

Frequency of Acute Blood Transfusion Reactions encountered in patients in a Tertiary Care Hospital

SADAF FATIMA¹, ASMA RAFIQUE², FATIMA TEHSIN³

ABSTRACT

Aim: To report acute transfusion reactions occurring in patients receiving transfusion of whole blood/components in a tertiary care hospital.

Methods: A total number of 250 patients who received transfusion of blood components from April 2016 to Dec 2016 were selected for analysis. All transfusion reactions were diagnosed clinically as well as by laboratory findings. Complete blood count, culture sensitivity and specificity, and urine analysis was done in all clinically suspected patients of acute transfusion reactions. ARTs were further classified into different subtypes.

Results: In this study, the mean age of participants was 41.76±11.06 years. There were 113(43.5%) female patients and 147(56.5%) male patients. Regarding type of transfusion, most of the patients 111(42.7%) received whole blood transfusion, 96(36.9%) received packed red cells. Blood transfusion reactions occurred in 7(2.7%) patients, out of which 4 reactions occurred in patients who received whole blood transfusion, 1 reaction in patients who received platelet concentrates and 2 reactions occurred in patients who received packed red cells. Most common types of reactions were febrile non-hemolytic transfusion reactions occurred in 3(1.2%) patients, allergic reactions occurred in 2(0.8%) patients, hemolytic transfusion reaction in 1(0.4%) patients, and bacterial contamination in 1(0.4%) donor blood was detected.

Conclusion: Frequency of blood transfusion reactions in this study was 2.7%. Febrile non-hemolytic transfusion reactions and allergic reactions were most common reactions.

Keywords: Acute blood transfusion reactions, packed red cells, fresh frozen plasma, platelets.

INTRODUCTION

Transfusion of blood products is often used to improve the hemodynamic profile and clinical condition of patients. However transfusion of blood components is not without complications and can cause infectious and non-infectious complications¹. Blood transfusion reactions are divided into acute and delayed transfusion reactions. Acute transfusion reactions (ATRs) are most common and occur within 24 hours of transfusion. Acute blood transfusion reactions are further divided into different subtypes such as hemolytic transfusion reactions, non-hemolytic transfusion reactions, bacterial infections, allergic and anaphylactic reactions².

The reported incidence of blood transfusion reactions ranges from 0.2% to 10% and these are responsible for 1/25000 deaths. Febrile non-hemolytic transfusion reactions (FNHTRs) are most common among all types of ATRs. The diagnosis of these ATRs is based upon clinical history as well as laboratory findings of the patients such as complete blood count, liver and renal function tests and urine analysis for evaluation of hemoglobin in urine^{3,4}.

Restricted transfusion strategy is helpful in reducing the rate of ARTs, and it also helps in reducing the number of blood transfusions required for a specific purpose.⁵ premedication is also effective in reducing the incidence of FNHTRs and allergic reactions⁶.

Haemovigilance is a relatively recent development in transfusion safety which is defined as surveillance procedures covering the whole transfusion chain, from collection of blood and its components to follow-up of recipients, has markedly improved early complications and safety of transfusion for patients⁷. The rationale of our study is to report acute transfusion reactions occurring in patients receiving transfusion of whole blood/components in a tertiary care hospital.

MATERIALS AND METHODS

In this descriptive cross-sectional study, total number of 250 patients who received transfusion of blood components in department of medicine of Nishtar hospital Multan from April 2016 to Dec 2016 was selected for analysis. Patients of all age groups and gender receiving whole blood /blood component transfusion were selected. Patients having chronic

^{1,3}Nishtar Medical College, Multan

²Multan Medical & Dental College, Multan

Correspondence to Dr. Sadaf Fatima Email oystershell14@gmail.com Cell # 0332-6022311,

liver disease, receiving multiple transfusions and pregnant females were excluded.

All transfusion reactions were diagnosed clinically as well as by laboratory findings. Complete blood count, culture sensitivity and specificity, and urine analysis was done in all clinically suspected patients of acute transfusion reactions. In spite of this we also done patients as well as donor ABO and Rh blood group to check human error in blood group testing. And checked the post-transfusion patient's blood plasma or serum for evidence of hemolysis and compared it with pre-transfusion sample (if available). ARTs were further classified into different subtypes according to the definitions of American association of blood banks. FNHTRs were diagnosed by the Presence of chills or elevation of body temperature $\geq 1C$ during transfusion. Cutaneous or systemic manifestations of allergic response subsided by anti-histamine drug was labelled as allergic reaction. Clinical and laboratory evidence of hemolysis and +ve DAT test was labelled as hemolytic transfusion reaction. And presence of positive blood culture for bacteria of recipient donated blood was labelled as bacterial contamination.

All the data were analyzed using SPSS v 23 Frequency of gender, blood transfusion reactions and its types and type of blood component therapy were presented as percentage. Quantitative variables were presented in form of mean \pm standard deviation.

RESULTS

In this study, a total number of two hundred and fifty (250) participants were included. The mean age of participants was 41.76 ± 11.06 years. There was 113(43.5%) female patients and 147(56.5%) male patients. Regarding type of transfusion, most of the patients 111(42.7%) received whole blood transfusion, 96(36.9%) received packed red cells (Table 1).

Table 1: Types of Transfusion given to the patients.

Type of Transfusion	Frequency	%age
Whole blood	111	42.7
Packed red cells	96	36.9
Platelet concentrates	13	5.0
Fresh frozen plasma (FFP)	40	15.4

Of the total 250 patients, blood transfusion reactions occurred in 7(2.7%) patients (Fig. 1), out of which 4 reactions occurred in patients who received whole blood transfusion, 1 reaction in patients who received platelet concentrates and 2 reactions occurred in patients who received packed red cells. Types of acute transfusion reactions are given in fig. 2. Most common types of reactions were febrile non-hemolytic transfusion reactions occurred in 3(1.2%)

patients, allergic reactions occurred in 2 (0.8%) patients, hemolytic transfusion reaction in 1(0.4%) patients, and bacterial contamination in 1(0.4%) donor blood was detected.

Fig. 1: Frequency of acute transfusion reactions

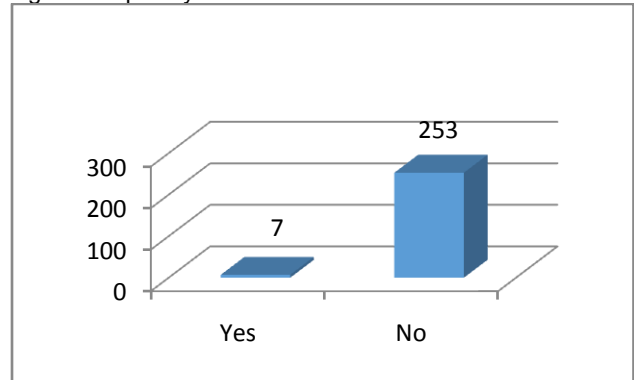
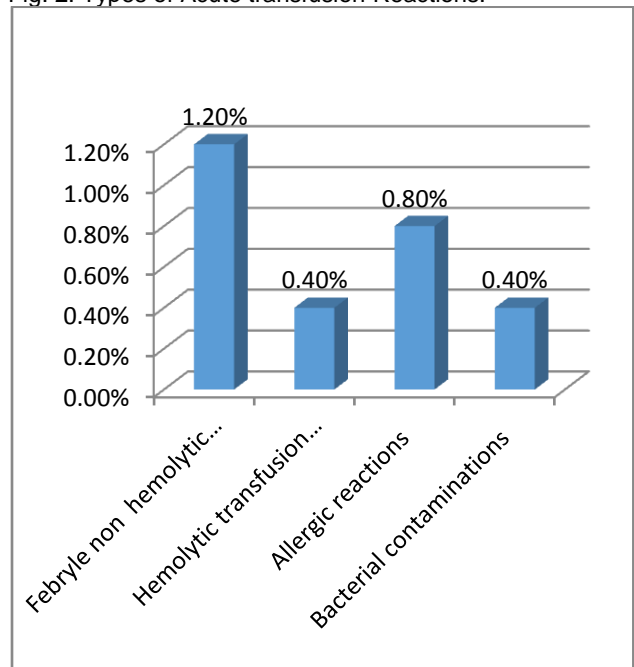


Fig. 2: Types of Acute transfusion Reactions.



DISCUSSION

Acute transfusion reactions (ATRs) occur during or within 24 hours of transfusion. On the basis of their severity and clinical response they can be mild, moderate, and severe or life-threatening⁸. These are further classified as immunological and non-immunological reactions. Acute immunological reactions are accompanied by an immune response to antigens on red blood cells or other cell surfaces and include acute haemolytic transfusion reaction (AHTR), FNHTRs, allergic, anaphylactic and transfusion-related acute lung injury (TRALI), while non-immunological reactions include transfusion-

related sepsis, circulatory overload, non-immune haemolysis, hypocalcaemia and hypothermia⁸. Around 0.5%–3% of all transfusions result in some adverse events, but most are minor without any consequence^{9,10}.

In this study, we reported the incidence of acute transfusion reactions in patients receiving blood or blood components transfusions. In our study, whole blood transfusion was most common type of transfusion followed by packed red cells. In our study, febrile non-hemolytic transfusion reactions were most common that occurred in 5 (1.9%) patients followed by allergic reactions. In the study by Khalid et al. FNHTRs also were the commonest followed by allergic reactions.¹ Other studies have also reported similar trends^{9,11,12}.

In Khalid et al. study, the incidence of acute transfusion reactions was 0.082%¹. In our study, the incidence of these reactions was 2.7%. In other international studies the incidence of acute transfusion reactions have been reported 0.5 to 3%^{13,14}. A study conducted in Nigeria reported 8.7% incidence of acute transfusion reactions.¹⁵ A study conducted in pediatric ICU in Montreal reported 1.6% incidence of ATRs.¹⁶ Studies conducted in Brazil, India, and Malaysia Have reported 0.24%, 0.05% and 0.53% rate of ATRs respectively¹⁷⁻¹⁹.

In our study, out of 7 reactions, 4(57.1%) reactions occurred in patients who received whole blood transfusion, 1(14.28%) reactions in patients who received platelet concentrates and 2 (28.57%) reactions occurred in patients who received packed red cells. In a study conducted in Pakistan, the highest frequency of transfusion reactions occurred with packed red cells/whole blood in 86.8% patients, followed by platelets (7.5%), FFPs (4.7%) and cryoprecipitate (0.09%).¹ another study also reported that packed cell transfusion are responsible for most of the transfusion reactions (62.4%) followed by platelets (14.4%) and FFP (11.2%)²⁰.

In conclusion, there is a need to enhance the knowledge of medical professionals for timely recognition and prevention of acute transfusion reactions. The hospital staff should be aware of the significance of reporting the even minor types of ATRs. The medical staff should recognize the significance of reporting all transfusion reactions even mild in nature to the blood transfusion department. Upgraded and authoritarian surveillance systems are required for estimation of the risk- benefit ratio of blood transfusion and to categorize the complications in the transfusion chain and to assure compatibility between the donor and the recipient. Establishment of a haemovigilance system can also be a superior option to get the better understanding of ATRs. The critical objective of all these exertions should be to make blood transfusions as safe as possible.

REFERENCES

1. Khalid S, Usman M, Khurshid M. Acute transfusion reactions encountered in patients at a tertiary care center. *J Pak Med Assoc.* 2010;60(10):832-836.
2. Contreas M, Taylor C, Barbara J. Clinical blood transfusion. In: Hoffbrand AV, Catovsky D, Tudenham E, editors. *Postgraduate Haematology*. 6th ed. Oxford: Blackwell publishing Ltd. 2011;268-299.
3. Mazzie CA, Popovsky MA, Kopko PM. Non-infectious complications of blood transfusion. AABB technical manual. 16th ed. Maryland: American Association of Blood Banks. 2008;715-749.
4. Tinegate A, Birchall J, Gray A, Haggas R, Massey E, Norfolk D et al. Guideline on the management and investigation of acute transfusion reactions prepared by the BCSH Blood Transfusion Task Force. *Haematology*. 2012;159:143–153.
5. Villanueva C, Colomo, A, Bosch A, Concepción M, Hernandez- Gea, V, Aracil et al. Transfusion Strategies for Acute Upper Gastrointestinal Bleeding. *N Engl J Med.* 2013;368:11-15.
6. Fry JL, Arnold DM, Clase CM, Crowther MA, Holbrook AM, Traore AN et al. Transfusion premedication to prevent acute transfusion reactions: a retrospective observational study to assess current practices. *Transfusion*. 2010;50(8):1722-30.
7. Bolton-Maggs P and Cohen H. Serious Hazards of Transfusion (SHOT) haemovigilance and progress is improving transfusion safety. *Br J Haematol.* 2013;163(3):303–14.
8. Gupta M, Kumar R, Gupta S, Kaur A. Acute transfusion reactions encountered in patients at a tertiary care centre in Punjab. *National Med J India.* 2015;28(1):8-11.
9. Robillard P, Nawej K, Jochem K. The Quebec hemovigilance system: description and results from the first two years. *Transfusion Apheresis Sci.* 2004;31(2):111-22.
10. Kleinman S, Chan P, Robillard P. Risks associated with transfusion of cellular blood components in Canada. *Transfus Med Rev.* 2003;17(2):120-62.
11. Siegenthaler MA, Schneider P, Vu DH, Tissot JD. Haemovigilance in a general university hospital: need for a more comprehensive classification and codification of transfusion related events. *Vox Sang* 2005; 88: 22-30.
12. Mbanya D, Binam F, Kaptue L. Transfusion outcome in a resource limited setting of Cameroon: a five year evaluation. *Int J Infect Dis* 2001; 5: 70-3.
13. Popovsky MA. *Transfusion Reactions*. 2nd ed. Bethesda, MD: American Association of Blood Banks Press; 2001.
14. Public Health Agency of Canada. Transfusion transmitted injuries. 2004. <http://www.phac-aspc.gc.ca/hcai-iamss/tti-it/>.
15. Arewa O, Akinola N, Salawu L. Blood transfusion reactions; evaluation of 462 transfusions at a tertiary hospital in Nigeria. *Afr J Med Med Sci.* 2009;38(2):143-8.
16. Gauvin F, Lacroix J, Robillard P, Lapointe H, Hume H. Acute transfusion reactions in the pediatric intensive care unit. *Transfusion.* 2006;46(11):1899-908.
17. Rabeya Y. An audit of reported acute transfusion reactions in Universiti Kebangsaan Malaysia Medical Centre. *Malaysian J Pathol.* 2011;33(1):25.
18. Kumar P, Thapliyal R, Coshic P, Chatterjee K. Retrospective evaluation of adverse transfusion reactions following blood product transfusion from a tertiary care hospital: A preliminary step towards hemovigilance. *Asian J Transfus Sci.* 2013;7(2):109-
19. Barbosa MH. Analysis of immediate transfusion incidents reported in a regional blood bank. *Rev Bras Hematol Hemoter.* 2011;33(5):337-41.
20. Grujić J, Gulan Z, Budakov Z. Importance of haemovigilance and reports on transfusion reaction in blood component therapy. *Medicinski preglod.* 2012;65(1-2):50-3.

