

Utility of blood components in paediatric patients. An audit.

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Abstract

We studied and analysed 688 transfusion episodes for different blood components at Sher-I-Kashmir institute of medical sciences, Soura Srinagar Kashmir. Out of 688 transfusion episodes for different components 170(24.7%) of episodes were detected inappropriate. Highest inappropriate use was detected for FFP in 90(46.4%). Paediatric surgery had the highest inappropriate use of blood components and were present in 45(32%) episodes.

Key words: Blood components, Inappropriate, Paediatric

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Introduction

The blood component implies separation of whole blood into various potential components like packed red cells, platelet rich plasma, fresh frozen plasma, cryoprecipitate and leucocytes. Blood and its components are an important part of patient management treatment protocols and like drugs have property to cause adverse reactions in the recipients.

To maximise the effectiveness, safety and utility clinicians and intravenous therapists should be knowledgeable about the potential risk of blood component therapy. Therefore the clinician should keep in mind the appropriate indication for ordering blood components there by avoid misuse and unnecessary exposure of the recipient to various infectious and non infectious complications.

Hence, regular audit of blood and its component usage is essential to access the blood utilization pattern and set ideal policies in all the blood using specialities. In spite of the sophisticated blood banking services worldwide; indiscriminate use of blood components with either no indication or inappropriate indication continues.

Material and Methods

This prospective study was conducted in the blood bank of Sher-I-Kashmir institute of medical sciences Soura Srinagar Kashmir over one year period from January 2009 to December 2010. A prospective analysis of blood

and its component requisitions in paediatric patients from different clinical paediatric departments were reviewed regarding diagnosis, indication for transfusion, number of units requested and the speciality prescribing it. Reports of silent investigations like haemoglobin, platelet count, coagulogram were also recorded. Nature of component and their quantity used was correlated with disease indication for transfusion of a particular component. Requests of exchange transfusion for neonatal hyperbilirubinemia were excluded from the study.

Results

The present study was conducted upon 688 episodes of transfusion episodes for different blood components over a period of one year from January 2009 to December 2010. Of the total of 688 transfusion episodes in 502 patients, seven (07) were for whole blood, 186 were for packed red cells, 194 for fresh frozen plasma, 198 for platelet rich plasma and 103 episodes for cryoprecipitate. Of the total 688 episodes; 518 (75.3%) episodes were appropriate and 170 (24.7%) transfusions were inappropriate. The distribution of the appropriate and inappropriate transfusions are depicted in table: 1. The appropriate use as per the different departments are shown in table: 2. It was observed that the highest number of inappropriate episodes 45(32%) were observed in paediatric surgery followed by neurosurgery in 30(29.5%), SICU 05(23%), paediatrics 34 (22.2%) and in Haematology/Oncology 56(20.7%) episodes.

Table 1. Distribution of appropriate and inappropriate use of components

Component	Appropriate	Inappropriate	Total
Whole blood	02 (28.6%)	05 (71.4%)	7
Packed red cells	157 (84.4%)	29 (15.6%)	186
Fresh frozen plasma	104 (53.6)	90 (46.4%)	194
Platelet rich plasma	163 (82.3%)	35 (17.7%)	198
Cryoprecipitate	92 (89.3%)	11 (10.7%)	103
Total	518 (75.3%)	170 (24.7%)	688

Table 2. Distribution of transfusion episodes by different departments

Department	Appropriate	Inappropriate	Total
Haematology /Oncology	214 (79.3%)	56 (20.7%)	270
Paediatrics	119 (77.8%)	34 (22.2%)	153
Paediatric surgery	96 (68.0%)	45 (32%)	141
Neurosurgery	72 (70.5%)	30 (29.5%)	102
Surgical ICU	17 (77.0%)	05 (23%)	22
Total	518	170	688

Discussion

Internal audits form an integral part of the quality control programme in any blood bank, like in any other organization. Blood and blood products are considered drugs by the food and drug administration (FDA). [2] Indiscriminate use of blood components is on a rise due to easy availability of sophisticated blood banking services. [3] It is important for the blood bank to be able to fulfil the demands for this life saving product and at the same time, evaluate and access the existing trends of blood ordering. The importance of an internal audit and education programme emphasizing proper selection of blood components for patients and avoiding their overuse. [3] First audit of transfusion practices was done by Bock as early as 1936. Till date most of the studies on transfusion practices are done in adults and children together. Therefore we tried to look into the transfusion practises in paediatric group of patients at a tertiary care hospital. As a fact the supply of blood and blood components are finite, a high rate of inappropriate use has been reported around the world. This inappropriate use of blood and its components have a significant impact on the patients and the hospital staff in the form of health care cost, wastage of resources, depriving more needy patients and transmission of infection with unnecessary allergic reaction leading to high mortality and morbidity in patients. [4] The over view of appropriateness of transfusion of various blood components in our study revealed that of the total 688 transfusion episodes 170(24.4%) were inappropriate. The number of inappropriate requests for whole blood were detected in 5(2.94%) and for packed red cells inappropriate requests were found in 29(17%). Presently with the advent of blood component usage for specific needs of patients better guide lines have been suggested and put into practice globally. It is now a standard practice of all blood banks to manufacture different blood components from donated

whole blood units and supply only components thereafter to patients.[5,6,7,8] However use of whole blood is recommended in certain situations, instead of replenishment of blood loss through components. One such situation where use of whole blood is preferentially indicated is poly trauma. Advanced trauma support(ALTS)guidelines recommend blood transfusion in class III and IV hypovolemia in adults.[8,9] An actively bleeding patient who has already received 4 units of packed red cells needs to be transfused with whole blood as it ; not only replishes but prevents dilution of coagulation factors too. Of the total 170 inappropriate episodes of transfusion, 5(2.94%) inappropriate transfusions for whole blood were utilized either for non availability of PRCs or for achieving haemostasis in bleeding patients with normal platelets and coagulation profile and all the requests were from neurosurgery. Of the 170 inappropriate episodes highest inappropriate use was detected for FFP in 90(46.4%) of episodes. There are many reports available regarding inappropriate transfusion of FFP at various centres showing 29% - 40% FFP being used inappropriately [10, 11, 12, 13]. It is recommended to transfuse 5-6 units of FFP to correct the haemostatic defect due to clotting factor deficiency, but most often 1-2 units are being transfused.[6] A misconception about FFP that, it is a good volume expander and a source of albumin does not hold true. In the present study FFP was given inappropriately for coffee brown aspirate, without derangement of coagulation tests and cases of nephritic syndrome .Of the total 170 inappropriate episodes 35(20.58%) PRCs transfusion episodes were inappropriate most of these inappropriate transfusion were from SICU and paediatrics where; in emergency situations may lead to inappropriate high use of PRCs and FFP. [14, 15, 16] Hume et al found 5.95% of PRCs to be inappropriate [15],while Mozes et al[17] depicted a much higher rate of inappropriate use of PRCs. Plate count of <20,000/mm³ or a case posted for operative procedure in less than 12 hours with platelet

count < 50,000/mm³ are indications for giving platelet transfusion. However these trigger levels can be safely reduced in certain situations without any overt risk to patients. 11(6.47%) cryoprecipitate transfusions were found inappropriate and were used by haematology residents in emergency situation in patients with haemophilia without active bleeding or prolongation of coagulation profile. In the present study 518(75.3%) episodes of transfusion were appropriate which is almost close to 83.15% observed by others from western world. [18] It should be in fact an aim of all blood banks to achieve even higher rate of appropriate transfusion of various blood components. Yeh et al [19] carried out audit on FFP use and followed it by five sessions of education on transfusion guidelines which resulted in 30% decrease in inappropriate use of FFP. Hawkins TE. [5] Instituted a system of pre transfusion approval which resulted in 33% decrease in units of FFP transfusions.

Conclusion

In conclusion periodic review of blood component usage is very important to access the blood utilization pattern in any hospital and judicious implementation of guidelines for use of various blood components may help decrease their inappropriate use. This will ensure availability of components to needy patients and save many patients from transfusion related reactions also. Awareness and education among all those treating doctors and establishment of guidelines in wards and, regular audit will prove a fruit full exercise to increase the appropriate use of blood and blood components to 100%.

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