## **Original Research Article**

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# Usage of blood products in emergency department at tertiary care centre

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## **ABSTRACT**

**Background:** Blood usage in the emergency department is a formidable challenge to the treating doctor. Inadvertent use of blood can do more harm to the patient than good. Analyzing blood transfusion data will help in formulating policies for transfusion in Emergency medicine department. The present study is taken to formulate guidelines for transfusion in Emergency department of our hospital. The present study also helps us to analyze the blood requirement, utilization and wastage in Emergency department, Victoria hospital.

**Methods:** The study done was a prospective study over a period of three months from March 2016 to May 2016. A descriptive, prospective study was conducted with a total of three hundred cases collected from the Emergency department (Casualty), Victoria hospital.

**Results:** Commonest indication for packed red cell transfusion was anemia, for FFP was hypoproteinaemia and for platelet concentrate was viral hemorrhagic fever. Transfusion trigger for packed red cells is haemoglobin of less than 7gram/dl with no co-morbid conditions and 7-9 gram/dl when there are co-morbid conditions.

**Conclusions:** A protocol has to be formulated to reduce the wastage and to effectively utilise blood and its products.

**Keywords:** Blood products, Emergency department

#### INTRODUCTION

Transfusion of blood and its products form one of the important pillars in the treatment of a patient in Emergency department. Blood usage in the emergency department is a formidable challenge to the treating doctor. Inadvertent use of blood can do more harm to the patient than good. This can lead to financial and medical burden to the patient. Analyzing the data will help in formulating policies for transfusion in emergency medicine department. This is part of the haemovigilance program which is required to identify and prevent

occurrence of transfusion related unwanted events due to inadvertent use of blood and blood products.  $^2$ 

The present study is taken to formulate guidelines for transfusion in Emergency department of our hospital. The most commonly utilized blood product in emergency department is Packed red blood cells.<sup>3</sup> The common indications for transfusion of packed red cells being Acute blood loss. Based on the percentage of blood lost requirement of packed red blood cells also varies. Anemia is also quite common indication in the developing nations. Also, heart failure is commonly

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associated with anemia.4 Transfusion of packed red cells in the children is done at a rate of 10-20 ml/kg/hr.5 Massive transfusion is also commonly done in the Emergency department in road traffic accidents and is associated will complications like hypothermia and hypocalcemia.6 One unit of packed red cells transfused will increase the hemoglobin by one gram per dl and Hematocrit by three percent.<sup>7</sup> Packed red blood cells are prepared by centrifuging whole blood and separating red cells. In uncomplicated anemia, transfusion trigger is 7-8 gm/dl, however it is largely to the discretion of the treating doctor to change the trigger based on the comorbidities of the patient. Fresh frozen plasma is indicated in patients with liver failure, warfarin overdose, disseminated intravascular coagulation and thrombotic thrombocytopenic purpura.<sup>8,9</sup> One unit of fresh frozen plasma contains one unit of coagulation factor and one ml of FFP contains two units of fibrinogen.

Platelet concentrate are used in a variety of diseases which manifest as low platelet count or thrombasthenia. <sup>10</sup> Viral fevers especially from dengue have become a quite common indication for platelet transfusion in India. <sup>11</sup> In all the transfusion there will be chances of transfusion transmitted diseases, allergic reaction and other forms of transfusion reactions leading to increased mortality and morbidity in the patients.

The present study aims at analyzing the blood requirement, utilization and wastage in emergency department.

## **METHODS**

The study done was a prospective study over a period of three months from March 2016 to May 2016. A total of three hundred cases were collected from the emergency department (Casualty), Victoria hospital. This is a descriptive study. All acute cases receiving blood transfusion admitted under emergency department, Trauma centre, Victoria hospital were included in the study.

## Exclusion criteria

- Patients who were recently blood transfused before being admitted to emergency department
- Severe Left ventricular dysfunction with ejection fraction of less than 30%.

Statistical analysis was done by means of descriptive statistics like mean, standard deviation, percentages and inferential statistics like chi-square test.

## **RESULTS**

Out of the total 300 cases included in the study 180 cases were males and 120 cases were females. Out of the total 300 patients 136 patients required only packed red cells. Out of these 136 patients, 86 were males and 50 were

females. The common indications for packed red cell transfusion in the casualty were anemia and acute blood loss

Table 1: Indications for packed red cell transfusion.

Indications for packed red cell transfusion	No. of male patients transfused	No. of female patients transfused
Anemia	56	30
Acute blood loss	21	14
Others	09	06
Total	86	50

Out of the 300 patients, 55 were transfused with only Fresh frozen plasma. Hypoproteinemia and alcoholic liver disease were the commonest indications for transfusion of FFP. Third space loss, nutritional anaemia and prolonged bed ridden patients who suddenly developed inter-current infections were also treated with FFP.

Table 2: Indication for FFP transfusion.

Indications for FFP transfusion	No. of males transfused	No. of females transfused
Hypoproteinemia	15	11
Alcoholic liver disease	07	05
3rd space loss	05	04
Nutritional anaemia	03	02
Critical illness/Prolonged bed ridden patients	02	01
Total	32	23

Out of the 300 cases which required transfusion, 48 cases required platelet concentrate. Majority of patients requiring Platelet concentrate transfusion were suffering from viral hemorrhagic fever. Some patients with thrombocytopenia with other causes were also transfused with platelet concentrate.

Table 3: Indication for platelet concentrate transfusion.

Indications for Platelet concentrate transfusion	No. of males transfused	No. of females transfused
Viral hemorrhagic fever	34	11
Thrombocytopenia due to other causes	04	01
Total	38	12

61 cases had diseases which required more than one component for their treatment. These cases were Massive blood transfusion, alcoholic liver disease with anaemia and altered coagulation profile with thrombocytopenia. 38 cases required massive transfusion with all the blood components including packed red cells, FFP and platelet

concentrate. Patients suffering from alcoholic liver disease with anaemia of haemoglobin less than 7g/dl were transfused with both packed cells and FFP. Some diseases coexisted which required packed cells, FFP and platelet concentrate to be given in various combinations.

147 units of packed red cells were given to 35 patients having acute blood loss. Acute blood loss required more units to be transfused to the patients on an average than other indications. On average patients with acute blood loss received 4.2 units of blood per patient as compared to anaemia which required 2.5 units of packed cells to be transfused to the patient. 86 patients suffering from anaemia had an average transfusion of 2.5 packed cells per patient which accounted to 215 blood units.

22 units of packed cells remained unutilised, as some had reactions and others did not require further transfusion.

Out of the 55 patients requiring FFP, most of them required multiple units of FFP. Each patient required 6.6 units of FFP on an average. 363 units of FFP were utilised and 15 units remained unutilised.

All the patients requiring platelets received random donor platelets only. Each patient received an average of 8.5 units of platelet concentrate. 16 units of platelet concentrate remained unutilised.

Haemoglobin of 7g/dl was taken as a trigger to transfuse packed cells in anaemia. When anaemia was associated with other co morbid conditions this trigger was increased based on the condition of the patient.

#### DISCUSSION

In present study, the commonest indication for packed red cell transfusion was Anaemia which accounted to 86 cases of the total 300 (28.6%). Yaddanapudi S et al conducted a study which also showed that the commonest indication for blood transfusion for packed red cells was anaemia. 12

In present study, the transfusion trigger was 7 grams/dl which is found to be similar to the other studies conducted by Yaddanapudi S et al in patients who did not have other co-morbid conditions. In patients having co-morbid conditions blood transfusion was started at 7-9 grams/dl. Acute blood loss was the most common indication for multiple blood transfusions and multiple component transfusions. Carson JL et al in their study also found out that the indication for blood transfusion in anaemia is 7 gram/dl in patients having no co-morbid conditions. <sup>13</sup>

The most common indication for platelet transfusion was viral hemorrhagic fever and required multiple units of platelet concentrate transfusion which was similar to other studies done by Sharma S et al.<sup>6</sup> Average number of packed red cell units transfused to a patient suffering

from acute blood loss was 4.2 which was similar to the number of units transfused to patients studied by Stanley et al which was 3.9 units.

Alcoholic liver disease with anaemia and altered coagulation profile with thrombocytopenia required packed cells, FFP and platelet concentrate in different proportions. These were also the commonest indications in present study and the study conducted by Yaddanapudi S et al. <sup>12</sup>

In current study, patients receiving Platelet concentrate used more than six units on an average per patient. In the study conducted by Carson JL et al the number of Random donor platelets used per patient were 6.2 units which were very similar to that of our study. 22 units of packed red cells were unutilised and wasted. There is no study to compare the wasted blood in emergency setting.

#### CONCLUSION

For better utilisation and to reduce wastage of blood and blood products, a protocol has to be formulated.

- Packed red cell is the commonest blood product which is utilised in Emergency department
- Packed red cell transfusion is indicated in patients with haemoglobin of less than 7gram/dl with no comorbid conditions
- In case there is any co-morbid condition, then transfusion has to be triggered at 7-9 gram/dl based on the condition of the patient
- Most common indication for platelet transfusion is viral hemorrhagic fever in Emergency department
- Hypoproteinemia and alcoholic liver diseases are the commonest indication for FFP transfusion in our study
- Massive transfusion is required in patients with acute blood loss where all three blood components are transfused.

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