

## An Analysis Of The Pattern Of Blood Requisition And Utilization In A Tertiary Care Centre

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**Abstract:Background:** Blood utilization audit helps to formulate guidelines for improving transfusion practice in a health care centre. With increasing demand for blood components being unable to meet the supply particularly in developing countries, there is a need to implement strategies for rational use of blood and its components. The present study aims to evaluate the transfusion practices in a hospital based blood centre. **Material and Methods:** A retrospective audit was conducted on 1000 blood requisitions and 300 requisitions for fresh frozen plasma and platelets. The requisitions were reviewed for pre transfusion hematological values, utilization trends and appropriateness. **Results:** Out of 1000 requisitions, 67.8% were for packed red cells and 32.2% were for whole blood. Pre transfusion hemoglobin values were available for 11.1%. The urgency for transfusion and indication was mentioned on 18.1% of requisition forms. The maximum cross match to transfusion ratio was for Department of Obstetrics and Gynaecology. The blood utilization was 41.3%. Out of 300 requisitions for fresh frozen plasma/platelets, 67.33% were for fresh frozen plasma and 32.6% were for platelets. Only 25.66% of requisitions had prothrombin index/platelet count mentioned. Over ordering was seen in 37.33% of requisitions. **Conclusion:** Retrospective audits help to identify key areas that need interventions to change local guidelines for transfusion. There is need for regular audit to improve transfusion practices in a health care set up. A type and screen policy for routine surgeries and obstetric patients should be implemented to save valuable time and resources in developing countries.[KaurP et al NJIRM 2013; 4(2) : 123-127]

**Key Words::** audit, blood components, blood requisition

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**Introduction:** There is increasing need for appropriate utilization of blood and its components as the concern for cost, safety and adequacy of blood supply is growing. An analysis of transfusion practices in a hospital set up can be of help to identify key areas where there is a need to change policy and formulate strategies for clinician education. One important tool for improvement of blood transfusion practice is an audit of blood requisition forms and blood component utilization.<sup>1</sup> The American association of blood banks (AABB) requirements state that transfusion services should have a system to monitor blood and blood component transfusion practices.<sup>2</sup> The major aim of such a system is to ensure appropriate usage of blood components that are considered a scarce resource. Transfusion practice audit may be conducted on individual requisition or aggregate data. Individual requisitions for blood or blood components may be reviewed prospectively or retrospectively. A retrospective audit can scrutinize combined transfusion data and utilization trends. It can identify issues that need to be addressed through interventions designed to

change transfusion practice. This can be followed by ongoing monitoring of input areas after assessment of the effectiveness of interventions.<sup>2</sup>The present study was undertaken to review the transfusion practices and pattern of blood component requisition and utilization in a hospital based blood centre.

**Material and Methods:** A retrospective audit was conducted on 1000 consecutive blood requisitions and 300 requisitions for fresh frozen plasma (FFP) and platelets. A requisition form used in our transfusion facility is colour coded (pink for whole blood/packed red cells and light yellow for FFP and platelets) for easy identification and record maintenance. It includes various details like name of the patient, central registration number, age, sex, ward, clinician in charge, diagnosis, priority and indication for transfusion, pre transfusion hematological values, quantity of units required and details pertaining to past transfusion. The data retrieved from the requisition forms was evaluated for the type of component requested, priority and indication, pre transfusion hematological values,

utilization trends and appropriateness of the indication. The number of units crossmatched and transfused and patients cross matched and transfused was determined. The department wise usage of blood along with cross match to transfusion(C/T) ratio was calculated (Units crossmatched/Units transfused). The transfusion probability (Patients transfused×100/Patients crossmatched) and transfusion index (Units Transfused/Patients crossmatched) were calculated. A C/T ratio of <2.5, transfusion probability of >30 and transfusion index more than 0.5 was considered indicative of significant blood usage. The overall blood utilization was also calculated by the formula - Units transfused×100/Units crossmatched.

**Results:** Of total 1000 requisitions,67.8%(n=678) were for packed red cells and 32.2%(n=322) were for whole blood. Out of 300 requisitions for FFP and platelets, 67.33%(n=202) were for FFP and 32.6%(n=98) were for platelets. The total number of units cross matched was 1386 out of which 573 units of blood were issued. The department wise usage of blood along with C/T ratio is shown in Table 1. The overall C/T ratio was 2.4:1. The maximum C/T ratio was for the department of Obstetrics and Gynecology (3.6:1) followed by Orthopedics (3.2:1). The blood utilization in our study was 41.3%. 66.7% of the patients were not transfused blood. The overall transfusion probability was 41.8% and transfusion index was 0.7. Comparison of units transfused and units not transfused is shown in Figure 1.

**Figure 1. Comparison of patients transfused and not transfused**

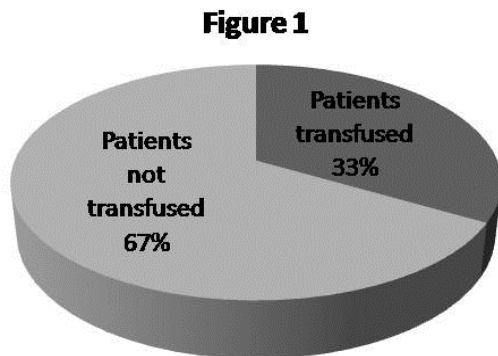
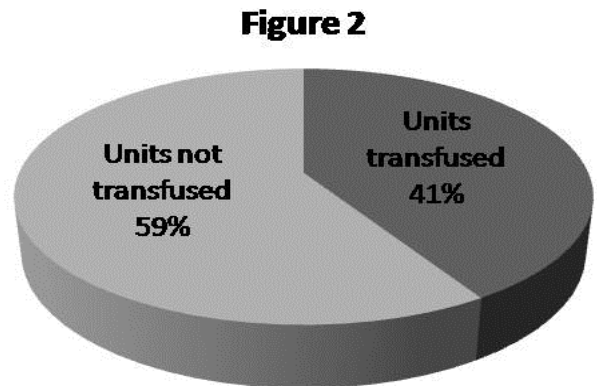


Figure 2 shows the patients who were transfused versus those not transfused inspite of blood ordering. Over ordering was seen in 37.33% of requisitions.

**Figure 1. Comparison of units transfused and not transfused**



**Table 1: Department wise usage of blood**

| Department             | Units cross matched | Units transfused | CT ratio |
|------------------------|---------------------|------------------|----------|
| Medicine               | 181                 | 113              | 1.6:1    |
| Surgery                | 327                 | 109              | 3:1      |
| ICU                    | 78                  | 44               | 1.8:1    |
| Obstetrics &Gynecology | 332                 | 93               | 3.6:1    |
| Orthopedics            | 268                 | 83               | 3.2:1    |
| Pediatrics             | 63                  | 40               | 1.5:1    |
| Others                 | 137                 | 91               | 1.5:1    |

**Table 2: Department wise usage of FFP/Platelets**

| Department                | FFP (n=202) | %    | Platelets (n=98) | %     |
|---------------------------|-------------|------|------------------|-------|
| Medicine                  | 53          | 26.2 | 50               | 51.02 |
| Surgery                   | 49          | 24.2 | 09               | 9.1   |
| ICU                       | 29          | 14.3 | 14               | 14.2  |
| Obstetrics and Gynecology | 26          | 12.8 | 04               | 4.08  |
| Orthopedics               | 05          | 0.02 | -                | -     |
| Pediatrics                | 03          | 0.01 | 13               | 13.2  |
| Others                    | 37          | 18.3 | 08               | 8.1   |

Inadequate information was provided on the requisition forms pertaining to priority and indication (18.1%), pre transfusion

hemoglobin values (11.1%) and pre transfusion prothrombin index (PTI)/ platelet count (25.66%). In 4.6% of requests, blood was demanded by immediate spin technique. There was request for single unit in 43.5% of requisitions.

A total of 202 requisitions for FFP resulted in 356 transfusion episodes with average 1.76 units per patient. The major users of FFP were the department of medicine (26.2%), followed by surgery (24.2%) and intensive care unit (14.3%) as depicted in Table 2. The various indications for FFP transfusion are shown in Table 3.

**Table 3: Indications of FFP transfusion**

| Indication     | No. of requisitions | Percentage |
|----------------|---------------------|------------|
| Liver Disease  | 78                  | 38.6       |
| Sepsis/DIC     | 54                  | 26.7       |
| Post operative | 39                  | 19.3       |
| Non specific   | 31                  | 15.3       |

The most common indication for FFP transfusion was liver disease. The indication was nonspecific in 15.3% of requisition forms. 22.2% of the FFP requests were inappropriate. 60.2% of the platelet transfusions were for patients admitted for medical conditions.

**Discussion:** Retrospective audits are effective in identifying areas requiring interventions to change transfusion practice. Various studies have evaluated the utilization trends of blood components with dedicated feedback to clinicians. Such measures are effective in reducing the total number of units transfused, number of units transfused per patient and the number of inappropriate transfusions. The utilization of blood in our study was 41.3%. Other studies have shown a utilization ranging from 13.6% to 23.14%.<sup>3,4</sup> Vibhute et al implemented a maximum surgical blood order schedule (MSBOS) for their surgical patients which improved the utilization from 23.14% to 74.74%.<sup>4</sup> In a recent study by Dexter et al, the authors have validated a method to determine procedures on the maximum surgical blood order schedule for which type and screen was not indicated. They used the estimated blood

losses and incidence of transfusion as the parameters.<sup>5</sup>

Henry and Boral introduced the C/T ratio and transfusion index. A ratio greater than 2.5 indicates significant blood utilization. The transfusion index denotes average number of units used per patient and is considered significant if more than 0.5 units are used per patient.<sup>6</sup> Mead et al described the transfusion probability of more than 30% as significant requirement of blood.<sup>7</sup> In the present study, the overall C/T ratio was 2.4:1, transfusion probability was 41.8% and transfusion index was 0.7. These parameters indicate that there was significant blood usage if analysed as a whole. Our findings are in contrast with previous studies that have C/T ratio ranged 14.16 to 41.4.<sup>8,9,10</sup> Transfusion probability has been reported by various authors 4.9 to 8.8% and transfusion index 0.06 to 0.11 in various elective surgeries.<sup>8, 9, 10</sup> The reason could be that in our institute regular monthly medical care review meeting is held which is attended by clinicians from all departments. The monthly data of each department is presented and discussed. Moreover, our department conducts training and symposia for clinicians to promote rational use of blood.

In our study, 66.7% of the patients were not transfused blood. Moreover, over ordering was seen in 37.33% of requisitions. The maximum C/T ratio was for the department of Obstetrics and Gynecology (3.6:1) followed by Orthopedics (3.2:1). Demanding large quantities of blood, of which little is ultimately transfused can increase the reserved blood inventory that is unavailable for transfusion. This may even contribute to aging and outdated of blood components. Moreover, it adds to technician time and financial burden. This can be decreased by changing the blood cross matching and ordering schedule depending upon the type of surgery. A study conducted to analyze blood ordering strategies in a hospital proposed type and screen procedure in cases where the transfusion probability is low. They also determined a maximum surgical blood order schedule for surgeries where transfusion probability is high. The authors proposed

implementation of such a procedure to avoid over ordering.<sup>11</sup> Inadequate information was provided on the requisition forms pertaining to priority and indication (18.1%), pre transfusion hemoglobin values (11.1%) and pre transfusion PTI/ Platelet count (25.66%). On analyzing the requisitions, 43.5% of cases demanded single unit of blood. In a study by Deb et al, priority was mentioned on 43.85% of requisitions and 60.71% requests were for single unit.<sup>12</sup> Another recent study has shown similar results with regard to indication for transfusion on requisition form (20.1%) and single unit demand in 49.5% of patients.<sup>13</sup>

The most common indication for FFP transfusion was liver disease. However, the indication was non specific in 15.3% of requisition forms. 22.2% of the FFP requests were inappropriate. Other studies have shown inappropriate transfusion requests ranging from 23.1% to 42%.<sup>14-22</sup> A total of 202 requisitions for FFP resulted in 356 transfusion episodes with average 1.76 units per patient, which is much below the recommended dose of FFP.

This study showed a high C/T ratio for the department of Obstetrics and Gynecology, Orthopedics and General Surgery. Pre transfusion hematological values were not provided in majority of the forms and demand for components was more than actual transfusion. There is need to conduct regular training sessions for residents, interns and clinicians to improve the information on requisition forms. Our department conducts regular training programs, symposia and issues guidelines for transfusion. To assess the effectiveness of such sessions, evaluation is done at the end of the program. Therefore, each hospital must develop its own guidelines depending upon the type of routine and emergency services and implement the same through the hospital transfusion committee to ensure effective blood utilization. A prospective audit with prior information to the clinicians can be of help to identify key areas that need change in transfusion practice.

**Conclusion:** A review of the pattern of blood and component utilization can be of help to determine the probability of transfusion and to formulate guidelines for usage. Revising of blood ordering pattern and steps to minimise over ordering should be taken. Implementation of a type and screen policy and estimation of MSBOS for each procedure can be rational and save valuable time and resources. There is constant need for generation of awareness and education among clinicians to ensure appropriate use of blood. The role of a functioning hospital transfusion committee in reducing the inappropriate transfusion requests and ensuring safe and effective use of blood components cannot be overemphasized.

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