(International Print/Online Journal)

SJIF IMPACT FACTOR: 5.565
PUBMED-National Library of Medicine ID-101739732

ISSN (Print): 2209-2870
ISSN (Online): 2209-2862

International Journal of Medical Science and Current Research (IJMSCR)
Available online at: www.ijmscr.com
Volume 6, Issue 6 , Page No: 197-201
November-December 2023

IJMSCR

Spectrum Of Adverse Transfusion Reactions In Recipient At Blood Centre Of A Tertiary Care Center

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Type of Publication: Original Research Paper
Conflicts of Interest: Nil

Abstract

Background:
Adverse transfusion reaction(ATR) is an unfavorable event to the transfused blood component which varies in severity among patients according to the type of reaction and patient's sensitivity. Depending on the onset of reaction, these transfusion reactions can be immediate or delayed type and depending on the pathogenesis they can be classified as immune or non-immune type. This study was done to study frequency of various types of transfusion reactions among study population,to determine the severity, associated morbidities and outcome of various types of transfusion reactions among study population and to compare transfusion reaction among different blood components issued.

Materials And Methods:
All ATR's that occurred over 1 year period at a tertiary care health center were worked up according to the standard protocol of the institute. Results were noted and analysed.

Results:
Out of 8913 blood units issued, 28 cases had ATR. Allergic reaction was the most common-18/28 (64.28%) followed by febrile reaction-8/28(28.57%) and only 2/28 (7.14%) cases showed transfusion- related acute lung injury. In this study, no immune reaction was seen.

Conclusion:
The most common transfusion reactions are allergic and febrile which are non-harmful. TRALI can be fatal and to prevent it,correct and prompt measures should be taken.

Keywords: adverse reactions, blood transfusion, blood centre, recipient, blood components

Introduction

In blood banks, blood transfusion is associated with definite benefits and risks. Adverse transfusion reaction(ATR) is an unfavorable event which varies in severity among patients according to the type of reaction and patient's sensitivity.[1] Depending on the onset of reaction, these transfusion reactions can be immediate or delayed type and depending on the pathogenesis they can be classified as immune or non-immune type.

The clinical and laboratory personnel dealing with transfusion of blood components should have knowledge regarding transfusion procedure and its adverse reactions so that appropriate steps can be taken in case of a reaction as it can not be predicted which patient will have reaction. Various types of adverse reactions should be identified so that prompt remedial measures can be taken to minimize them and add to the safety of the blood transfusion procedure.

The present study was done to study frequency of various types of transfusion reactions among study population,to determine the severity, associated morbidities and outcome of various types of transfusion reactions among study population and to compare transfusion reaction among different blood components issued.

Materials And Methods

This is a retrospective study conducted in Blood Bank Centre, Department of Pathology of Jaipur National Institute of Medical Sciences And Research Center,Jaipur during the period of 1 year from January 2022 to December 2022. We have included all the blood components issued in the Blood Bank Centre , Pathology department. .

All blood bags were transfused along with a transfusion form which included details of transfusion including timings, vitals, type of component, blood group, issue number along with recipients personal details. In case of ATR the form was sent to blood bank along with blood bag and patients blood sample (ethylenediaminetetraacetic acid EDTA and plain vial). All the cases were worked up according to standard protocol of the institute which included checking for clerical errors,doing blood grouping of patient and issued blood bag again, cross matching, Coombs test and blood culture. All immunohematology tests were done using gel card. Results were noted and analysed.

All the issued blood components and received ATR forms in blood bank centre of Pathology Department are included in this study. The analysis was done using percentages and ratios.

Results

Present study was done over a period of 1 year in which total blood and components transfused were 8419 out of these 28 (0.33%) cases were reported as adverse transfusion reactions. Out of 28 ATRs cases 11 (39.28%) cases were males and 17 (60.7%) were females.reactions were seen in almost all age groups, 1 case was found in younger age group (<18 years), 20 cases in middle age groups (19-59 years) and 7 cases in elderly (> 60 years).

The reactions were seen mostly with PRBC 21/28 (71.4%) followed by FFP 6/28 (21.4) and RDP 1/28 (3.5%) [Table 1]. It was found that transfusion reactions happened mostly with small volume (<50mL) of transfusion of issued components [Table 2]. Most common presenting symptoms noticed in this study was itching 11/28 (39.28%) followed by dyspnea 9/28 (32.14%), fever 8/28 (28.57%), chills 8/28 (28.57%) and hives 2/28 (7.14%) [Table 3].

Table 1 Number of units that showed adverse reactions

Component	n (%)
PRBC	21 (75%)
FFP	6 (21.4)
RDP	1 (3.5)
Total	28 (100)

PRBC: Packed red blood cells, FFP: Fresh frozen plasma

Table 2 Blood volume transfused before reaction was noticed

Volume transfused (mL)	n (%)
<50	7 (25)

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51-100	6 (21.4)
101-150	2 (7.14)
151-200	3 (10.7)
201-250	2 (7.14)
251-300	4 (14.28)
301-350	4 (14.28)
Total	28 (100)

Table 3 Symptoms reported among patients having adverse reactions

Symptoms	n (%)
Itching	11 (39.28)
Dyspnea	9 (32.14)
Fever	8 (28.57)
Chills	8 (28.57)
Hives	2 (7.14)

Clerical error was not observed in the ATR workup of all these 28 cases. Physical examination noticed haemolysis in post transfusion sample in 1 case. Direct and indirect Coomb's test were negative in all cases. It was observed in final diagnosis that allergic reactions were more common 18/28 (64.28%), followed by febrile reactions 8/28(28.57%) and Transfusion- related acute lung injury (TRALI) was observed in 2/28 (7.14%) cases [table 4].

Table 4 Causes of ATRs

Diagnosis	n (%)	Percentage of transfusion
Allergic reaction	18 (64.28)	0.21
Febrile reaction	8 (28.57)	0.09
TRALI	2 (7.14)	0.02
Total	28 (100)	

ATR: adverse transfusion reactions, TRALI: transfusion related acute lung injury

On considering percentage of transfusion reactions with respect to the total number of blood bags transfused, it was found that allergic reactions was seen in 0.21% of 8419 units, febrile reactions in 0.09% of 8419 units and TRALI in 0.02% of 8419 units transfused.

Discussion

The present study aimed to investigate the spectrum of adverse transfusion reactions (ATRs) in recipients at a tertiary care center. The analysis of 8913 blood units issued over a one-year period revealed 28 cases of ATRs, with allergic reactions being the most common (64.28%), followed by febrile reactions (28.57%), and transfusion-related acute lung injury (TRALI) in only 7.14% of cases. Notably, no immune reactions were observed in this study. The predominance of non-immune reactions, such as allergic and febrile reactions, aligns with findings from various studies in the literature. The absence of

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immune reactions in the current study suggests that measures in place, such as blood typing and cross-matching, are effective in preventing immune-mediated ATRs.[16]

The analysis of ATRs in relation to different blood components revealed that packed red blood cells (PRBC) were most commonly associated with reactions (75%), followed by fresh frozen plasma (FFP) (21.4%) and random donor platelets (RDP) (3.5%). This distribution is consistent with previous reports, highlighting the importance of monitoring and addressing ATRs in the context of specific blood components.[17] The volume of transfused blood also played a role in the occurrence of ATRs, with reactions more frequently observed with smaller transfusion volumes (<50 mL). This finding underscores the need for heightened vigilance, even in cases involving relatively small transfusion volumes.[18]

The clinical presentation of ATRs varied, with itching being the most common symptom (39.28%), followed by dyspnea, fever, chills, and hives. These findings align with established literature on the clinical manifestations of ATRs. The prompt recognition of these symptoms is crucial for timely intervention and patient safety. It is noteworthy that clerical errors were not observed in the ATR workup, indicating the effectiveness of the blood bank's protocols in ensuring the accuracy of transfusion-related documentation and processes.[19]

In terms of TRALI, a potentially life-threatening complication, it was observed in 2 out of 28 cases (7.14%). While TRALI is relatively rare, its severity emphasizes the importance of implementing preventive measures and prompt responses to minimize the risk of such reactions. The study provides valuable insights into the frequency and characteristics of ATRs in a tertiary care center. The predominance of non-immune reactions, especially allergic and febrile reactions, highlights the overall safety of blood transfusion procedures. However, the occurrence of TRALI emphasizes the need for ongoing vigilance and continuous improvement in transfusion safety protocols.[20]

Conclusion

The most common adverse transfusion reactions seen are allergic and febrile reactions. These are non-fatal. But there can be other reactions like TRALI which can be life-threatening. Therefore, preventive and prompt measures should be taken to avoid them.

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