

BLOOD TRANSFUSION REACTION IN PATIENTS RECEIVED WHOLE BLOOD IN IRAQ-DIYALA GOVERNORATE

a Mazin Razooqi Mohammed,

b Mustafa Gheni Taher,

b Fatimah Kadhim Ibrahim AL- Mahdawi

a Bilad Alrafidain University College, Diyala, 32001, Iraq.

b Diyala Unveracity, College of Medicine

a Mazinpath2006@yahoo.com

07703691424

<https://orcid.org/0000-0002-0015-5200>

b Mustafa.gheni.taher@gmail.com

07722055393

<https://orcid.org/0009-0001-5375-2703>

b fatimakad87@gmail.com

07901210827

<https://orcid.org/0000-0002-9077-6157>

Abstract:

Blood transfusion is important in the treatment of recipients in health care services as a life-saving process, even though blood transfusions can be a life-saving treatment, each transfusion carries an intrinsic hazard of reverse reactions, the current research was done to determine adverse transfusion complications after transfusion of blood units to the patient admitted to Baqubah Teaching Hospital in the Diyala - Iraq. Six thousand and four hundred eighty-three bottles of blood were dispensed form blood bank for the period from first January to the end of December 2020, data were collected from the blood monitoring department in Baqubah teaching hospital in Diyala governorate. The results were analyzed statistically by calculating the percentages of positive outcomes for each test. the data didn't show any acute serious advisers' reaction from the blood transfusion.

Conclusion

pre-transfusion compatibility testing and careful selection of blood components can help minimize the risks associated with transfusions.

Keywords: Blood, blood bank, blood group, transfusion reaction, whole blood.

Introduction

Blood is often classified as a specialized form of connective tissue because it consists of cells suspended in an extracellular matrix. It serves several crucial functions in the body, including transporting oxygen and nutrients, removing waste products, regulating body temperature, and



supporting the immune system. It's a vital component of the circulatory system, ensuring the proper functioning of various organs and tissues. [1]. As well as blood transfusion important in the treatment of recipients in health care services as a life- saving process [2]. Even though blood transfusions can be a life-saving treatment, each transfusion carries an intrinsic hazard of reverse reactions [3]. An adverse reaction refers to an unwanted or harmful response that occurs in individuals, typically occurring shortly after the administration of blood or a blood-related medical procedure. These reactions can vary in severity and may include side effects, allergic responses, or other negative outcomes. It's important to monitor and manage adverse reactions to ensure patient safety during blood-related treatments [4,5]. Today, Transfusion-related complications, particularly non-infectious ones, have indeed become a significant concern in developed nations. While great strides have been made in reducing infectious risks through improved screening and testing, non-infectious complications such as transfusion reactions, transfusion-associated circulatory overload (TACO), and iron overload can pose serious threats to recipients [6]. Transfusion reactions can be categorized into acute and delayed reactions based on when they occur relative to the blood transfusion. Acute transfusion reactions (ATRs) typically happen within 24 hours of the transfusion and can include febrile non-hemolytic reactions, acute hemolytic reactions, volume overload, and allergic reactions [7]. Delayed transfusion reactions (DTRs) occur more than 24 hours after the transfusion and can involve different complications such as delayed hemolytic reactions and graft-versus-host disease, among others. It's important for healthcare providers to monitor patients closely during and after transfusions to detect and manage any potential reactions promptly [8]. These complications highlight the ongoing need for stringent safety measures, proper donor screening, and research into safer transfusion practices to minimize the risks associated with blood transfusions, the current research was done to determine adverse transfusion complication after transfusion of blood units to the patient admitted to Baqubah Teaching Hospital in the Diyala - Iraq.

Material and Methods

Six thousand and four hundred eighty-three bottles of blood were dispensed from blood bank for the period from first January to the end of December 2020, data were collected from the blood monitoring department in Baqubah teaching hospital in Diyala governorate. The results were analyzed statistically by calculating the percentages of positive outcomes for each test.

Blood groups test were done to all donor blood units and recipients to determine blood group and Rh types, cross match tests also done by mixed patient's serum with the donor RBCs to confirm their compatibility before transfusion processes.

Results

Six thousand and four hundred eighty-three donor and recipients including in this study, Regarding the age & sex of patients, As shown in Table 1 below, illustrated age range for 6483 patients were range (18-60) years, and their sex include 4902 male (75.6%), and 1581 female (24.4%) "Fig. 1".



Age	18 - 60 years		Total Number
Sex	Male	4902 (75.6%)	6483
	Female	1581 (24.4%)	

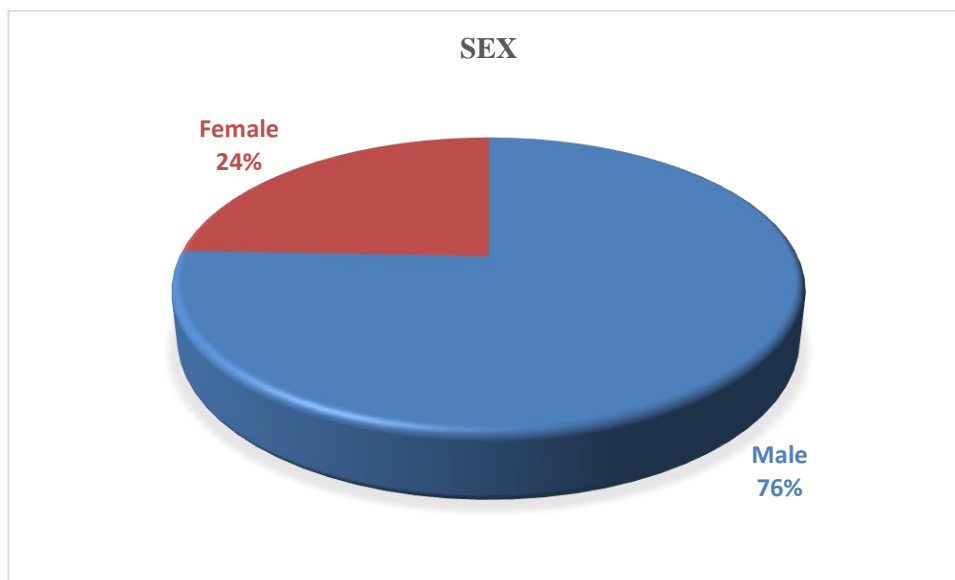


Figure (1) Sex percentage of patients

Regarding the ABO & Rh. Of 6483 blood bottles dispensed which was as following, 2220 (34.2%) O+, 1779 (27.4%) A+, 1497 (23%) B+, 400 (6.1%) AB+, 199 (3%) O-, 206 (3.1%) A-, 147 (2.2%) B-, and 35 (0.5%) AB- table 2, “Fig. 2”

Blood groups	O+	A+	B+	AB+	O-	A-	B-	AB-
Numbers	2220	1779	1497	400	199	206	147	35
percentage	34.2%	27.4%	23%	6.1%	3%	3.1%	2.2%	0.5%

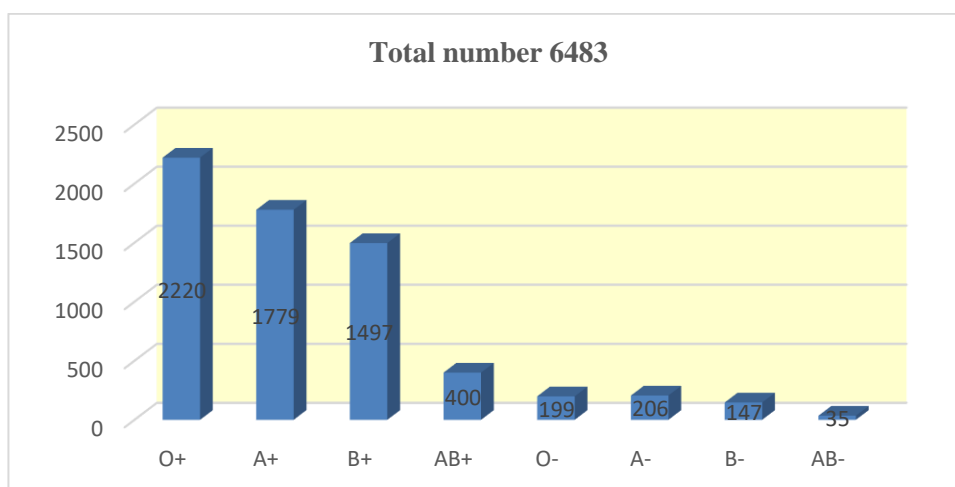


Figure (2) ABO & Rh. Of Total blood bottles dispensed



Regarding the blood transfusion complication. Collected data after the end of all transfusion processes, did not show any acute transfusion reactions or delayed transfusion reactions, but rather a slight change in the vital activities, a localized rash, and mild sensitivity that did not need treatment which appear only in 21 patients, the highest percentage appeared for recipient blood type O + (38%), and A + (33.3%) and less in B + (19.4%), as well as AB + and B- (4.7%). As shown in table 3 & figure 3 below:

Table (3) patient with complications after transfusion								
Total (21)	O+	A+	B+	AB+	O-	A-	B-	AB-
Numbers	8	7	4	1	0	0	1	0
Percentage	38%	33.3%	19.4%	4.7 %	0%	0%	4.7%	0%

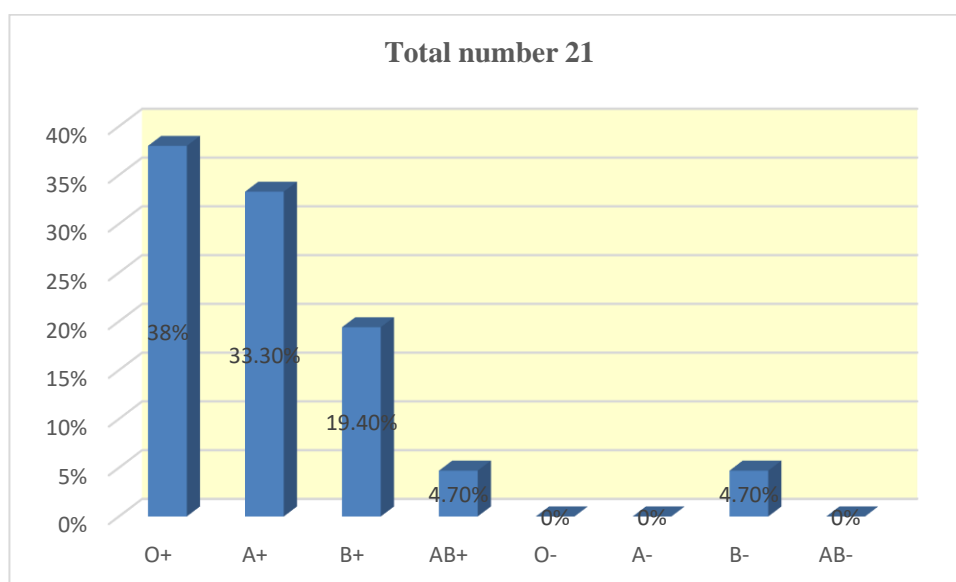


Figure (3) Percentage blood groups with complications

Discussion

In this study, we determine adverse transfusion complications after the transfusion of blood units to the recipient, the data didn't show any acute serious advisers' reaction from the blood transfusion. And this can be explained due to high level of medical service provided by the blood bank in the hospital and the accuracy of the tests conducted in hospital blood bank, which ensured the matching of blood between donor and recipient and reduced the percentage of transfusion reaction. Pre-transfusion testing is essential to ensure the safety of the procedure and prevent adverse transfusion reactions [9,10].

Furthermore, a slight change in the vital activities, a localized rash, and mild sensitivity that did not need treatment which appear only in 21 patients. These changes may vary depending on the individual's health status, the type of blood components transfused, and other factors [11,12].



A localized rash after a blood transfusion could be caused by various factors, including: allergic reaction to components in the donated blood, such as proteins or preservatives, can lead to a rash, which manifested as an allergic reaction to the transfusion and may present as a rash which clinically not significant and not need any treatment [13]. Sensitivity or mild reactions after a blood transfusion can occur for various reasons. And can manifested clinically as : mild fever which can sometimes occur as a natural response to the introduction of foreign substances into the body, receiving a large volume of blood too quickly can lead to fluid overload, causing symptoms like shortness of breath or swelling [14].It's important to report any adverse reactions to healthcare providers during or after a transfusion, as they can provide appropriate care and investigate the cause. Blood type O is considered the universal donor, which means individuals with blood type O can donate blood to people with any other blood type (A, B, or AB) [15]. This can explain the highest percentage of complication appeared for recipient blood type O + (38%), Type O blood can be transfused to individuals with other blood types, it's not the ideal match [16]. The immune system may recognize the A or B antigens in the type O blood as foreign, potentially leading to an immune response [17]. This can result in a transfusion reaction, although it tends to be less severe than if there's a major ABO incompatibility (e.g., giving type A blood to a type B recipient) [18].

Conclusion

It's important for healthcare providers to closely monitor patients during and after a blood transfusion to detect and manage any adverse reactions promptly. Additionally, pre-transfusion compatibility testing and careful selection of blood components can help minimize the risks associated with transfusions. In cases where type O blood is used as a universal donor, close monitoring and precautions are taken to reduce the chances of adverse reactions.

References

1. Vijayvergiya G, Fulzele P, Vairyamoorthy N.(2021). Study of blood donor complications after whole blood donation in our center. *Int J Res Med Sci*;9:243-7.
2. AL-Mahdawi, F. K. I., Mohammed, M. R., & Mahmood, M. M. (2022, October). Screening tests for voluntarily donated blood in Diyala governorate. In *AIP Conference Proceedings* (Vol. 2398, No. 1, p. 040030). AIP Publishing LLC.
3. Ackfeld, T., Schmutz, T., Guechi, Y., & Le Terrier, C. (2022). Blood Transfusion Reactions—A Comprehensive Review of the Literature including a Swiss Perspective. *Journal of Clinical Medicine*, 11(10), 2859.
4. Sahu, S., & Verma, A. (2014). Adverse events related to blood transfusion. *Indian journal of anaesthesia*, 58(5), 543.
5. Mafirakureva, N., Khoza, S., Mvere, D. A., Chitiyo, M. E., Postma, M. J., & Van Hulst, M. (2014). Incidence and pattern of 12 years of reported transfusion adverse events in Zimbabwe: a retrospective analysis. *Blood Transfusion*, 12(3), 362.
6. Hendrickson, J. E., & Hillyer, C. D. (2009). Noninfectious serious hazards of transfusion. *Anesthesia & Analgesia*, 108(3), 759-769.



7. Gauvin, F., Lacroix, J., Robillard, P., Lapointe, H., & Hume, H. (2006). Acute transfusion reactions in the pediatric intensive care unit. *Transfusion*, 46(11), 1899-1908.
8. Kleinman, S., Chan, P., & Robillard, P. (2003). Risks associated with transfusion of cellular blood components in Canada. *Transfusion medicine reviews*, 17(2), 120-162.
9. Oldham, J., Sinclair, L., & Hendry, C. (2009). Right patient, right blood, right care: safe transfusion practice. *British Journal of Nursing*, 18(5), 312-320.
10. White, J. (2009). Pre-transfusion testing. *ISBT Science Series*, 4(1), 37-44.
11. Tinegate, H., Birchall, J., Gray, A., Haggas, R., Massey, E., Norfolk, D., ... & Allard, S. (2012). Guideline on the investigation and management of acute transfusion reactions Prepared by the BCSH Blood Transfusion Task Force. *British journal of haematology*, 159(2), 143-153.
12. Clarke, G. (2017). Investigation and management of non-infectious transfusion reactions. *ISBT Science Series*, 12(1), 80-86.
13. Sahu, S., & Verma, A. (2014). Adverse events related to blood transfusion. *Indian journal of anaesthesia*, 58(5), 543.
14. Sirianni, G., Perri, G., Callum, J., Gardner, S., Berall, A., & Selby, D. (2019). A retrospective chart review of transfusion practices in the palliative care unit setting. *American Journal of Hospice and Palliative Medicine®*, 36(3), 185-190.
15. Barty, R. L., Pai, M., Liu, Y., Arnold, D. M., Cook, R. J., Zeller, M. P., & Heddle, N. M. (2017). Group O RBC s: where is universal donor blood being used. *Vox Sanguinis*, 112(4), 336-342.
16. Oyedeyi, O. A., Adeyemo, T. A., Ogbenna, A. A., & Akanmu, A. S. (2015). Prevalence of anti-A and anti-B hemolysis among blood group O donors in Lagos. *Nigerian Journal of Clinical Practice*, 18(3), 328-332.
17. Seltsam, A., Wagner, F. F., Salama, A., & Flegel, W. A. (2003). Antibodies to high-frequency antigens may decrease the quality of transfusion support: an observational study. *Transfusion*, 43(11), 1563-1566.
18. Marco-Ayala, J., Gómez-Seguí, I., Sanz, G., & Solves, P. (2021). Pure red cell aplasia after major or bidirectional ABO incompatible hematopoietic stem cell transplantation: to treat or not to treat, that is the question. *Bone Marrow Transplantation*, 56(4), 769-778.

