NURSES RESPONSIBILITY IN BLOOD TRANSFUSION MONITORING CARE PLAN AND EARLY INTERVENTION; REVIEW

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Abstract:
During their stay in the hospital, a significant number of patients require the administration of one or more blood components. Consequently, it is essential for nurses to have a thorough understanding of who is accountable for the rapid administration of blood transfusions, the monitoring of patients, and the identification and management of transfusion reactions. A much higher degree of knowledge was possessed by nurses who had both a higher level of education and a longer period of working experience. It is possible that the findings might serve as the foundation for the development of structured continuous education, which would lead to a gain in knowledge, an improvement in practice, and a reduction in the risks to patient safety during the transfusion procedure.

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DOI: 10.53555/ecb/2022.11.8.134

Introduction:

Blood transfusions are a rather routine medical operation, and while they are generally considered to be safe, there are a number of issues that medical professionals need to be able to identify and manage. Through this activity, the indications for blood transfusions are discussed, including those that pertain to specific patient populations, the preparation that takes place before to the transfusion, and the potential complications that may arise from blood transfusions. Additionally, the responsibility of the interprofessional team in providing care for patients who are undergoing blood transfusions is brought to light through this activity [1].

Whole blood, packed red blood cells (PRBCs), individual factor concentrates, fresh frozen plasma (FFP), platelet concentrates, and cryoprecipitate are all examples of different types of blood products. The transfusion of blood products is a frequent practice, with over 16 million blood components being transfused annually in the United States [2].

The intravascular volume can be restored through transfusion therapy, which also has the ability to boost oxygen-carrying capacity and supply coagulation components. On the other hand, there is a possibility that additional issues that could potentially be fatal will arise. Within the context of safe transfusion therapy, the nurse plays a crucial role from the beginning to the end, and it is imperative that they adhere to safety guidelines and best practices with utmost attention to detail. During this chapter, you will be given an introduction to the fundamental ideas of blood product administration, as well as the opportunity to apply the nursing process to the administration of blood products [3].

Over the course of the last few hundred years, the field of medicine has achieved considerable advancements in its understanding of circulation. The concept of the "four humors" has been a part of medical practice for millennia, and bloodletting has been utilized as a treatment. William Harvey, who lived in the 1600s, was the first person to demonstrate how the circulatory system worked. In a short period of time after that, scientists began to take an interest in transfusion, initially attempting to transplant human blood into animal blood. In 1795, Dr. Philip Syng Physick performed the first human blood transfusion. In 1818, Dr. James Blundell performed the first transfusion of human blood for the purpose of treating hemorrhage. Both of these events took place in England. Since the beginning of the 1900s, significant progress has been made in the understanding of blood components, blood typing, and storage. The practice of transfusion medicine has emerged as a result of this development. Laboratory and clinical medicine are both components of the area of transfusion medicine. Additionally, contributions to the discipline come from medical professionals that specialize in a variety of fields, including pathology, hematology, pediatrics, and anesthesia. The process of transferring red blood cells from one individual to another has become reasonably widespread. There are approximately 15 million units that are transfused annually in the United States, while there are approximately 85 million units that are transfused worldwide [4].

Components are typically used for the storage of blood. Fresh whole blood has traditionally been considered the gold standard for transfusions. However, recent developments in medical technology have made it possible to make effective use of a variety of components, including packed red blood cells (PRBCs), individual factor concentrates, fresh frozen plasma (FFP), platelet concentrates, and cryoprecipitate. As a consequence of this, there are currently very few indications for the transfusion of whole blood. According to [5], the buddy transfusion system used by the United States military is the most widely used system for whole blood transfusion.

Review:

According to the American Association of Blood Banks' guidelines on red blood cell transfusion, a limited approach is recommended for patients who are stable and have non-hemorrhaging anemia. A hemoglobin level of less than 13 g/dL in males and less than 12 g/dL in females is typically considered to be the diagnostic criteria for anemia. However, there may be deviations in this definition. Although a more stringent threshold is employed to assess the need for transfusion at the present time, in the past, a more liberal approach was utilized, which often involved a cutoff of hemoglobin levels that were lower than 10 g/dL, regardless of the presence of symptoms [5].

The criteria that are now in place for the transfusion of red blood cells (RBC) often adhere to a threshold that is quite stringent. Even if there is considerable fluctuation in the amount for the threshold, 7 g/dL is a value that is generally accepted for people who are healthy and do not exhibit any symptoms. There have been a number of studies that have demonstrated that this threshold is appropriate in various patient categories, such as those with

bleeding in the gastrointestinal tract (GI) and patients who are critically ill. A number of 8 g/dL is recommended as the threshold in patients who are undergoing orthopedic procedures or who have coronary artery disease, according to the guidelines. It is possible that this is a secondary issue due to the absence of published research on the utilization of a threshold of 7 g/dL in the evaluation studies of these patient populations. Additionally, the recommendations and clinical trials on transfusion needs in critical care (TRICC) indicate a value of 7 g/dl as the threshold for patients who are critically ill [6].

The use of a transfusion may also be recommended for patients who are experiencing active or acute bleeding, as well as individuals who are experiencing symptoms associated with anemia (such as tachycardia, weakness, and dyspnea when exerted) and whose hemoglobin levels are lower than 8 g/dL. A decrease in the circulating red cell mass, which is defined as grams of hemoglobin per 100 milliliters of whole blood, is what is referred to as anemia in these kinds of situations. One or more of the following may be the cause of anemia: loss from the outside, insufficient production, destruction from within, or a combination of these factors. Anemia is a condition that occurs in a significant number of individuals who are suffering active bleeding; however, anemia does not constitute a reason to have a transfusion. A state of shock is that which occurs as a consequence of significant hemorrhage, and shock is characterized by an inadequate supply of oxygen to carry out the metabolic processes of cells. The therapy of hemorrhagic shock includes the repletion of red cell mass as one of its components [7].

If the patient is not bleeding actively, it is recommended that one unit of packed red cells be transfused at a time. This will normally result in an increase of one gram per deciliter (g/dL) in the hemoglobin value and a three percent increase in the hematocrit. Afterwards, examine the patient's hemoglobin levels after the transfusion. When the patient's hemoglobin level is 6 g/dL or lower, the American Society of Anesthesiologists recommends that a transfusion be administered. However, more recent research indicates that patients who have a preanesthetic hemoglobin that is higher than 8 g/dL have a lower risk of death, particularly those who have undergone renal transplantation [8].

Although the transfusion of fresh frozen plasma (FFP) is an extremely widespread practice, there are only a few specific indications for its utilization. There is not enough data to support its application in a variety of clinical settings, such as the prevention of bleeding in patients who are not bleeding. In patients who are bleeding, a transfusion of FFP may be necessary in order to replenish the coagulation factors that have been lost. Clinical circumstances fulfilling this criterion include cardiopulmonary bypass, large transfusion, decompensated liver illness, extracorporeal pulmonary support techniques, or acute disseminated intravascular coagulation [9].

When there was an excess of warfarin in a patient with a life-threatening hemorrhage, FFP, when paired with vitamin K, was recommended as a treatment option. Due to the widespread availability of prothrombin complex concentrate, FFP is only seldom required in cases of vitamin K insufficiency or resistance to warfarin. In the event that there is a simultaneous decrease in plasma volume, there is an exception.

Patients who are suffering from platelet dysfunction or deficiency can benefit from receiving a platelet transfusion. When there are no additional risk factors for bleeding and the patient's platelet counts are below 10 x 10/L, a prophylactic platelet transfusion is recommended for individuals who have bone marrow loss. Should there be additional risk factors associated with the transfusion, the threshold for transfusion may be increased to 20 x 10/L. It is necessary to have platelet counts that are higher than 50 x 10/L in order to undergo invasive treatments. The administration of a platelet transfusion is recommended in the event of active hemorrhage, provided that thrombocytopenia is a contributing factor to the hemorrhage and the platelet count is less than 50 X 10/L. In the event that there is microvascular hemorrhage that is diffuse, it is imperative that the platelet count be kept at or above 100 x 10/L [10].

Critically ill patients get intensive and specialized medical and nursing care in intensive care units, sometimes known as ICUs. These units are also known as intensive care units. In these units, an increased capacity for monitoring and several modalities of physiologic organ support are made possible in order to maintain life despite the presence of life-threatening organ system insufficiency. Numerous patients who are hospitalized in the intensive care unit (ICU) require the administration of one or more blood components due to the fact that they are experiencing ongoing blood loss or haemostatic problems [11]. When determining whether or not to perform a red blood cell (RBC) transfusion, it is important to take into consideration the following factors: the cause and stage of the patient's anemia,

the patient's age and comorbidities, disorders that result in an increased demand for oxygen (sepsis), and blood loss or loss. The term "transfusion trigger" refers to the haemoglobin (Hb) value that triggers the recommendation for red blood cell (RBC) transfusion. There are two types of transfusion strategies: a restrictive transfusion strategy aims to maintain a lower haemoglobin level (70–90 g/L) with a transfusion trigger when the haemoglobin drops below 70 g/L, and a liberal transfusion strategy aims to maintain a higher haemoglobin level (100–120 g/L) with a threshold for transfusion when the haemoglobin drops below 100 g/L. In the treatment of thrombotic thrombocyte thrombocytopenia purpura, fresh frozen plasma (FFP) is recommended for the purpose of replacing coagulation factors in patients who are having huge transfusions, for the purpose of reversing the impact of warfarin in an emergency, for the treatment of known coagulation factor deficit, and for the treatment of warfarin's effect [12]. When the platelet count of a bleeding patient is below 50 × 109/L, a platelet transfusion is typically required. However, over 100 × 109/L is an uncommon occurrence. In cases of platelet dysfunction, persistent bleeding, and procedures such as those performed in the eye and brain, transfusion is typically considered in the event that the values fall anywhere in the middle of these two ranges [12].

Transfusions are administered to around 15–53% of intensive care unit patients, as stated in the published research. There were more than 1.7 million red blood cell units that were transfused in intensive care units in the United States in the year 2021. Nevertheless, there is a lack of published information regarding the quantity of blood units that were given to intensive care unit patients in Serbia as well as the frequency of transfusions [13].

Blood and blood components are capable of having large unfavorable effects, which can lead to the deterioration of the health of a critically ill patient. Blood and blood components deliver therapeutic reactions, but they also have the potential to cause considerable adverse consequences. The administration of blood products is frequently linked to the occurrence of transfusion reactions, which can take place in as many as one out of every one hundred transfusion treatment procedures. The rate of transfusion responses of red blood cells and fetal blood plasma ranges from 1.7 to 4.3 per 100,000 transfusions, while the incidence of platelet transfusion reactions is 62.6 per 100,000. On the other hand, the degree of adverse events can range from moderate, which may include generalized pain, fever, tachycardia, rash, and hypotension, to severe, which may result in anaphylactic responses and acute hemolytic reactions (AHTR), both of which have the potential to endanger the patient's life. Because of this, the administration of any other drug in the intensive care unit should be deemed to be the same as the transfusion of blood and blood products. Therefore, it is necessary to take into consideration both the benefits and the hazards associated with the utilization of blood and blood components in critically ill patients [14].

In the intensive care unit, the process of administering blood and blood components is a procedure that involves multiple disciplines. A nurse, a transfusiologist, and an intensivist who specializes in anesthesia are the members of the multidisciplinary team together. In intensive care units, nurses are accountable for administering blood transfusions immediately, monitoring patients, and recognizing and managing any responses that may occur as a result of transfusions [15].

Transfusions of blood are one of the most common procedures performed in hospitals, and they carry significant hazards. Therefore, it is imperative that all nurses who are concerned are aware of the problems that are linked with blood transfusions. There was a reasonable level of understanding among the majority of our nurses regarding the strategies that may be used to reduce the risk of transfusion reactions and AHTR. Similar to the findings of the study that was conducted in India and Iran [15], they possessed a high level of knowledge regarding how to handle AHTR, which was 80.1%.

There was a study that found that the majority of nurses who responded to the survey were aware of the availability of their wards' written blood transfusion policy, and the majority of them had read the policy. However, the policy and guidelines already provided the information about the transfusion procedure chain, blood component transfusion indications, transfusion complications, and the role of each staff member involved in the transfusion [17]. This was despite the fact that fifty percent of the nurses had an overall lack of knowledge regarding blood transfusions. Additionally, a different study demonstrated that nurses have a high level of knowledge concerning blood transfusion policies, despite the fact that there was a significant knowledge gap overall [18].

Conclusion:

The goal of a blood transfusion is to replace components of the blood that have been lost, and it is an essential and life-saving procedure for patients who are suffering from both acute and chronic diseases. Every year, millions of individuals all over the world go through this process, and while it is generally believed to be safe, there are certain bad consequences that can occur, such as immunological problems, immunomodulation, or infection that is transmitted through transfusion. The processes involved in blood transfusions have been reported to have a significant number of risks related with human error, which account for approximately 85 percent of the total preventable hazards. One of these effects is an acute hemolytic reaction, which ultimately leads to death and is mostly brought on by incompatibilities between ABO and the patient's blood type.

In light of the dangers that are connected with blood transfusions, there is a growing corpus of study on developing the most effective methods of providing patients with the highest possible level of safety and care. Informing and enhancing the expertise of nurses is an essential component of this research. Blood transfusion is a nursing technique, and as such, having sufficient expertise is essential to ensuring that the practice is both safe and effective. There are a number of factors that are considered to be among the most important contributors to blood transfusion-related errors. These factors include inadequate understanding regarding the compatibility test, delays in the administration of blood, and the recognition of aberrant reactions that accompany blood transfusions. In order to develop an evidence-based clinical practice, the new trends in nursing research have been centered on exploring, evaluating, training, and updating the knowledge of nurses. This is due to the fact that nurses require knowledge in order to make appropriate decisions, and it is essential to have sound knowledge in order to ensure that blood transfusions are safe while also providing high-quality patient care.

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