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A haemovigilance team provides both significant financial and quality benefits in a University Hospital

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ABSTRACT

Background: Haemovigilance is the process of surveillance of blood transfusion procedures including unexpected hazards and reactions during the transfusion pathway in both donors and recipients. The haemovigilance team aims to increase blood transfusion safety and to decrease both morbidity and mortality in donors and recipients. The team collects data about transfusion reactions and incidents, instructs the involved health workers and assures the tracing of blood components. The haemovigilance team at the University Hospitals Leuven has played a pioneering role in the development of haemovigilance in Belgium Although the literature about safety and quality improvements by haemovigilance systems is abundant, there are no published data available measuring their financial impact in a hospital. Therefore, we studied the costs and returns of the haemovigilance team at the University Hospitals Leuven.
Material and methods: This study has a descriptive explorative design. Research of the current costs and returns of the haemovigilance team were based upon data from the Medical Administration of the hospital. Data were analyzed descriptively.
Results: The haemovigilance team of the University Hospitals Leuven is financially viable: the direct costs are covered by the annual financial support of the National Public Health Service. The indirect returns come from two important tasks of the haemovigilance team itself: correction of the electronic registration of administered blood component and improvement of the return of conform preserved blood components to the blood bank.
Discussion: Besides safety and quality improvement, which are obviously their main goals, the haemovigilance team also implies a financial benefit for the hospital.

1. Introduction

The aging of the population, increasing supportive care, an increase of surgical procedures and myelosuppressive therapies are challenges of modern health care [1]. The estimation is that the need for blood transfusions will increase by 30% over the next 15 years. Fifty percent of the patients receiving a blood transfusion will be older than 70 years and 25% of the transfusions will be intended for people older than 80 years [2]. Blood components are expensive, but they can be lifesaving. Despite the motivation for a restrictive transfusion practice, the demand for transfusions will continue to grow over the next decades. At the same time, the number of blood donors is stabilizing or is even declining [2–4].

The introduction of rigorous conditions for blood donations and more screening tests to guarantee the safety of blood, are factors that cause an increase in costs of blood components. Also, the stringent criteria in context of traceability and transport, make that blood components are expensive and scarce products in healthcare. All those incentives made the implementation of a system of haemovigilance indispensable. Furthermore, the need to control seriously unexpected hazards to donors and recipients is also an argument for the introduction of a haemovigilance system [2,3,5,6].

Haemovigilance systems have been successfully implemented in various countries worldwide. In Belgium, haemovigilance is one of the tasks of the Federal Agency for Medicines and Health Products (FAMHP). The goal of haemovigilance is based upon current legislation, scientific guidelines and evidence-based medicine. The 'function' haemovigilance 'as is' is defined by the Belgian Federal Public Health Service as a multidisciplinary team consisting of a

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nurse, a physician with clinical expertise and the person responsible for the hospital blood bank [7–9].

Since January 2011 the Belgian Federal Public Health Service provides a lump financing for the function haemovigilance based upon three criteria. First, there is a lump sum for the technical equipment (software), necessary for the tracking processes. Secondly, this sum is complemented with a variable amount, which takes into account the total number of accredited beds in the hospital and thirdly, the total number of administered blood components in the hospital [9–11].

A haemovigilance team is now introduced in most of the Belgian hospitals. Research on the work of a haemovigilance team, their costs and effects is limited. Also, the funding from the government for the function haemovigilance is in its early stade. Little is known about the cost-effectiveness of a haemovigilance team as there are no publications about this topic. In this study we investigated the costs and effects of a haemovigilance team in the concrete situation of the University Hospitals Leuven.

2. Materials and methods

2.1. Setting

The study was performed at the University Hospitals Leuven in Belgium, a hospital with 1.803 beds and 8.800 employees. Each year, there are about 45.000 blood transfusions. The hospitalization services with high transfusion activities are the departments of anesthesiology, oncology, hematology and the critical care departments of intensive care and the emergency department.

The haemovigilance team of the University Hospitals Leuven was introduced in 2002 at the hospital's own initiative. Since then, this team has been playing a pioneering role in the extension of haemovigilance systems in Belgium. From 2011 on, the University Hospitals Leuven, together with all Belgian hospitals, receive funding from the government for the haemovigilance activities. The team consists of 1.5 full time equivalent nurses, 0.3 full time equivalent physician and 0.09 fulltime equivalent person responsible for the hospital blood bank.

The tasks of the haemovigilance team consist of preventing, reporting and analyzing adverse events and incidents in the transfusion process. Furthermore, the team provides computerized procedures for the control and traceability of blood components and gives regular education to improve expertise and awareness of the hospital workers. Finally, the haemovigilance team has to report serious unexpected hazards and transfusion reactions to the national authorities.

In 2005, an electronic blood tracking system was introduced at the hospital with barcode scanning in order to increase the safety in the administration of blood components. The in hospital blood transfusion process consists of many steps, each one of them prone to mishaps and errors. After the clinician requests a blood transfusion through the electronic patient file, a first step in the blood tracking procedure is scanning the moment the blood component is being picked up at the blood bank (situated in the hospital). After transporting the blood unit to the ward, a second scanning step is necessary upon arrival. Just before starting the transfusion, a third (bedside) scanning step is required. At that moment, the electronic control system checks if the unique blood unit is intended for the right patient.

The University Hospitals Leuven require all the non-administered blood components (erythrocyte concentrates, blood platelet and plasma units) to be returned to the blood bank. If erythrocyte concentrates are preserved on the ward in conformity with the quality procedures, they can be released for another patient after their return to the blood bank. A unit is considered as conforming only if it meets the following conditions: first, there is a guarantee that the blood unit was preserved no longer than 5 days at the ward and that it was stored in a dedicated blood refrigerator during that time. Secondly, the expiration date of the unit has not been exceeded (unit must not be older than 42 days) and third, it must also be possible to perform a new cross-match test (maximum of nine cross-matching's for one unit).

If an erythrocyte concentrate is non-conforming, it should be brought back to the blood bank. It is not released again and the hospital must cover the costs of the units (i.e. no reimbursement for units not used in patients). Also punctured or damaged blood components should be brought back to the blood bank. The nursing units themselves are responsible for bringing back these blood units. This process also requires a strict scanning procedure.

Blood platelets and plasma units can never be used again for another patient. If not administered to the patient after first release, these units are brought back to blood bank and will always be charged to the hospital.

Since 2011, the blood bank only delivers blood components if the blood group is definitively known (based on two independent samples with identical results), except in children under the age of 4 months or in case of emergency. In these cases blood components from universal donors will be delivered.

2.2. Data collection and analysis

Research of the current costs and returns of the haemovigilance team was based on data from the Medical Administration Department of the University Hospitals Leuven. These costs and returns were calculated for the period 2010-2013 and were based on the working costs of the team members. The direct returns were calculated on the basis of the financial support received from the government. The indirect returns were counted through measuring the corrections of blood components that the haemovigilance team realized in relation to the total use of blood components in the hospital. Furthermore, the indirect returns resulting from the implementation of the transfusion policy of the haemovigilance team, were also measured. Numerical data of the use of blood components were calculated and analyzed descriptively. Financial data about requests, administered blood components and returned blood components were analyzed descriptively. The amount of corrections in registration and the number of blood components charged to the hospital were also investigated.

3. Results

1) Costs versus reimbursement of the haemovigilance team

The annual costs and returns of the haemovigilance team for the University Hospitals Leuven were analyzed for the year 2013.

a) *annual costs of the haemovigilance team for University Hospitals Leuven*

The direct costs of the haemovigilance team consist of the staff costs. These are calculated based on the standard costs for each type of function for the year 2013 and do not take into account the current remuneration and seniority of the staff members.

The annual salary for the physician was 60.570 euros. The total wages for the two nurses (1.5 FTE) was 101.400 euros and the wage for the person responsible for the hospital blood bank (0.09 FTE) was 18.141 euros. For the year 2013, the total staff expenditure was 180.141 euro.

On top of the direct average costs, the indirect costs of employment (employees need a work space, their working hours must