

# Retrospective Evaluation of Complications Occurring During Blood Transfusion: An Observational Institutional Based Study

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## ABSTRACT

**Background:** Blood transfusion and transfusion of various blood products is a routinely employed procedure these days. Along with this, there is also increasing incidence of various adverse blood transfusion reactions. Hence; we planned the present study to assess various complications occurring in patients undergoing blood transfusions.

**Materials & Methods:** We planned to retrospectively evaluate complications occurring in patients undergoing blood transfusion. Data records of all the patients that underwent blood transfusion within last two years were included in the present study. We analyzed complete clinical, demographic and medical details of all the patients' obtained from their record files. Separate pro-forma was attached for assessing the presence or absence and type of transfusion reaction (if present) among the patients.

**Results:** Most commonly used blood products were RBCs and frozen plasma. In a total of 81 times, the blood transfusion adverse reactions were reported. Among these, most commonly encountered adverse transfusion reactions were febrile non-haemolytic transfusion reaction and anaphylaxis.

**Conclusion:** By utilizing advanced technologies and by adopting adequate screening methods, the incidence of adverse blood transfusion reactions can be significantly reduced.

**Key words:** Adverse, Blood Transfusion, Complication.

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## INTRODUCTION

Transfusion of blood products is a double-edged sword, which should be used judiciously. Though blood transfusion can be life-saving, it can also lead to certain adverse reactions which can be fatal. There has been a concern and debate in the medical literature regarding the appropriate use of blood and blood products. There is limited high-quality evidence of the benefits and harms of different blood product transfusion practices that exist throughout the world.<sup>1-3</sup>

A massive transfusion of red blood cells (RBCs) may lead to a dilutional coagulopathy, as plasma-reduced RBCs contain neither coagulation factors nor platelets. Secondly, haemorrhage, as a consequence of delayed or inadequate perfusion, can result in disseminated intravascular coagulation. This causes consumption of platelets and coagulation factors and may account for the numerical distortion of clotting studies appearing out of proportion to the volume of blood transfused.<sup>4-5</sup> Under the light of above mentioned data, we planned the present study to assess various complications occurring in patients undergoing blood transfusions.

## MATERIALS & METHODS

We planned the present study in the Mahatma Gandhi Memorial (MGM) Medical College, Indore, Madhya Pradesh (India) and it included retrospective evaluation of complications occurring in patients undergoing blood transfusion.

Data records of all the patients that underwent blood transfusion within last two years were included in the present study. We analyzed complete clinical, demographic and medical details of all the patients' obtained from their record files. We prepared a standard pro-forma under the expertise guidance of doctors of the same department and recorded complete details of all the patients. Retrospective reviewing of the data records of the selected patients was done from the blood bank of the medical institute. Separate pro-forma was attached for assessing the presence or absence and type of transfusion reaction (if present) among the patients. All the details were carefully recorded on the excel sheet and were analysed by SPSS software. Univariate regression curve was used for assessment of level of significance.

**RESULTS**

In the present study, we observed that a total of 88691 units of blood products were used during the study period. Among this, most commonly used blood products were RBCs and frozen plasma. 1768 units of RBCs and 1325 units of frozen plasma were used. Platelets were the next commonly used blood product in the

present study (1288 units). In a total of 81 times, the blood transfusion adverse reactions were reported. Among these, most commonly encountered adverse transfusion reactions were febrile non-haemolytic transfusion reaction and anaphylaxis. Other encountered blood transfusion adverse reactions were Post transfusion purpura and Transfusion associated dyspnoea.

**Table 1: Assessment of blood products used for transfusion**

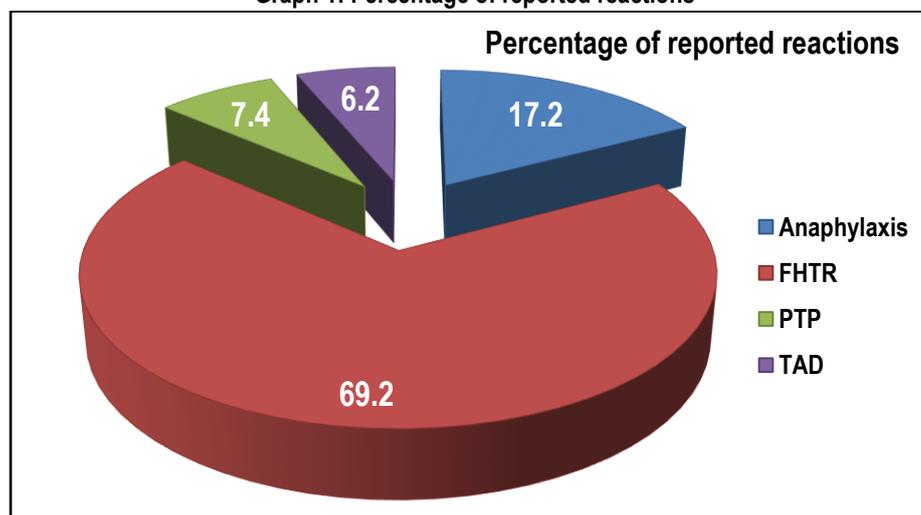
Blood products	Transfused units
Fresh frozen plasma	1325
RBC	1768
Platelets	1288
Whole blood	175
Pooled platelet	84
Cryoprecipitate	135
<b>Total</b>	<b>88691 (4775)</b>

**Table 2: Adverse transfusion reactions**

Adverse transfusion reaction	Number of reactions reported	Percentage
Anaphylaxis	14	17.2
FHTR	56	69.2
PTP	6	7.4
TAD	5	6.2
<b>Total</b>	<b>81</b>	<b>100</b>

FHTR: Febrile non-haemolytic transfusion reaction; PTP - Post transfusion purpura;  
TAD - Transfusion associated dyspnoea

**Graph 1: Percentage of reported reactions**



**DISCUSSION**

Hemovigilance consists of collection and collation of data pertaining to adverse blood transfusion reactions, its analysis and policy making at a national level and its subsequent implementation to avoid such occurrences. The Hemovigilance Program of India which finds its roots from the European Hemovigilance network, being launched in 2012 is still in its infancy. A lot needs to be done to achieve the ultimate goal of being a part of the International Hemovigilance Network.<sup>6-8</sup> The National Blood Policy of India introduced in 2002 mentions various steps to be taken to increase the awareness of Transfusion Medicine at the undergraduate and postgraduate level so as to sensitize the medical fraternity of the importance of early recognition as well as reporting of all such events.<sup>9,10</sup> Hence; we planned the present study to assess various complications occurring in patients undergoing blood transfusions.

We observed, in the present study, that in a total of 81 times, the blood transfusion adverse reactions were reported. Among these, most commonly encountered adverse transfusion reactions were febrile non-haemolytic transfusion reaction and anaphylaxis. Kumar P et al determined the frequency and type of transfusion reactions (TRs) occurring in patients, reported to the blood bank at our institute. A retrospective review of all TRs reported to the blood bank at the All India Institute of Medical Sciences, between December 2007 and April 2012 was done. All the TRs were evaluated in the blood bank and classified using standard definitions. During the study period a total of 380,658 bloods and blood components were issued by our blood bank. Out of the total 196 adverse reactions reported under the hemovigilance system, the most common type of reaction observed was allergic 55.1% (n = 108), followed by febrile non-hemolytic transfusion reaction (FNHTR) 35.7% (n = 70). Other less frequently observed reactions

were anaphylactoid reactions 5.1% (n = 10), Acute non-immune HTRs 2.6% (n = 5), Circulatory overload 0.5% (n = 1), Transfusion related acute lung injury 0.5% (n = 1), Delayed HTRs 0.5% (n = 1). Not a single case of bacterial contamination was observed. The frequency of TRs in our patients was found to be 0.05% (196 out of 380,658). This can be an underestimation of the true incidence because of under reporting. It should be the responsibility of the blood transfusion consultant to create awareness amongst their clinical counterpart about safe transfusion practices so that proper hemovigilance system can be achieved to provide better patient care.<sup>7</sup>

Vasudev R et al evaluated the various adverse reactions related to transfusion occurring in our institution as a pilot institutional effort toward a hemovigilance program. This study also helped in understanding the problems faced by blood banks/Transfusion Medicine departments in implementing an effective hemovigilance program. All the adverse reactions related to transfusion of whole blood and its components in various clinical specialties were studied for a period of 1 year. Any transfusion-related adverse event was worked up in accordance with guidelines laid down by the Directorate General of Health Services (DGHS) and departmental standard operating procedures. During the study period from November 1, 2011 to October 31, 2012, 45812 components were issued [30939 WB/PRBC; 12704 fresh frozen plasma (FFP); 2169 platelets]. Risk estimation per 1000 units of red cells (WB/PRBC) transfused was estimated to be: 0.8 for febrile nonhemolytic transfusion reaction (FNHTR), 0.7 for allergic reaction, 0.19 for acute hemolytic transfusion reaction (AHTR), 0.002 for anaphylactoid reactions, 0.1 for bacterial sepsis, and 0.06 for hypervolemia and hypocalcemia. 0.09 is the risk for delayed transfusion reaction and 0.03 is the risk for transfusion-related acute lung injury (TRALI). Risk estimate per 1,000 units of platelets transfused was estimated to be 1.38 for FNHTR, 1.18 for allergic reaction, and 1 in case of bacterial sepsis. Risk estimation per 1,000 units of FFP was estimated to be 0.15 for FNHTR and 0.2 for allergic reactions. Factors such as clerical checks at various levels, improvement in blood storage conditions outside blood banks, leukodepletion, better inventory management, careful donor screening, bedside monitoring of transfusion, and documentation of adverse events may decrease transfusion-related adverse events.<sup>11</sup>

Bassi R et al determined the incidence of adverse transfusion reactions (ATRs) in recipients of blood and blood components. Prospective study from January 2014 till April 2015 was done. ATRs reported to the Department of Transfusion Medicine were recorded and analyzed on the basis of their clinical features and lab tests. During the study period 25,099 units of blood and blood components were transfused and 100 ATRs (0.40 %) were reported. The incidence of febrile nonhemolytic transfusion reactions (FNHTR) was maximum (73 %) followed by allergic reactions (24 %), bacterial sepsis (1 %), hypotension due to ACE inhibitors (1 %) and acute hemolytic transfusion reaction (AHTR) (1 %). Of all the reported ATRs, 76 % occurred with packed red cells, 15 % occurred with whole blood, while platelets and Fresh Frozen Plasma transfusions were responsible for 8 % and 1 %, respectively. The majority of the reactions were FNHTRs followed by allergic reactions. Reporting of all adverse events and continuous medical education to medical and paramedical staff will help in strengthening hemovigilance system.<sup>12</sup>

## CONCLUSION

The present study showed presence of significant adverse blood transfusion reactions. However; by utilizing advanced technologies and by adopting adequate screening methods, the incidence of adverse blood transfusion reactions can be significantly reduced.

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