



Immediate transfusion incidents: an integrative literature review

Incidentes transfusionais imediatos: revisão integrativa da literatura

Incidentes transfusionales inmediatos: revisión integrativa de la literatura

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ABSTRACT

This integrative literature review had the objective of analyzing research on the occurrence of immediate transfusion incidents and implemented hemovigilance actions. Data were obtained through database searches of LILACS, MEDLINE and PubMed, for the period of 1980 to 2009, in the Portuguese, English and Spanish languages. We identified 1382 articles, of which 29 met the established inclusion criteria. Of these articles, 20 (69.0%) were retrospective transversal, 8 (27.5%) were prospective, and one (3.5%) was a case control study. In regard to approach, the studies were classified into two thematic foci: types of immediate transfusion incidents, and implemented hemovigilance actions associated with the types of immediate transfusion incidents. The analysis of this work highlighted the higher incidence of febrile nonhemolytic reactions and allergic reactions, the advancement in hemovigilance actions, and greater concern with the quality of care in hemotherapy.

Keywords: Blood transfusion; Blood safety; Surveillance

RESUMO

Este estudo de revisão integrativa da literatura teve como objetivo analisar as pesquisas que abordam a ocorrência de incidentes transfusionais imediatos e ações de hemovigilância implantadas. Os dados foram obtidos por meio de busca nas bases de dados – LILACS, MEDLINE e PUBMED – abrangendo o período de 1980 a 2009, nos idiomas português, inglês e espanhol. Foram identificados 1.382 artigos, dos quais 29 atenderam aos critérios de inclusão estabelecidos. Destes artigos, 20 (69,0%) eram estudos retrospectivos transversais, 8 (27,5%) prospectivos e um (3,5%) caso-controle. Em relação à abordagem, os estudos foram classificados em dois focos temáticos: tipos de incidentes transfusionais imediatos e ações de hemovigilância implantadas associadas aos tipos de incidentes transfusionais imediatos. A análise dos trabalhos destacou a maior ocorrência de reação febril não hemolítica e alérgica, avanço em ações de hemovigilância e maior preocupação com a qualidade da assistência hemoterápica.

Descritores: Transfusão de sangue; Segurança do sangue; Vigilância

RESUMEN

Este estudio de revisión integrativa de la literatura tuvo como objetivo analizar las investigaciones que abordan la ocurrencia de incidentes transfusionales inmediatos y acciones de hemovigilancia implantadas. Los datos fueron obtenidos por medio de la búsqueda en las bases de datos – LILACS, MEDLINE y PUBMED – abarcando el período de 1980 a 2009, en los idiomas portugués, inglés y español. Fueron identificados 1,382 artículos, de los cuales 29 atendieron a los criterios de inclusión establecidos. De estos artículos, 20 (69,0%) eran estudios retrospectivos transversales, 8 (27,5%) prospectivos y un (3,5%) caso-control. En relación al abordaje, los estudios fueron clasificados en dos focos temáticos: tipos de incidentes transfusionales inmediatos y acciones de hemovigilancia implantadas asociadas a los tipos de incidentes transfusionales inmediatos. El análisis de los trabajos destacó una ocurrencia mayor de reacción febril no hemolítica y alérgica, avance en acciones de hemovigilancia y mayor preocupación por la calidad de la asistencia hemoterápica.

Descriptores: Transfusión sanguínea; Seguridad de la sangre; Vigilancia

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INTRODUCTION

The transfusion of blood components is, usually, an effective means of correcting a temporary deficiency of red blood cells, platelets and coagulation factors ⁽¹⁾.

In the history of medicine, there are ancient accounts that describe attempts to treat patients with blood. However, the field of transfusion therapy is relatively recent and has only been developed during the second half of the twentieth century ⁽²⁾.

Although in some clinical situations, transfusion represents the only way to save a life, or to rapidly improve a serious disease, the transfusion process involves risks with the potential occurrence of transfusion incidents, whether immediate or delayed; and these vary from mild to severe and involve the risk of death ⁽³⁾.

The immediate transfusion incidents occur during transfusion or within 24 hours thereafter, and are reportable: acute hemolytic reaction, nonhemolytic febrile reaction, allergic reactions (mild, moderate, severe), volume overload, reaction to bacterial contamination of the bag, noncardiogenic pulmonary edema, hypotensive response, and nonimmune hemolysis ⁽⁴⁾.

Transfusion incidents that occur 24 hours after the completion of the transfusion are called late, and among these are: delayed hemolytic reaction, hyperhemolysis syndrome, post-transfusion purpura, graft versus host disease related to transfusion, alloimmunization and iron overload ⁽⁵⁾.

It has been observed that various transfusion incidents are not identified and reported by health teams and, as a consequence, they generate health problems of patients and increase the risk of receiving blood transfusions. The need to know the unique aspects of transfusion incidents opens up possibilities of seeking and constructing evidence that validates and can be incorporated into clinical practice. Based on these, we conducted a study with the objective of analyzing research on the occurrence of immediate transfusion incidents and implemented hemovigilance actions .

METHODS

This was an integrative literature review, the development of which used the following guiding questions: what types of immediate transfusion incidents occur with most frequency, and what hemovigilance actions are implemented?

This type of review is a comprehensive method, which ranges from review of theoretical and empirical literature, through studies with different methodological approaches. Six distinct phases comprise this method of research: identification of the theme; sampling or literature search; categorization of studies; assessment

of studies included in the integrative review; and, interpretation of the results and synthesis of knowledge evidenced in the analyzed articles or presentation of an integrative review ⁽⁶⁾.

The identification of the theme is the first phase of integrative literature review, and its purpose is to guide the conduct of an elaborate review ⁽⁶⁾.

Articles were selected by searching three databases: *Latin American and Caribbean Health Sciences Literature*, *Medical Literature Analysis and Retrieval System On-line* and *PubMed*.

Inclusion criteria for this study consisted of articles published in Portuguese, English and Spanish, with abstracts available in the selected databases, for the period of 1980 to 2009. We opted to exclude literature review and case study articles, because they presented limitations for answering the guiding questions proposed by the authors. Observational studies were considered more adequate for analysis; they demonstrated results that met the objectives proposed in this study.

The methodological consistency of the articles was not evaluated in this study, although it was an integrative literature review.

The following descriptors used were : *transfusão de sangue*, *hemovigilância*, blood transfusion, safety and surveillance. The search was conducted using online access, and 1,382 studies were identified, with 29 studies that met the proposed inclusion criteria constituting the sample of this research.

The articles were grouped into two thematic foci: those who wrote about the types of immediate transfusion incidents that occurred and those that addressed the hemovigilance actions implemented associated with the occurrence of immediate transfusion incidents.

RESULTS

Of the 29 studies analyzed, 20 (69.0%) were retrospective transversal, 8 (27.5%) were prospective, and one (3.5%) was a case-control study. Of all the studies analyzed, 12 (41.0%) were published between 2006 to 2009, 12 (41.0%) from 2002 to 2005, and 5 (18.0%) from 1990 to 2001. Seven (24.1%) were from the United Kingdom, 4 (13.8%) from France, 5 (17.2%) from other European countries, 6 (20.7%) from Central America, 1 (3.4%) from Australia, and 2 (6.9%) from the United States, Canada and Brazil, respectively.

Selected articles were published in 18 different journals, including national (5.5%) and 17 international (94.5%) publications. Among the 18 journals used as a means to disseminate the articles we analyzed, 12 were specific to hemotherapy (66.7%). Regarding the language of the disseminated studies, 23 were published in English (79.3%), 5 in Spanish (17.2%), and 1 in Portuguese (3.5%).

Table 1. Distribution of the studies, according to the type of research and thematic focus addressed. 1980 – 2009.

Studies	Type of research	Thematic focus addressed
Pruss et al. ⁽⁷⁾ ; Michlig et al. ⁽⁸⁾ ; Martinez et al. ⁽⁹⁾ ; Siegenthaler et al. ⁽¹⁰⁾ ; Canadian Paediatric Society ⁽¹¹⁾ ; Recibo et al. ⁽¹²⁾ ; Climent-Peris et al. ⁽¹³⁾ ; Fung et al. ⁽¹⁴⁾ ; Stainsby et al. ⁽¹⁵⁾ ; Chapman et al. ⁽¹⁶⁾ ; Rivera Ramos et al. ⁽¹⁷⁾	Retrospective transversal	Types of immediate transfusion incidents that occurred
Keller-Stanislawski et al. ⁽¹⁸⁾ ; Stainsby et al. ⁽¹⁹⁾ ; Hervé et al. ⁽²⁰⁾ ; Flesland ⁽²¹⁾ ; Rasonglès et al. ⁽²²⁾	Retrospective transversal	Types of immediate transfusion incidents that occurred
Silva Ballester et al. ⁽²³⁾	Prospective transversal	- Hemovigilance actions occurring with immediate transfusion incidents - Types of immediate transfusion incidents that occurred
Callera et al. ⁽¹⁾ ; Fernandez Luis et al. ⁽²⁴⁾ ; Gauvin et al. ⁽²⁵⁾ ; Osselaer et al. ⁽²⁶⁾ ; Win et al. ⁽²⁷⁾ ; Willaert et al. ⁽²⁸⁾	Prospective transversal	- Types of immediate transfusion incidents that occurred
Regan et al. ⁽²⁹⁾ ; Williamson et al. ⁽³⁰⁾	Retrospective transversal	- Hemovigilance actions occurring with immediate transfusion incidents - Types of immediate transfusion incidents that occurred
Munksgaard et al. ⁽³¹⁾ ; Brecher et al. ⁽³²⁾	Retrospective transversal	- Types of immediate transfusion incidents that occurred
Cunha Junior ⁽³³⁾	Prospective transversal	- Types of immediate transfusion incidents that occurred
González ⁽³⁴⁾	Case control	- Types of immediate transfusion incidents that occurred

The data in Table 1 present the classified articles, according to the already indicated focus themes.

DISCUSSION

Types of immediate transfusion incidents that occurred

In this classification, we included 29 (100%) studies addressing the occurrence of immediate transfusion incidents.

Some of the work identified confirmed a higher incidence of febrile nonhemolytic reaction from the immediate transfusion incidents reported. They affirmed red blood cells to be the blood component involved in the majority of these transfusion reactions, taking into consideration that it is distributed in larger quantities when compared to other blood products. The allergic reaction was presented as the second most common type of transfusion incident occurring, manifested primarily by pruritus and urticaria^(1, 8, 10, 17-18, 24-26, 34).

Other studies highlight a greater occurrence of allergic reactions to that of febrile nonhemolytic reactions^(11-13, 15, 23, 34). Some authors relate these reactions to platelet transfusion in a significant number of cases^(15, 28) and other studies do not mention the type of blood component involved^(13, 23).

We observed the influence of platelets on the occurrence of transfusion reactions when compared to incidents arising from transfusion of red blood cells, fresh frozen plasma or cryoprecipitate^(8, 10, 15, 22).

One infrequent type of transfusion incident, non-cardiogenic pulmonary edema, or *transfusion related acute lung injury* (TRALI), has emerged as a major cause of morbidity and mortality, being responsible for an increased frequency of death among cases of reactions reported in Germany in the years 1997 to 2007⁽¹⁸⁾. It should be noted that the origin of TRALI is due to the presence of anti-leukocyte antibodies in the plasma of donors, especially in women donors. The greatest risk of occurrence of TRALI is with the transfusion of fresh frozen plasma and platelets^(14, 16, 19, 21). In a study conducted in England, between 1996 and 2004, evidence was sought in laboratory analysis of blood from donors of 96 suspected cases of TRALI, in which anti-leukocyte antibodies were detected in the plasma of 64 donors among the 96 cases analyzed⁽²⁷⁾.

The immediate transfusion incidents are more frequent after transfusion of blood products that were not subjected to the process called leukoreduction, in which there is a reduction of leukocytes and cytokines present in the blood bag. Moreover, it is observed that the number of reports of immediate transfusion reaction is higher in patients with multiple transfusions^(7, 9, 26).

In a study carried out in Cuba between 1992 and 1993, it was found that of 1,403 transfusions in the period analyzed, there were 45 transfusion reactions in 34 patients, and of these only one did not receive multiple transfusions⁽⁹⁾.

Of the studies reviewed, three had the objective of assessing the occurrence of bacterial contamination of blood components. One of these verified that for the

notification of deaths related to the reaction by bacterial contamination of blood products in the United States of America in a given period of time, the greater number of deaths were observed related to transfusion of contaminated concentrated platelets⁽³²⁾. Another study examined six years of utilization of a triage system for contaminated concentrated platelets, confirming that in the occurrence of 0.38% of contaminated platelet components that were produced in the period, the majority of bacteria belonged to normal skin flora⁽³¹⁾. In a study that evaluated the prevalence of bacterial contamination in two thousand units of concentrated platelets in a transfusion service of a university hospital, contamination was observed in 0.40% of the sample, with 65.0% of cases involving gram-negative bacterias⁽³³⁾. Two of the three studies found a predominance of gram-negative bacterial contamination of blood products⁽³²⁻³³⁾.

In the study that analyzed the first two annual reports of the system of notification of transfusion reactions in the United Kingdom, *Serious Hazards of Transfusion* (SHOT), between 1997 and 1998, there was an occurrence of 191 cases with an identification error of the receiver, which led to 62 incidents of incompatibility of the ABO group. In the years 1999-2000, 97 cases of ABO incompatibility were reported to SHOT, of which there were four deaths and 29 cases of immediate morbidity⁽²⁹⁻³⁰⁾. The increase in cases of ABO group incompatibility, reported to SHOT, may suggest greater activity of health professionals in hemovigilance, concerning the notification.

Hemovigilance actions implemented associated with the occurrence of transfusion incidents

In this thematic focus, we included three (10.34%) studies that dealt with implemented hemovigilance actions associated with the occurrence of immediate transfusion incidents. Of these, two were retrospective and one was prospective.

The countries within the United Kingdom, in 1999, implemented a strategy of protocols to prevent transfusion errors, annual reports on hemovigilance, coded wristbands to identify patients thereby avoiding transfusion errors, and improvement in education and training of professionals involved in blood transfusion⁽²⁹⁾.

By using concentrated platelets treated with a photochemical system of pathogen inactivation, it was observed that of the 1,950 units of platelets treated and used in a year, there were 19 adverse events classified as non-hemolytic febrile reaction or allergic reaction. There were no cases of TRALI or bacterial contamination of the bag detected using this system during the study period⁽²²⁾.

In France, after the implantation of a system for leukoreduction of red blood cells concentration, there was a reduction of 40% of febrile nonhemolytic reactions⁽²⁰⁾.

In a prospective study in a municipal hospital in Cuba, in the period from 2003 to 2005, it was observed that after creating the Transfusion Committee and developing a training program for health professionals working in hemotherapy, an increase in transfusion safety occurred, with a decrease from 15 transfusion reactions in 2002, to six in 2005⁽²³⁾.

FINAL CONSIDERATIONS

Studies on the occurrence of immediate transfusion incidents and hemovigilance are scarce, possibly due to recent issues in transfusion practice, although the work in this area has been intensified since 2002.

In relation to the occurrence of immediate transfusion incidents, studies showed that the febrile nonhemolytic reaction and allergic reaction were the most common, and when the actions of hemovigilance were in place, it is believed that there was progress and greater concern with quality of transfusion care, although methodological consistency of these studies was not an area of analysis within this study.

It is evident that studies in the field of hemovigilance are focused on reporting and occurrence of various types of transfusion incidents; there is a need to focus on prevention, appropriate management and treatment of such incidents.

It is suggested that more studies be conducted to add to the scientific evidence, and thus to support new possibilities of delivering greater security for clients who require transfusion therapy, providing quality care, and adding new knowledge to the health professionals working in this area.

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