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Haemovigilance – building one from none

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Haemovigilance is a surveillance system which aims to detect and analyse adverse events and reactions in the blood transfusion chain to improve blood safety by instituting corrective and preventive actions. Setting up such a system is a complex task, and it involves both organizational and operational aspects, which may vary between countries depending upon the structure and regulation of blood transfusion services. First and foremost, it should be a part of the National Blood Policy. The organizational structure should ideally have governmental oversight to the programme through its Ministry of Health or equivalent authority. Haemovigilance advisory committees are required to give direction to the programme. During the phase of planning, the following issues need to be addressed: i) whether reporting of all adverse events in the transfusion chain is required, ii) whether reporting will be voluntary or mandatory, iii) what would be the flow of information, iv) adoption of definitions of adverse events and reactions as per international consensus, v) uniform reporting formats and vi) requisite resources. At the reporting end, awareness and training of staff who would be involved in haemovigilance activities needs to be conducted. A validated system for collection, collation and analysis of haemovigilance data is required. Mechanisms for regular publications of haemovigilance reports with recommendations for better transfusion practices should be put in place. This would help in directing policy decisions to improve blood safety. It should also be aimed to establish linkage with the international haemovigilance network and database for exchange of information between member countries.

Key words: transfusion medicine, transfusion reactions, quality management

Introduction

The definition of haemovigilance as per international consensus is, 'a set of surveillance procedures covering the whole transfusion chain from the collection of blood and its components to the follow-up of its recipients, intended to collect and assess information on unexpected or undesirable effects resulting from the therapeutic use of labile blood products and to prevent their occurrence and recurrence' (http://www.ihn-org.net) [1]. Haemovigilance thus looks at the information on the safety of the whole transfusion process from blood collection to component preparation and its final administration at the bedside. A practical approach is usually to focus on a limited area of the transfusion process, recipient haemovigilance or reporting of adverse transfusion reactions to begin with. This scope has been further extended to cover 'near-miss' events and 'rapid alerts'. 'Near-miss' events are errors or deviations from standard procedures or policies that are discovered before the start of transfusion and that could have led to a wrongful transfusion or to a reaction in the recipient [2]. 'Near-miss' events draw attention to error-prone areas in the transfusion process. Rapid alerts help to disseminate information vital for transfusion safety, rapidly, to the participants for corrective action in the shortest possible time. The European Commission has recently approved 'Rapid Alert Blood' between member states [3]. It is equally important to recognize adverse events in donors, as the blood supply is entirely dependent on donors. Standardized definitions are now made available by the ISBT working party

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for donor complications and help provide a framework to aid process improvement in this area[4].

Japan and France were amongst the first countries to set up national haemovigilance systems, followed soon by the United Kingdom and several other European counties. In 1998, the European Haemovigilance Network (EHN) was established. As haemovigilance systems developed in other regions of the globe, the EHN was transformed into an International Haemovigilance Network (IHN) in 2009 [1]. Analysis of haemovigilance data has led to several blood safety initiatives and the positive impact of haemovigilance in improving transfusion practices over the last two decades has made haemovigilance an integral component of the quality system in transfusion medicine.

Establishment of a haemovigilance system is a complex process. The spectrum of the blood transfusion services is wide, and there are multiple stakeholders along the transfusion chain. The implementation and scope of haemovigilance will depend upon blood safety priority in a national health framework, the financial and technical resources to initiate and sustain the haemovigilance system, co-operation from various stakeholders and the level of awareness and training of involved personnel.

The organizational set-up

Review of haemovigilance systems across the world reveals wide differences in the way haemovigilance has been organized in various countries. It could be through legislation where notification of adverse events is mandatory as in France, where the ANSM (French National Agency for Medicines and Health Products Safety) under the French Ministry of Health inspects blood establishments and ensures continuous surveillance of adverse events related to labile blood components and plasma-derived medicinal products [5]. The system has a three-level organization. At the local level, a haemovigilance correspondent or a haemovigilance nodal physician is identified in each healthcare facility and blood centre. The reporting is web based. Regional haemovigilance co-ordinators have been appointed in each of the 29 administrative regions of France, and the national co-ordination is carried out by the ANSM. In the United Kingdom, a haemovigilance system based on voluntary reporting – the 'Serious Hazards of Transfusion (SHOT) was initiated in 1996. It is an independent professionally led programme. The Steering Group gives strategic direction to the programme, ensures confidentiality of data and makes recommendations for blood safety. The SHOT Working Expert Group analyses the data and publishes annual haemovigilance reports. Transfusion-related adverse events are reported from hospitals by either transfusion practitioners or laboratory directors. Donor events are reported by the blood centres. From 2006 onwards, it became mandatory to report all serious adverse reactions to the competent authority for blood safety – Medicines and Health Regulatory Agency (MHRA). Presently, the system in UK combines mandatory reporting of all serious adverse transfusion reactions to MHRA and voluntary reporting of all reactions to SHOT [6]. In Japan, life-threatening serious events are reported directly to the Blood Advisory Council of the Ministry of Health. For all other transfusion- and donor-related events, the haemovigilance programme is co-ordinated by the Japanese Red Cross Society (JRCS) through its Safety Vigilance Division at the Blood Service Headquarters. Reports from medical institutions are sent to the Safety Vigilance Division through Japanese Red Cross blood centres. The JRCS performs the data analysis and submits the final report to the Blood Advisory Council and feedback to the reporting medical institutions [7]. Thus, haemovigilance could be organized by the governments, professional organizations or blood suppliers, or there may even be public–private partnerships. In India, the haemovigilance system was developed in 2012 under the broad ambit of pharmacovigilance programme with oversight by the Indian Pharmacopoeia Commission which is an autonomous institution within the Ministry of Health and sets standards for drugs including blood and blood products within the country. A central haemovigilance core committee co-ordinates with the national advisory and executive committees and the reporting blood centres [8]. In the United States, haemovigilance is a component of the Biovigilance initiatives, [9] within the National Healthcare Safety Network. It thus becomes apparent that governance mechanisms for haemovigilance systems are diverse and will depend upon the organizations overseeing blood safety or more broadly biological product safety/drug safety/healthcare safety, within a country.

Scope and characteristics of haemovigilance

The scope of haemovigilance could be as wide as the transfusion chain itself including complications in donors during blood collection, errors in blood processing, testing and release, adverse events in transfusion recipients, near misses and rapid alerts. Or else it could begin in a restricted manner with focus on one aspect of the transfusion chain. In most of the countries, haemovigilance began with reporting of adverse reactions in recipients. In few of the countries, mechanisms for reporting donor complications commenced first. In both the situations, the scope has been expanded to include donor complications and recipient reactions. To bring about objectivity in the categorization of reactions and their grading of severity, haemovigilance systems need to adopt standard international definitions.

The basic approach to a haemovigilance system may be considered as follows.

What is to be reported?

Recipient and/or donor and/or process haemovigilance

For reporting of transfusion reactions in patients, categorization of reactions as per international consensus is essential. This will allow information sharing and data comparison between different countries. Transfusion reactions are categorized according to their time of onset into acute (within 24 h) and delayed reactions (after 24 h). These are further subdivided according to their pathogenesis into infectious and non-infectious. It is useful to refer to the definitions agreed upon by the ISBT Working Party on Haemovigilance and accepted by the IHN [2]. The reactions are further graded as per their severity depending upon their response to conservative management or risk to life or mortality. Reactions are also assessed on the strength of their association with the transfusion, that is imputability. The association is definite when there is conclusive evidence beyond doubt that the reaction was caused by the transfusion, probable when evidence is favourable, possible when causation is indeterminate, doubtful or unlikely and excluded. Some might choose to report only serious adverse transfusion reactions, while others may consider reporting all reactions. In some systems, all adverse events such as 'near misses' and errors not necessarily leading to reaction are also reported. These events offer the opportunity of identifying error-prone areas in the clinical transfusion process [10]. Complications of blood donation are also drawing increasing attention with the aim of improving donor safety. Standard definitions have been made available by the Working Group on Donor Vigilance of the ISBT-WP on Haemovigilance in collaboration with IHN and AABB Donor Haemovigilance Working Group [4].

Who reports and to whom?

The roles and responsibilities of the staff at various levels of the reporting mechanism need to be defined. In case of recipient haemovigilance, the bedside transfusion staff is to be encouraged for early recognition and reporting of the transfusion reaction to the blood centre from where blood/blood component was issued. This would facilitate relevant investigations, preparation of a final transfusion reaction report and reporting to the regional/national haemovigilance office/centre. It would always be advisable to conduct a pilot with few well-established blood centres and hospitals before upscaling the programme to include majority or all the blood centres. In some countries, transfusion nurses or transfusion practitioners are authorized to send haemovigilance reports. Reports of complications in blood donors would be reported by the blood centre staff.

What are the options for reporting?

Will haemovigilance be voluntary or mandated by law? This would be a policy decision by the regulatory authorities for blood safety. It could even be a mixed option, where there could be an obligation to report serious adverse reactions and complications. Where reporting is mandated by law, no doubt all blood centres or departments of transfusion medicine would submit haemovigilance reports, but the fear of reporting to a government office may lead to underreporting of some serious adverse reactions. In a voluntary system, participation depends upon the choice of professionals; hence, there may be limited enrolment of blood centres or hospitals. In the initial years, there may be drawbacks with either system, but as the confidence of the professionals is gained, there are ultimately no differences in participation.

The reporting formats

The haemovigilance report needs to capture a large amount of data – clinical information, transfusion details, laboratory investigation results, type of adverse reaction, severity and imputability. The details are necessary for subsequent analysis of data, yet the format must be user friendly. In India, a one page simplified Transfusion Reaction Reporting Form (TRRF) was introduced to encourage reporting. However, at the time of analysis of reports, the expert group was unable to review the clinical and laboratory investigation details on the basis of which the transfusion reaction option was selected in the form. The TRRF has been modified to capture all relevant details for a more meaningful and accurate data analysis [11]. It is useful to study the reporting formats available from well-established haemovigilance systems and then adapt the one most suitable for use in a particular country.

Awareness and training

Awareness about the concepts and objectives of haemovigilance to all stakeholders is essential for the success of the programme. Training of staff who will be involved in the reporting chain is necessary. Bedside staff, whether medical officers, residents or nursing staff need to be educated about the signs and symptoms of transfusion reactions so that these can be recognized and reported. Staff of the departments of transfusion medicine

will need to put in place protocols for appropriate investigations in the patient and on the product. Similarly, training is required for preparation and submission of transfusion reaction reports to the designated haemovigilance office. Accurate categorization of donor complications will be expected from blood centres.

Data management

Haemovigilance reports contain sensitive information about transfusion reactions, errors, near misses and donor complications. Hence, security and confidentiality of data is essential. In many systems, identity of clinician and patient is excluded from the reports. The principal aim of haemovigilance is systems improvement; hence, individuals are neither named nor blamed. The WHO guidelines on adverse event reporting [12] emphasize the need for a non-punitive approach. Report submission could be online through a webpage or the completed forms sent through mail. Online reporting requires access to computers and internet connection, and this could be limitation in some of the developing countries.

The reports received from reporting institutions have to be scrutinized and reviewed by expert groups for analysis and collection and collation of data. How many reports are consistent with standard definitions of reactions and complications? What is the frequency of adverse events, the severity, imputability, patient/donor demographics (age, gender, clinical diagnosis) and the implicated blood products? The risk assessments may be expressed in relation to number of blood units collected/issued/transfused, depending upon what statistics is available. Data analysis should ideally be followed by preparation of an annual haemovigilance report and specific recommendations by expert group for reducing reactions and errors. It is also necessary to include these recommendations into guidelines and policies for blood safety. Implementation of specific recommendations would then serve as a base for comparison purposes with subsequent annual reports.

International linkages

The concern for blood safety is a global issue. Documentation, reporting and analysis of adverse events yield valuable information for introduction of measures to enhance safety in all aspects of the transfusion chain. Haemovigilance systems around the world are diverse although all have a common goal. It is useful to exchange information, harmonize definitions, compare methods for data analysis and build up international database on transfusion-related adverse events. The IHN and ISBT-WP on haemovigilance are collaborating to realize these objectives. The World Health Organization in association with IHN and ISBT has published an Aide-Memoire to assist countries intending to set up national haemovigilance systems. A checklist has been prepared incorporating the following key elements: leadership and governance, organization and co-ordination, haemovigilance in the donation and provision of blood and blood products and haemovigilance in clinical transfusion [13].

Conclusion

The positive impact of haemovigilance in improving transfusion practices over the last two decades has made haemovigilance an integral component of the quality system in transfusion medicine. Establishment of a haemovigilance system is a complex process. The spectrum of the blood transfusion services is wide, and there are multiple stakeholders along the transfusion chain. Review of haemovigilance systems across the world reveals wide differences in the way haemovigilance has been organized in various countries. It could be through legislation or reporting on a voluntary basis. The roles and responsibilities of the staff at various levels of the reporting mechanism need to be defined. For reporting of transfusion reactions in patients, or complications in blood donors, categorization of reactions and complications as per international consensus is essential. Awareness about the concepts and objectives of haemovigilance to all stakeholders is essential for the success of the programme.

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