

Audit

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A Clinical Audit on Management of Transfusion Reactions

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ABSTRACT

Introduction: Blood and blood product transfusion is a standard practice in the clinical setting; however, transfusion-associated adverse events are a growing concern. This study is to evaluate the transfusion reactions occurring at a tertiary care hospital in Sri Lanka. **Methods:** This was a prospective audit, and data were collected from the transfusion reaction notification forms. **Results:** There were 144 reported transfusion reactions in the study period, and out of that, 121 reactions were due to red cell transfusions. The commonest symptom was urticaria, followed by fever. Management, only 65(45.14%) cases were managed appropriately. **Conclusion:** Transfusion Reactions are not always preventable; however, detection, management and prevention of transfusion reactions could be improved.

Keywords: Transfusion, transfusion reactions, hemovigilance

INTRODUCTION

Blood transfusion is a widely used treatment modality in modern medicine, and it saves thousands of lives worldwide. Even though transfusion is generally safe, adverse events are possible with the transfusion of blood and blood products. A transfusion reaction is defined as an adverse event attributable to the transfusion of blood and blood components, which occur during or after transfusion [1]. Therefore, all transfusions should be done in a clinical setting by trained health staff and actively monitored throughout the transfusion [2]. Moreover, facilities for emergency treatment must be available to manage any possible transfusion reaction.

Diagnosis and management of a transfusion reaction need a multidisciplinary approach. There are many categories of transfusion reactions. However, it is important to note that most clinical signs and symptoms of transfusion reactions are not very specific to each type of transfusion reaction. Furthermore, the clinical condition and the ongoing treatment of the patient can alter those features. In clinical setting, initial management does not depend on the reaction type; it is focused more on symptomatic management [3].

There are published studies to highlight the importance of recognition and management of transfusion reactions [4-6]. Awareness of health professionals about transfusion reaction management is a critical factor. Early



discontinuation of the blood product, as well as the symptomatic management, play a critical role in management [3]. Another important factor is reporting the incident. The assessment of current practice in transfusion management is crucial for the improvement of the practice. This should include transfusion reaction management in all specialities and all units such as clinical wards, intensive care units and operating theatres.

Therefore, this prospective audit was designed to assess the appropriateness of the transfusion reaction management in clinical settings. A tertiary care hospital in Sri Lanka was selected and focused on the clinical management of transfusion reactions.

METHODOLOGY

This study was a prospective audit conducted in a tertiary care hospital in Sri Lanka. Transfusion reactions that occurred from January 2024 to December 2024 were included in the study. Every adverse event related to transfusion should be reported to the blood bank by filling out a 'transfusion reaction notification form'. For this study, data were collected from the transfusion reaction notification forms by the author.

Description of the symptoms of transfusion reactions and the type of blood product was focused initially. Furthermore, clinical monitoring of the patient before and during the transfusion was evaluated. Then the appropriateness of the initial management of the reaction was determined. Collected data were entered into a spreadsheet software and analyzed.

RESULTS

There were 144 reported transfusion reactions in 2024 in the hospital. 118 of those were transfused in wards, and 13 and 6 were transfused in intensive care units and operating theatres, respectively.

In terms of blood products, the majority of reactions were due to red cell transfusions, showing a number of 121 (84%). 17 (11.8%) transfusion reactions were due to Fresh Frozen Plasma (FFP) transfusion, and 6 (4.2%) reactions were due to platelet transfusions.

When symptoms of transfusion reactions are concerned, the majority of patients, 105 (72.9%), had experienced more than one symptom. The commonest symptom shown among patients was urticaria, which was experienced by 50 patients, followed by fever, which was evident in 49 patients. 47 of them had experienced chills and rigor during the transfusion. 25 and 18 patients had tachycardia and dyspnoea respectively. Hypotension was a marked symptom in 15 patients, whereas 10 patients had hypertension. 8 patients experienced restlessness. After the serological investigations, the final diagnosis of the reactions was categorized as on Table 1. It is important to note that none of the reported reactions have occurred as a result of major blood group incompatibility.

Table 1: Frequency of reactions according to the type of reaction

Type of reaction	Number (Percentage)
Minor allergic reaction	56 (38.9%)
Febrile non-haemolytic transfusion reaction	51 (35.4%)
Anaphylaxis	2 (1.4%)
Transfusion associated dyspnoea	7 (4.9%)
Acute pain reaction	11 (7.6%)
Transfusion associated circulatory overload	4 (2.8%)
Non-specific reactions/ Others	13 (9%)
Total	144 (100%)

Regarding the symptomatic management of transfusion reactions, only 65(45.1%) patients were managed appropriately. According to the investigation reports, 42(29.17%) of the above transfusions were not indicated.

Prior to the transfusion, patients' baseline temperature, pulse rate and blood pressure were recorded in 89(61.8%), 122(84.72%) and 121(84.03%) cases respectively and during transfusion those parameters were recorded only in 50(34.72%), 66(45.83%) and 67(46.53%) patients. Those parameters were measured and documented in every patient after discontinuing the transfusion.

DISCUSSION

Blood product transfusion is generally beneficial; however, unwanted adverse effects could occur, and they are termed transfusion reactions. The majority of transfusion reactions are mild and do not cause significant harm. But in some patients, morbidity and mortality is increased by transfusion reactions. It is important to rule out sinister transfusion reactions, while other reactions could be managed symptomatically. This study aimed to assess the initial clinical management of patients who had a transfusion reaction.

Results of the study show that most of the transfusion reactions, 121 (84%), are due to red cell transfusions. The reason for this is that the commonest blood product used is a red cell unit. A similar study done in Malaysia has also revealed that the commonest type of reactions occurred in the red cell transfusions, which accounted for 111 cases out of 149 [4]. Furthermore, it has been shown that the commonest type of reaction is allergic reactions, followed by febrile non-haemolytic transfusion reactions. It is comparable to this study; however, they have not analyzed symptoms or the management of transfusion reactions. Another study carried out in South India also showed that allergic reactions and febrile non-haemolytic transfusion reactions are more common than other types [5]. As far as the symptoms of transfusion reactions are considered, the highest frequencies are with urticaria and

fever, which are again compatible with the previous studies.

In a suspected transfusion reaction, transfusion must be immediately discontinued, and in order to be sure the right blood product was administered, a repeat document check must be carried out. The remaining blood products are returned to the blood bank with a post-transfusion sample from the patient. Meanwhile, the patient is given symptomatic management. For instance, when the predominant clinical feature is fever, the patient should be given paracetamol, while chlorpheniramine is indicated for features of allergic reactions. This study shows that symptomatic management is rational only in 45.1% of cases. The commonest cause for this finding is the use of chlorpheniramine and hydrocortisone in most of the reactions, irrespective of the clinical symptoms, failing to recognize the reaction type accurately. Although similar studies on management are lacking, one study has revealed that the ability to recognize a transfusion reaction is not satisfactory [6]. Hence, further research is needed to evaluate the management of transfusion reactions. Furthermore, to improve the reaction management, educational programs are recommended for healthcare professionals. Such interventions are beneficial not only in the treatment of adverse events but also useful for the prevention of adverse events [7].

Another important aspect in transfusion is continuous monitoring of the patient, and it should begin before the initiation of transfusion [2]. Clinical parameters of the recipient, including body temperature, oxygen saturation, pulse rate and blood pressure, must be measured. Fifteen minutes after commencing the transfusion and at the end of the transfusion also parameters must be checked by the involved healthcare professionals, and more frequent monitoring is recommended in critically ill patients. The results of the current study show that body temperature is measured only in 89 patients (61.8%) prior to the transfusion. Non-compliance to this could result in under-recognition of fever during the transfusion. The heart rate and the blood pressure were recorded in 122(84.72%) and 121(84.03%) cases, respectively, which are important in

recognizing the severity of the transfusion reaction event. A study conducted in the United States, covering 660 hospitals, patient vital sign monitoring was completed in 81.6%, which is comparable to the current study [8]. The researchers have highlighted the importance of practice compliance and non-uniformity among the hospitals have been identified as a major challenge. Moreover, blood bank accreditation standards are suggested for every health care institute where blood transfusion is practiced. This is applicable to Sri Lanka as well and it would be easier as Sri Lanka has a centrally coordinating transfusion service.

Rational use of blood and blood products is a preventive strategy for transfusion reactions. [9]. A restrictive transfusion strategy must be encouraged among clinicians. This study also shows that 42 (29.17%) transfusion reactions could have been prevented by adhering to the guidelines. This is more applicable for the plasma products. There are published articles revealing that the mildly abnormal laboratory coagulation studies are not clear indications for FFP transfusion, as it does not necessarily cause active bleeding [10]. Furthermore, researchers have shown that the appropriateness of blood product usage is usually low, and implementation of Patient Blood Management (PBM) policies is needed to increase the appropriateness [11]. In addition, they have highlighted that it reduces the risks of blood transfusion. PBM also ensure the cost-effectiveness of health care management.

It is important to note that the study only includes the reported adverse events. Reporting is a crucial step in the management of transfusion reactions. Haemovigilance, the system of monitoring the unwanted effects of transfusion, is an essential component of the transfusion service to manage transfusion reactions. It enables to analyze the unwanted effects of transfusion and to implement appropriate actions when required. The National Blood Transfusion Service of Sri Lanka also maintains the National Haemovigilance Unit for this mission [12]. Reporting every transfusion reaction to this unit should be more encouraged, and the causes for non-compliance must be evaluated. Multiple studies have shown that underreporting of adverse events is a main barrier

for improving transfusion safety. Research conducted by tracing medical records revealed 393 transfusions have resulted in 17 reactions, and none had been reported [13]. Another study conducted involving 4857 transfusion episodes in four tertiary care hospitals also concluded that the compliance with reporting is poor, and the researchers identified that complete and accurate reporting is a critical need to diagnose and treat transfusion reactions [14]. That evidence highlights the importance of reporting and the need to evaluate in Sri Lanka as well.

CONCLUSION

In conclusion, mild reactions are more common in transfusion reactions, and patients typically only require symptomatic treatment. Monitoring the patient before, during, and after the transfusion should be improved to enhance patient safety during transfusion. Hence, educational programs for transfusion practice, which include training on monitoring the patient during transfusion, should be encouraged. In addition, adherence to indications of transfusion according to the updated guidelines should be promoted among clinicians through awareness programs. Moreover, health professionals must be trained in the management of transfusion reactions. Further studies are recommended to assess the compliance with reporting for transfusion safety in Sri Lanka.

Author declaration

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Conflicts of interest:

The author declares that there is no financial or non-financial conflict of interest.

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As this was a clinical audit for quality improvement, ethics approval was not obtained according to the guidelines.

Statement on data availability:

All data generated during this study are available upon request from the corresponding author.

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