
Profile of transfusions carried out in the medical clinic and intensive care units of a hospital in the central hinterland of Ceará

Perfil das transfusões realizadas nas unidades de clínica médica e terapia intensiva de um hospital do sertão central do Ceará

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ABSTRACT

Objective: This study aimed to describe the profile of transfusions carried out at the Hospital Regional do Sertão Central (HRSC) in 2022 in the medical clinic sector and intensive care unit (ICU). **Background:** Transfusion of blood components is a procedure with significant risks, which is why the World Health Organization (WHO) encourages the development of programs for the proper management of blood components through Patient Blood Management strategies, optimizing the use of these products. In this context, the transfusion agency at HRSC collects information and generates indicators to assess the level of adherence to its safety protocol. **Methods/Materials:** Data of transfusions in adults were collected by recording quality indicators of the HRSC transfusion agency and then a retrospective, descriptive, and quantitative analysis were conducted. **Results:** This study analyzed 1072 transfusions, with 53.3% occurring in men and 46.7% in women, with a mean age of 42 years. The ICU requested 79.1% of the transfusions. Symptomatic anemia and bleeding were the cause. Concentrated red blood cells (73%) were most required, 49.6% of which were O+. In terms of criticality, 54% of the requests were urgent. Sixteen adverse reaction notifications were observed. **Conclusion:** Analysis of the transfusions made it possible to identify and describe the characteristics of the transfusion process in a tertiary referral hospital in a city in the interior of Ceará. The data survey showed that the team maintained good levels of adherence to the transfusion indication protocol but with possible underreporting of transfusion reactions.

Keywords: Transfusion; Blood bank; Epidemiology;

RESUMO

Objetivos: Este estudo teve como objetivo descrever o perfil das transfusões realizadas no Hospital Regional do Sertão Central (HRSC) no ano de 2022 no setor de clínica médica e na unidade de terapia intensiva (UTI). **Contexto:** A transfusão de hemocomponentes é um procedimento com riscos significativos, motivo pelo qual a Organização Mundial da Saúde incentiva o desenvolvimento de programas para o manejo adequado dos hemocomponentes por meio de estratégias de Patient Blood Management, otimizando o uso destes produtos. Nesse contexto, a agência transfusional do HRSC coleta informações e gera indicadores para avaliar o nível de adesão ao seu protocolo de segurança. **Métodos/Materiais:** Foram coletados dados de transfusões em adultos por meio do registro de indicadores de qualidade da agência transfusional do HRSC e, posteriormente, foi realizada uma análise retrospectiva, descritiva e quantitativa. **Resultados:** Este estudo analisou 1072 transfusões, sendo que 53,3% ocorreram em homens e 46,7% em mulheres, com média de idade de 42 anos. A UTI solicitou 79,1% das transfusões. As principais causas foram anemia sintomática e sangramento. Os concentrados de hemácias (73%) foram os mais solicitados, sendo 49,6% de O+. Em termos de criticidade, 54% dos pedidos eram urgentes. Entre as transfusões avaliadas foram observadas 16 notificações de reações adversas. **Conclusões:** A análise das transfusões permitiu identificar e descrever as características da condução do processo de transfusões em um hospital de referência terciária de uma cidade do interior do Ceará. O levantamento de dados mostrou que a equipe manteve bons níveis de adesão ao protocolo de indicação transfusional, mas com possível subnotificação de reações transfusionais.

Palavras-chave: Transfusão; Banco de sangue; Epidemiologia;

INTRODUCTION

Transfusion of blood components, particularly concentrated red blood cells, is one of the most common medical procedures performed during hospitalization (Tormey; Hendrickson, 2019). This practice is changing with the aim of reducing inappropriate use of those products, reducing complications for patients, and reducing the waste of blood components, which are valuable and still scarce. In addition, blood components need to undergo strict quality control to reduce the risk of reactions that can be serious, causing functional limitations and sometimes leading to death (Quintana-Diaz et al., 2020).

The WHO highlights the risk of blood transfusions, it has the potential of lead to acute or delayed complications and still transmit infections. The risks associated with transmission can be reduced by minimizing the number of unnecessary transfusions. Therefore, the WHO encourages the creation of a proper transfusion management program through Patient Blood Management (PBM), which consists of a set of strategies aimed at minimizing waste and optimizing the indication of blood components. The PBM strategy is based on applying a restrictive transfusion indication model, properly diagnosing and treating anemia, reducing blood loss, and using blood recovery technologies (Biagini, 2021).

Indicators are important sources of information that reflect health conditions and can be used in managing health services. The implemented indicators are important to monitor the rational use of blood to transfusion adverse events (Brito et al., 2022). The transfusion agency of the Hospital Regional do Sertão Central (HRSC) decided to collect complete information of the required transfusions to generate indicators. This study aimed to describe the profile of transfusions in 2022, in patients over the age of 18, in the medical clinic and intensive care unit (ICU) sectors of the HRSC. In this way, it aims to identify the number of transfusions carried out, their indications, and the occurrence of transfusion reactions, compared with the national and international literature.

METHODOLOGY

This study is a retrospective, descriptive, and quantitative analysis of transfusions performed in the medical clinic and ICU sectors of the HRSC. Data were collected from the HRSC Transfusion Agency Quality Indicator database. The transfusions analyzed occurred in patients aged > 18 years in 2022.

Data were collected from the records kept by the transfusion agency during the process of quality management and transfusion safety. The research was conducted with the authorization of the team lead and the coordinator of the HRSC transfusion agency and was authorized by the local ethics committee.

Transfusions carried out on patients aged > 18 years who were hospitalized between January and December 2022 in the Medical Clinic and Intensive Care Unit of the HRSC and whose information was fully included in the transfusion agency database were included.

Transfusions carried out in other sectors of the HRSC, transfusions in patients under 18 years of age, and transfusions that did not have complete records in the database were excluded.

As a result, when analyzing the database of quality indicators of the HRSC transfusion agency, 1465 transfusions were observed in 2022, and the inclusion and exclusion process was performed with the selection of 1072 transfusions that were selected for analysis.

RESULTS

Evaluated Sectors

The medical clinic unit has 39 inpatient beds, the special care unit (SCU) has 10 long-stay beds, and the intensive care unit (ICU) has 20 beds. In 2022, there were separate wards and ICU beds for COVID, which were also included. The hospital does not provide urgent and emergency care, and all patients are admitted through the regulation center of the Ceará State Government.

Patient characteristic

The study included 1072 transfusions, and the average age of the patients was 42 years. Of these transfusions, 572 (53.3%) were performed on male patients and 500 (46.6%) on female patients. In terms of where they were requested, 849 (79.1%) came from the ICU, and 47 of these came from the COVID ICU. The medical clinic sector had 223 (20.8%) transfusion requests, five of which were from COVID wards and 82 from the SCU.

With regard to the indications for transfusions, the main diagnosis recorded for packed red blood cells (PRBC) was symptomatic anemia, with a total of 351 requests, followed by bleeding with 182 requests and hemodynamic instability with 113. With regard to other blood components, the main indications for fresh frozen plasma were acute bleeding in 134 requests, pre-surgery in 36 requests, and coagulation disorders in 31 requests. The main indications for platelet concentrates were bleeding in 35 requests, followed by thrombocytopenia in 09 and pre-surgery in 07 requests. All requests for cryoprecipitate were due to bleeding events.

About transfusions

Of the 1072 transfusions, 783 were PRBC, corresponding to 73% of the total, with an average hemoglobin of 6.24 g/dL (95%CI: 5.22-7.26 g/dL). In addition, there were 219 (20.4%) units of fresh frozen plasma, 65 (6.06%) units of Platelet Concentrates, and 5 (0.46%) units of cryoprecipitate.

Requests for blood components were classified as extremely urgent, urgent, and non-urgent. As a result, 43 (4%) transfusions were requested in extreme urgency, 579 (54%) were requested in Urgency and 450 (42%) were requested as Non-Urgent / Reserve.

With regard to ABO and Rh D typing, the majority of red blood cell concentrates were O positive, totaling 532 (49.6%), followed by A positive with 358 (33.3%), B positive with 77 (7.1%), O negative with 60 (5.5%), A negative with 25 (2.3%), AB positive with 18 (1.6%), and B negative with 2 (0.1%).

The evaluation of blood component indication compliance showed that 1037 (96.7%) transfusions were in accordance with the clinical transfusion indication protocol, so their data were filled in correctly, while 35 (3.3%) were outside the clinical indication standards. Of these non-compliant transfusions, 27 (77.14%) had no clinical justification for transfusion for hemoglobin values greater than 7.0 g/dL, 07 (20%) had platelet concentrates and did not provide adequate clinical justification for the need for transfusion based on the platelet value indicated, and 02 (5.71%) had fresh frozen plasma and did not provide adequate justification for transfusion based on the prothrombin activation time and activated partial thromboplastin time values.

Reported Adverse Reactions

Among the 1072 transfusions evaluated, 16 (1.49%) reactions were identified, of which 11 were mild intensity non-hemolytic febrile reactions, 03 were allergic reactions, 01 was bacterial contamination and 01 was an unspecified immediate reaction. In terms of severity, there were four moderate reactions, 12 mild reactions and there were no severe reactions or suspected transfusion-related deaths occurred. The main kind of blood component were the red blood cell concentrates related to 15 reactions and the other reaction was related to a fresh frozen plasma. Regarding the conclusion of the reactions, none were confirmed, 08 were classified as probable, 09 as possible and 01 as unlikely according to Manual for the National Hemovigilance System in Brazil of 2022 (Brasil, 2022).

DISCUSSION

It can be seen that most transfusions occurred in middle-aged patients, with an average of 42 years. The incidence of transfusions differed minimally according to sex, as previously described by Karafin et al. (2018).

The majority of transfusions took place in the ICU, which is to be expected and has already been described by Raasveld et al. (2023), who described that between 2019 and 2022, the ICU was responsible for the greatest number of requests for blood components since they are usually more serious patients.

PRBC were the most requested blood components, corresponding to 73% of all requests in the period analyzed, which are similar to those described by Quintana-Diaz et al. (2022) and Sharif et al. (2020). The frequencies of other blood components were fresh frozen plasma, platelet concentrate, and cryoprecipitate. These findings are similar to the data from the 2019 survey of transfusions in Brazil, which showed 2,951,212 transfusions, of which 1,809,913 were PRBC (61.32%) (Ceará, 2021).

Among the indications for transfusions according to each component, requests for PRBC, as described by Karafin et al. (2018) and Quintana-Diaz et al. (2022), had symptomatic anemia as the main indication, with 44.5% of the requests. The main indication for other blood components was acute bleeding in 61.1% of requests for fresh frozen plasma, 53.8% of requests for platelets, and 100% of requests for cryoprecipitate. The other indications included hemodynamic instability, pre-surgery, coagulation disorders, and other cytopenia.

Regarding ABO and Rh D blood typing, 49.6% were O+ and 33.3% were A+, totaling 82.9% of the total registered. This finding is compatible with that described by Arruda et al. (2019), who found that in the population of Ceará, the majority of donors were O+ (45.46%) and A+ (33.17). These data are also in line with the findings of other national studies, such as those by Beiguelman (2003) and De Souza et al. (2014). These data are similar to the frequency of ABO blood types described in the European population (AABB, 2020).

Adherence to the HRSC transfusion indications protocol was 96.7% of the total evaluated, and no failures were identified in the recording of patient identification on transfusion requirements, a fact that must be related to the integration of the transfusion requisition with the electronic medical record system, reducing the risk of errors in identification and recording on the requisition. As for the transfusion indication data, much of it was inaccurate and difficult to assess using the data reviewed by the local transfusion agency team, which analyzes all the transfusions carried out and summarizes their indications after reviewing the cases. This was similar to that described by Souza (2013), who reported that the majority of transfusion indications were considered inconclusive due to a lack of clinical and laboratory information.

When evaluating the transfusion indication data and the hemoglobin values of the requests, with an average of 6.24 g/dL, they are in line with PBM strategies (Mueller et al., 2019), as it guides the transfusion threshold for PRBC for critically ill and clinically stable patients to be < 7 g/dL.

Regarding the criticality of transfusion indications, the number of requests in the urgent mode exceeded those in the non-urgent mode, with 579 (54%) in the urgent mode, 450 (42%) in the non-urgent mode, and 43 (4%) in the extremely urgent mode. This may be due to the greater demand from the ICU sector when referrals can occur in the context of greater criticality. However, it is possible to see deliveries not carried out within the time required for each situation, which occurred in 198 (13.51%) of the transfusions, of which 155 (78.28%) were urgent or extreme urgency. The main causes of the delay were refusal by the sector itself, the need for more complex tests, and the absence of a compatible blood component at the transfusion agency.

Regarding transfusion reactions, non-hemolytic febrile reactions were the most frequent, as described by Karafin et al. (2018). The number of transfusion reactions

expected in Brazil is between 0.03% and 0.05%, according to the hemovigilance bulletin no. 7 (Brasil, 2015), which means that there is an adequate level of reported transfusion reactions. However, reports from other centers show that the transfusion reaction notification rate varies between 26% and 2.5% in several international centers (Gelaw; Woldu; Melku, 2020). In Brazil, it is speculated that there is a high rate of underreporting of transfusion reactions, which is an important point for transfusion agencies (Ackfeld et al., 2022).

Analyzing all above, the service ensures patient safety and clinical suitable results. Although there are points for improvement that have been identified, which can be used to work on intervention strategies in the work planning of transfusion agencies.

LIMITATIONS OF THE STUDY

As this is a retrospective epidemiological study, the evidence only shows factors that remain unchanged over time, such as sex, age, and ABO and RhD antigens. As a result, there is no correlation of temporality or a cause-effect relationship since it only describes the findings.

The data were obtained through direct analysis of the database of indicators recorded by the HRSC transfusion agency. As a result, there is a possibility of sampling and data observation bias. Despite the risks, throughout the study, there was double-checking in the collection and recording of information, to minimize the occurrence of errors.

It is important to mention that, as this is a retrospective study, there are still limitations in the records in the tables, as well as contributing to some underreported adverse reactions, since there were no observations by the research team.

CONCLUSION

Analysis of the profile of the 1072 transfusions carried out at the HRSC in 2022 in the medical clinic and ICU sectors made it possible to identify and describe the characteristics of how transfusions are carried out in a tertiary referral hospital in a country town of Ceará.

The data survey showed that the service achieves good adherence to the strategies proposed by its internal organization, with adherence to the protocols proposed for

transfusion, which are in line with the PBM guidelines, as well as identifying points for improvement, such as the need to better train the care team to identify transfusion reactions and raise awareness about urgent and extremely urgent care. Consequently, the service ensures patient safety and clinical results.

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