negative this should suffice. If transfusion is required on the day of surgery, very occasionally in such patients, then a “rapid spin cross-match” with blood of the same ABO and Rh D group should be preformed. This requires very little time (5 to 10 minutes) if antibodies are already known to be negative and the packed cell unit can be released immediately if found compatible.

Many hospitals in the developed countries have

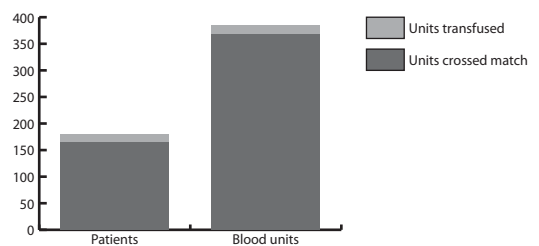


Figure 1: Blood ordering and transfusion pattern of patients

adopted the policy of using G and S instead of crossmatch for a proportion of surgical procedures. This technique has proven to be effective without compromising patient safety⁷ 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 donors.⁸ Our study showed a C/T ratio of 20.1 which means that less than 5% units of blood were transfused for elective cholecystectomy. Mead et al⁹ suggested the probability of a transfusion for the any procedure (%T). A value of 30 has been suggested as significant, our figure for transfusion probability was only 0.06.

Boral and Henry¹⁰ 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. Some reports have revealed that non-transfused blood units were cross-matched 3-10 times for different patients.² When calculating the time spent performing these cross-matches, it was estimated that a technician can crossmatch three units per hour. This results in 54.5% wasted technician working time, leading to an average blood bank annual loss of US\$25,000.00 for one 120-bed department of surgery.¹¹ Serious hazards of transfusion (SHOT) are well documented which include incorrectly administered blood, acute and delayed transfusion reactions, transfusion related acute lung injury, transfusion associated graft-versus host disease, post-transfusion purpura and transfusion transmitted infections.¹² Therefore 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:

For elective cholecystectomy there is no need for routine cross match, only blood grouping of patient should be done but one must confirm the availability of blood for hepatitis B & hepatitis C positive patients and cases with recurrent cholecystitis attacks. This will lead to monetary savings and more effective blood utilization.

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