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Comparative Haemovigilance Requirements of Brics Countries with that of USFDA and EMA Guidelines

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A B S T R A C T

Background: Transfusions are necessary for the management of variety of acquired and hereditary diseases, are indicated by the physicians of almost all specialties, but consists potential threats such as infections and immunological reactions. **Objective:** The study was focused on the history, organization, various aspects and reported cases of hemovigilance programmer of various countries. Both Donor side and recipients hemovigilance were analyzed with emphasize on adverse effects /infections associated with transfusion and blood donation based on comparative study. **Methods:** Comparison of various aspects of hemovigilance programmers of BRICS countries with that of USFDA and EMA guidelines on hemovigilance was done. Suitable method of implementation for a successful hemovigilance programmer and reported cases of adverse donor as well as recipient reactions were analyzed. **Results:** The functioning and implementation of the HvPI was studied with respect to 40blood banks in southern Kerala. All of them were licensed for the handling of whole blood, and 23 for the handlingofcomponents.6 blood banks processed 100 % blood into components, of which is packed RBCs, platelets and FFPs had the highest demand. A functioning Hospital transfusion committee (HTC) was in place in majority of the blood banks. 25 banks had positive feedback on the HvPI, though only 11 were currently enrolled in the same. ASWOT analysis was conducted and recommendations made for an efficient Hemovigilance program of India after comparison of the program in BRICS countries with USFDA and EMA guidelines. **Conclusion:** It is of paramount importance to have an efficient and fully functioning Hemovigilance system in place in order to regulate all aspects of blood transfusion such as donor recruitment, safety and quality assurance of blood and implementation of proper blood transfusion practices. Such a system has to function at many levels starting from individual blood banks, all the way up to the Ministry of Health, ensuring proper data collection and transfer up the hierarchy and efficient policy-making and implementation the other way round. The implementation of guidelines, regular training programmers for all professionals involved, and above all, a judicious effort in spreading awareness about the importance of hemovigilance among the general public and medical professionals, to maximize the benefit in the health care sector.

Keywords: *Hemovigilance, blood bank, Hospital transfusion committee, USFDA and EMA.*

A R T I C L E I N F O

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C O N T E N T S

1. Introduction

Blood is a connective tissue in the body that serves a myriad of functions ranging from transportation of gases and metabolites to and from the body cells, infection control, thermoregulation, etc.(1) It is made up of two components plasma and the cells. The cellular component can be further subdivided into RBCs, WBCs and platelets. Plasma contains water about 90–92% and other dissolved substances. Blood transfusion refers to the procedure of infusing blood or it components into patients for purposes of emergency management, therapeutic purposes, to improve the quality of life. It has an interesting history as it was not till recently that this became an almost routine procedure in the medical profession. The first transfusions done mostly involved just drinking of blood on a spiritual basis, with no scientific rationale for the same. Intravenous injection of blood was first introduced by Christopher Wren in 1657.

Animal blood was mostly used during the early days. Transfusions were associated with a high rate of adverse effects due to the nature of the blood as well as the technique, including deaths. This led to a legal ban on the procedure, lasting for over 100 years. It was an English doctor named James Blundell in 1818, who is credited with bringing blood transfusion back to prominence when used the procedure for patients with postpartum hemorrhages saving 4 out of 10patients. Even then the procedure was associated with a lot of adverse reactions and technical difficulties. Following advancements such as the discovery of blood groups and cross-matching techniques, blood transfusion has become a much safer procedure now. Blood transfusion includes not just that of whole blood but also its components[1-9]. These include packed red blood cells for anemia, blood loss, etc., fresh frozen plasma, cryoprecipitate for coagulopathy, platelets for bleeding due to platelet disorders. PRBCs require fractionation of plasma. Precipitate obtained by thawing FFP (Plasma in the frozen stage)is called Cryoprecipitate. Hemovigilance refers to a system that encompasses the broad spectrum of activities, starting from collection of blood to component separation to transfusion practices and monitoring and surveillance.

Need of the study

India has hemovigilance program in place since 2012.While this initiative has brought around its fair share of improvements in the field of blood transfusion services in India, there is still a lot of room for improvement. This study aims at analyzing a few key indicators of this program, to understand the areas of progress as well as to delineate the factors that need improvement. Further, we have tried to compare the important guidelines of our program with Hemovigilance programs of BRICS countries, US-FDA and European countries, in order to understand any possible advantages and deficiencies that we have, and to outline possible guidelines to make the current program more successful and efficient in its implementation[10-16].

2. Materials and Methods

Table 1

Step-1	Groundwork	To gather information regarding the transfusion reactions, blood safety, Haemovigilance etc from experts
Step-2	Review of literature	To collect articles on related topics from books, internet, blood bank etc, To analyze and interpret the articles for relevant information to set precedent for the preparation
Step-3	Materials &Methods 1. Extensive literature survey	To collect information from websites of related agencies on requirements ,regulations, legislations etc
	2. Field Surveys	• On Adverse transfusion and donor reactions reported by blood banks • On impact and implementation of haemovigilance on blood banks
Step-4	Compilation	To compile collected information after checking, reviewing and analysis,

Step-5	Result and Discussion	Comparison of Haemovigilance requirements of countries
Step-6	Summary and Conclusion	To propose for a successful haemovigilance stem for India[17]

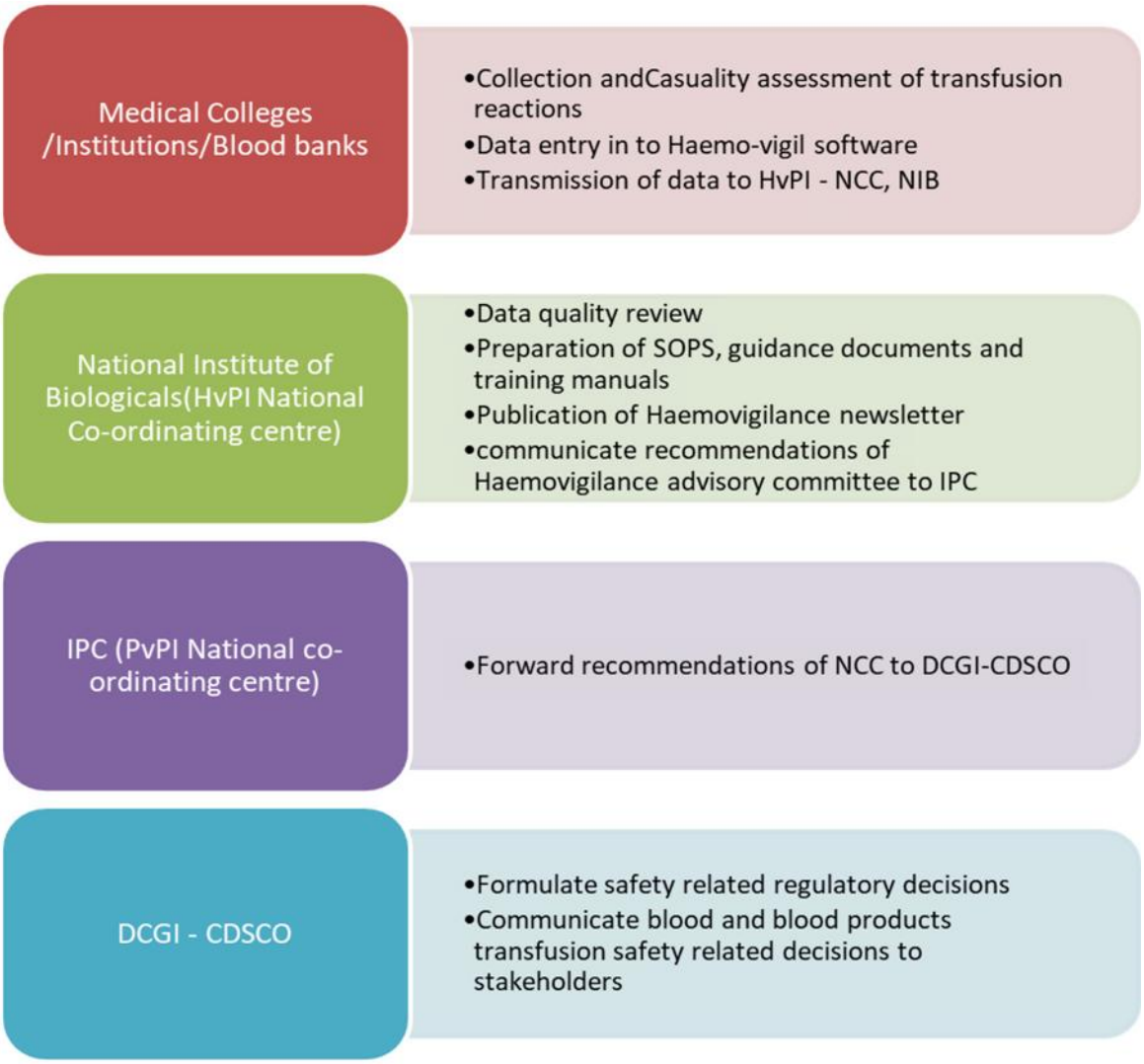

Figure 1: Roles and Responsibilities of Hv PI units

3. Results and Discussion

Results of this study revealed that a sum of 625605 units were prepared by the participated blood banks during the period. Out of which 455201 units were transfused. The analysis projects that the RBC is the main product found a major place in transfusion during the study period. 181256 units (39.8%)of RBC was transfused over the specified period of time. Followed by fresh frozen plasma (FFP)128177 units (28.2%), platelets 111254 units (24.4%), whole blood 16656 units (3.7%), cryoprecipitate 11581 units(2.5%),pooled platelets 6277units (1.4%) were Transfused.

While analyzing the frequency of transfusion reaction, it was observed that totally 814 reactions (0.18%) were reported out of 455201units of transfusion. Among them, febrile non-FNHTR is the major one, 569 (69.9%) out of 814 reactions reported was FNHTR. It constitutes 0.125% in total units of transfusion. The second major reaction reported was anaphylaxis. 143 reactions of anaphylaxis (17.6%) were reported. It constitutes 0.030% in total units of transfusion; followed by 60 reactions (07.4%) of post transfusion purpura (PTP), 42 reactions (05.2%)of transfusion associated dyspnoea (TAD) were reported during the study period.

With regard to the number of units transfused, it was found that febrile reaction was seen in 13 out of 10000 units, anaphylactic/hypersensitivity reactions were observed in 3 out of 10000 units, PTP was seen in 1 out of 10000, TAD is 9 in 100000 units of transfusion. It was also noted that all the patients were recovered from the transfusion reactions.

The study was aimed on analyzing the type and frequency of reported TRs and it was found that reactions such as

FNHTR were mainly reported. These reactions are less harmful but major reaction such as TRALI may also occur. Corrective steps are to be taken to prevent such incidences.

Obviously, the present study may not reflect the true incidence because of under reporting of transfusion reactions. The prevailing disease conditions in the transfusion recipient are the major hindrance in the accurate diagnosis of transfusion reactions. All these limitations can be circumvented by implementing proper and effective haemovigilance system. Utilizing newer technologies, recruiting enough skilled staff with positive attitude, 100% setting up of operational transfusion committees at Hospital level and continuous scientific awareness to the staffs of medical and paramedical department will definitely improve in energizing HV system and reduction of the number of adverse transfusion reactions to a great extent.

Result of evaluation of adverse donor reactions

Initially, a total number of 246092 (94.34%) blood donations and 14752 (5.66%) donor rejections were found during the study period.

Result of evaluation of vasovagal and hypotensive reactions: In the present study, a total of 246092 donations were reported for the period of study. Among them, 233711 (95%) donations were done by males and remaining 12381(5%) donations were given by females. Totally, 999(0.41%)vasovagal reactions were reported out of 246092 donations. These reactions were observed in929 (93%) males and 70 (7%) females. From this it was clear that 0.56% in total female population and 0.39% in total male population were affected with vasovagal reactions (Table18).

Analysis of prevalence of vasovagal reactions based on the age of donors revealed that, majority, 474 (47.4%) vasovagal reactions were noticed in the group of21-30yrsand it was 328 (32.8%) in the age group of 18-20. 136 (13.6%) reactions were noted in the age range of 31-40. In the group of 41-50yrs, 54 reactions (5.4%) were found. Only 7 reactions (0.7%) were noted in the age groupof51-60 (Table19).

It was found that, 483 reactions (48.3%) occurred during blood donation, 509(51%) reactions were noticed at post donation phase. In the pre donation stage, only 7 reactions (0.7%) were found.

This study assessed the vasovagal & hypotensive reaction which occurred in donors were with special attention to their gender, age and the phases of donation to identify the appropriate action stop revent such type of reactions. Analysis of blood products handled by these blood banks revealed that all theblood banks under study were licensed for handling the whole blood. 23 out of 40blood banks were licensed for handling blood components includes 5 blood banks possess the apheresis facility also. It was found that only six blood banks (26.08%) process 100% blood into components. This study suggests that the clinicians are to be made aware about the advantages of components and optimal use of blood as the blood is scares.

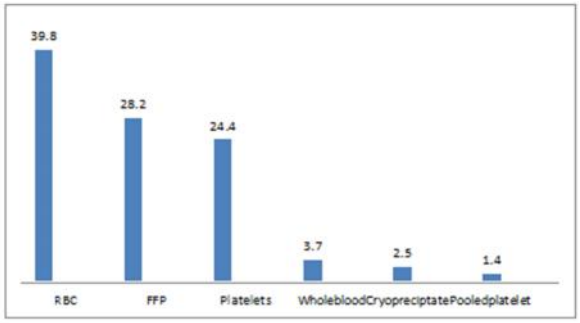

Figure 1: Percentage distribution of blood products issued for transfusion

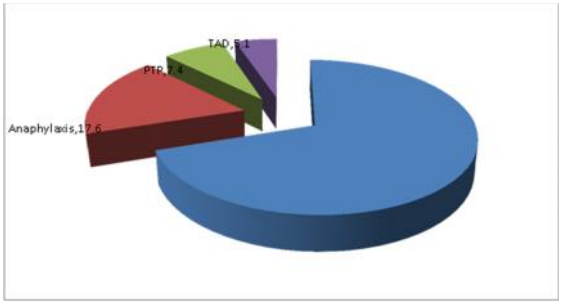

Figure 2: Adverse transfusion reactions reported

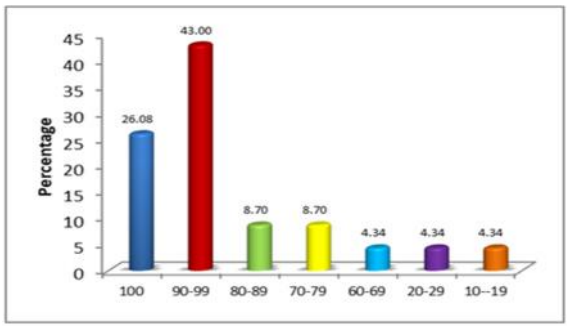

Figure 3: Percentage of blood processed in to components by blood banks understudy

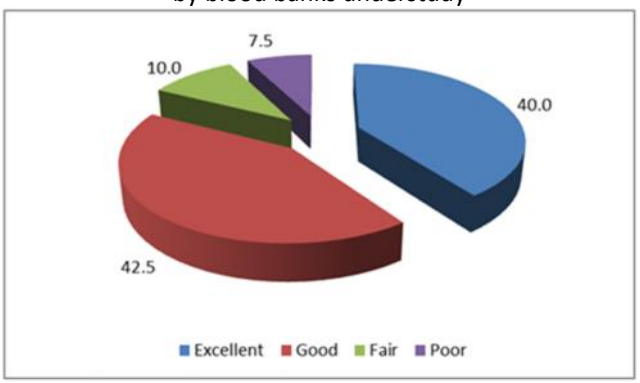

Figure 4: Response of blood banks with regard to demand of components in own clinical facility

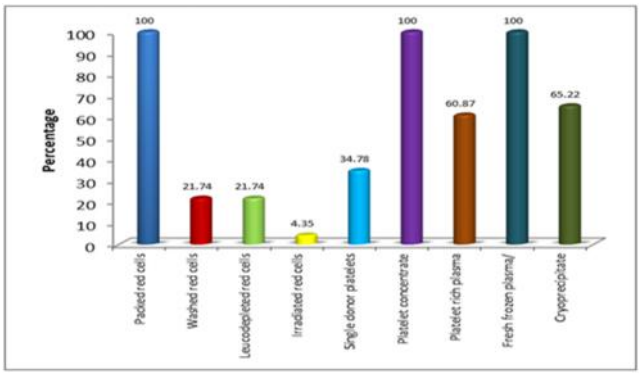

Figure 5: Types of blood components prepared by blood banks

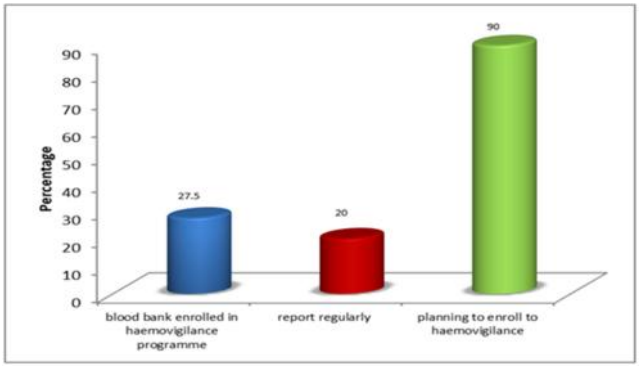

Figure 6: Responses of participants in regard to haemovigilance programme of India

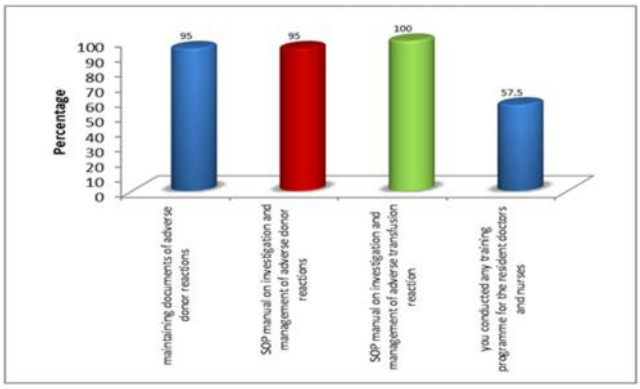

Figure 7: Questions and replies of blood banks regarding with adverse trans fusion reaction

4. Conclusion

The present study indicated various important steps requiring immediate attention. They are Local policies and guidelines should develop at institutional level based on national guidelines. Different aspects of transfusion chain such as indication for administration, chance of contraindications, triggers, dose, technical matters, alternative measures for blood and documentation should becovered[18]. Safety aspects of blood transfusion like identification of patient samples, bed-side checks, after transfusion monitoring and steps in case of an adverse reaction. Encouraging the staff to report each and every adverse event related to transfusion is essential one. Implementation of newer technology like Leuco reduction to reduce the FNHTR, irradiation in the case of transplantation is the results of proper haemovigilance system. It should be non-punitive and blood banks should be convinced that the data is used only for assessment and improvement of transfusion practices. Hospital transfusion committee should ensure mandatory reporting of transfusion reactions. Attention should be given in the area where in under reporting, poor implementation of haemovigilance, reporting of only serious reactions, avoiding minor reactions etc. are observed.

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