Nursing care in the transfusion of blood components to surgical patients in the perioperative period

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Abstract

Introduction: Blood transfusion consists of the administration of blood components intravenously in clinical or surgical treatments. In the preoperative period, it is performed with the objective of improving tissue oxygenation, as well as promoting hemodynamic and hemostatic balance.

Objective: To understand nursing care in the transfusion of blood components to surgical patients in the perioperative period.

Method: This is a descriptive and exploratory study with a qualitative approach. Grounded Theory was used, with constant comparative analysis. A total of 18 nurses and 28 nursing technicians from a university hospital took part in the study. Data were collected between October 2019 and February 2020, through a sociodemographic questionnaire and semi-structured interviews.

Results: The study resulted in the central category nursing care during transfusion, which gave rise to the categories: caring for before transfusion; caring for during transfusion; and caring for after transfusion, which were discussed according to the standardized nursing methodology.

Conclusion: Nursing care is planned and implemented following an ordering of practices in a logical sequence due to the characteristics of the procedure in the perioperative period. Nurses demand indirect care; in contrast, nursing technicians engage in direct patient care.

Keywords

Blood Components
Transfusion; Perioperative
Period; Standardized Nursing
Terminology; Grounded
Theory.

Introduction

Blood transfusion consists of the administration of blood components intravenously in clinical or surgical treatments. In the preoperative period, it is performed with the objective of improving tissue oxygenation, as well as promoting hemodynamic and hemostatic balance [1-4].

Among health professionals who work in hemotherapy, nurses and nursing technicians perform essential care throughout the process [5]. The performance of nursing professionals in hemotherapy, specifically in the transfusion of blood components, is regulated by Resolution nº 629/2020 of the Federal Nursing Council (COFEN, as per its Portuguese acronym), which attributes to nurses responsibilities that require complex technical-scientific knowledge and delegates to nursing technicians some attributions under the supervision of nurses [6-7].

Accordingly, considering the importance of understanding how nursing care takes place in this area, the study was held in the context of the surgical units of a trauma hospital, keeping in mind that the traumatic injuries that lead to great blood loss are the main cause for the performance of surgical procedures and the use of blood components [8].

Given the above, the objective of the study was to understand the nursing care in the transfusion of blood components to surgical patients in the perioperative period.

Methods

This is a descriptive and exploratory study with a qualitative approach. Resources and concepts from the Grounded Theory (GT) were used, whose steps propose a circular model in which collection and interpretation of data, as well as selection of participants, happen concomitantly [9-10].

It was performed in the surgical units of a university hospital located in the city of Petrolina, Per-

nambuco, Brazil, a reference in teaching, research and health care. A total of 46 professionals, 18 nurses and 28 nursing technicians took part in the study, selected through intentional non-probabilistic sample, who met the following inclusion criteria: being a nurse or nursing technician working for at least six months in the selected units and having performed nursing care in the transfusion of blood components to surgical patients in the perioperative period in the 30 days prior to data collection. Those who were on leave or on vacation during the collection period were excluded from the study.

Data collection happened from October 2019 to February 2020 using a semi-structured interview script, with questions about nursing care during transfusion in surgical units.

The interviews lasted an average of 10 minutes, were recorded in digital audio format (*mp3*) and immediately transcribed in full after their accomplishment, which contributed to the definition of the theoretical sample, complying with saturation criteria, when the relationships among categories were well established and validated, with no additional data found [10].

Data obtained from the interviews went through constant comparative analysis, through three stages: open coding, axial coding and selective coding. In the open coding stage, the data was separated, conceptualized, and then the researchers established the relationship among them in the creation of the substantive codes. This process allowed the researchers to move on to the next stage, axial coding, where a reflective process was held in search of explanations on the topic that enabled the onset of the categories. These categories went through selections, modifications related to their nomination and inclusion of new categories according to the identified relationships, selective coding or integration [10].

The relationships among categories were recorded in memos that contributed to the development

of a substantive theory presented according to the paradigmatic model from the Straussian perspective [11] about the care reported by the participants in comparison with the relationship standards identified in the nursing actions and interventions present in the International Classification for Nursing Practice (ICNP®), version 2017, prepared according to ISO 18104:2014 [12]

The study complied with the ethical principles of Resolution 466/12 of the National Health Council and was approved by the Research Ethics Committee of the Amaury de Medeiros Integrated Health Center (CISAM, as per its Portuguese acronym) of the University of Pernambuco (UPE, as per its Portuguese acronym). The research participants were identified by replacing the names with the letters "N" (for nurses) and "NT" (for nursing technicians), followed by a numeric code drawn up in ascending order for each interview, in order to guarantee confidentiality and anonymity.

Results

Caring for before transfusion

This category refers to pre-transfusion care, that is, those performed before the administration of the blood component. Nurses report that they are responsible for the request at the hemocenter (blood center), collection for blood typing or guidance to the nursing technician to perform it and the feasibility of transporting the sample.

The collection of blood to be able to typing, the conversations with the blood center staff, the feasibility of transporting this blood [from the blood center] or not, the nurse is the one who performs it all.

N16.

[...] taking the request form with the doctor to request that this nursing technician take a sample, call the central office to inform that this blood is available [blood component requested] and deliver the blood [sample] to the ambulance driver [...].

N4.

Regarding the sample collection for blood typing and other compatibility tests, only part of the nurses in the intensive care unit (ICU) perform it, while the other nurses from the other surgical units in the study delegated this function to nursing technicians, appropriating indirect care and delegating direct care.

[...] the nurse here in the ICU is the one who collects the sample that will be sent to the blood center for testing and we delegate to the nursing technician the checking of pre-transfusion vital signs.

N13.

[...] we guide the technician in relation to the sample collection, and we supervise it, as well as the patient's condition for the blood transfusion.

N5.

The question regarding the arrival of the blood component to the surgical units was reported by some nurse participants, who highlighted the importance of checking the identification data of the patient who will be transfused and the proper record.

We looked at the request. We check the patient's status, if he is well, the requested blood type, if it is the same as what is in the bag. The question of checking is in general: name, bag number, blood type [...].

N3.

[...] checking the question of identification, if the bag identified with the blood type really came or if it is a heterogroup and if we also recorded in the proper book, the record of the blood bag, what was the blood component or blood product [...].

N6.

The care procedures least cited by nurses were: to check a patent intravenous administration route that is compatible with the volume and flow of the infusion; to check the possibility of drug interactions and incompatibility with the blood component; and to check the transfusion indication and inform the patient of the procedure.

[...] if you have any other medication in that access, you have to stop the infusion depending on the medication.

N7.

In turn, the care procedures most cited by nursing technicians were: to evaluate and record vital signs; to check the blood bag and identification data; and to analyze the bag temperature before infusion.

Firstly, we will check: the patient's name on the medical chart; we'll also check the bag issue, if everything is right, if it is the compatible blood type, besides checking vital signs.

NT1.

[...] we prepare the bag, check if it is at the right temperature, we usually leave it in the environment for 30 minutes; and then, when it is at the ideal temperature and the patient is stable, we start the transfusion [...].

N3.

Using calibrated access and specific equipment for transfusion was also the most cited care procedure by nursing technicians.

[...] checking if the patient is stable [...] I leave the patient with calibrated access.

NT13.

[...] we got an access with [excluded the brand name of an intravenous device] preferably of 18 gauge so that the blood can flow well and [...] ready [...] you can hear the patient's complaints even to know how to differentiate what he was feeling before the bag and what he may feel again after the bag.

NT6.

Conversely, the care procedures little reported by nursing technicians are: to observe the presence of air bubbles in the bag or circuit of the transfusion equipment; to check the appearance of the contents of the blood bag and explain to the patient the procedure.

The care is to observe the consistency of the bag, the temperature, air bubbles [...] talking to the patient to explain what is going to be done.

NT2.

[...] talking to the patient and explain what we are going to do.

NT5.

Caring for during transfusion

This category corresponds to intra-transfusion care, which is performed during intravenous infusion of the blood component. Most nurses stated that they delegate direct care, that is, the administration of the blood component, to nursing technicians.

[...] the question of preparing the bag in the equipment, the question of placing it on the patient to transfuse, observing vital signs is the technician's duty.

N1.

[...] we delegate the installation and measurement of signals to the technician.

N12.

[...] actually, we delegate this function of transfusing, it is the nursing technician's role, the nurse takes over a more administrative and supervisory care.

N13.

Other care procedures little discussed by nurses is related to the time and speed of the infusion and to the evaluation of coagulation of the equipment circuit or venous catheters.

[...] a care related to the checking of the transfusion time, not to exceed four hours, to assess whether it is clotting, whether the drip is really present.

N15.

[...] I request; and, when I transfuse, I decrease the infusion speed in the first five minutes and increase it slightly with another five minutes, I ask that they remain at the bedside in those first ten minutes and then we can increase the transfusion speed.

N10.

The nursing technicians, on the other hand, highlighted the evaluation of vital signs in the first ten minutes, concern about the infusion time and possible transfusion reactions.

I continue to monitor vital signs, and then I check if the patient will have any reaction during this period.

NT26.

I check vital signs after ten minutes, observing the onset of any reaction [...].

NT10.

[...] being careful with a set time of one hour minimum and four hours maximum.

NT23.

Nevertheless, the least addressed care procedures were: to observe changes in the location of the venous access; to check patent access and avoid administering medication together with the blood component; and to interrupt the transfusion of the bag in cases of transfusion reaction.

[...] not passing any type of drug other than blood, so as not to interfere, if there is any type of reaction [...] type of venous access that will be transfused, if it is good, if it is well perfused, if it is having edema or phlebitis.

NT24.

[...] interrupting the transfusion to the doctor and the nurse [...].

NT18.

Using personal protective equipment and hand antisepsis were reported by the nursing technicians, more even than the nurses themselves in all stages of hemotherapy.

[...] with all the correct techniques, aseptic, such as the washed hands, I put on the procedure gloves [...].

NT22.

[...] standard care, such as washing my hands before handling [...].

NT4.

[...] using safety equipment for transfusion [...].

NT25.

Caring for after transfusion

The category is focused on post-transfusion care, which is performed after the infusion of the blood bag. It is noticed that nurses and nursing technicians generally mention the same care. Among them, the most discussed were focused on the checking/monitoring of vital signs and observation of possible reactions.

We look again at the vital signs, the patient's complaints. If there is any abnormality, we inform the nurse or the doctor on duty.

NT14.

We're going to check vital signs, see if there was any effect, change [...]

N17.

We cease using the bag in the face of any reaction and then communicate to the blood bank for further conducts.

N18.

The care least mentioned by the nurses were: to communicate the infusion during the shift change; to administer intravenous saline in the face of an adverse reaction; to discard the bag in an appropriate place and notify reactions. Nursing technicians also addressed the question of discarding the bag in an appropriate place and checking if the bag content was fully transfused.

[...] being careful with the disposal of the bag, which must be in an appropriate place.

N4.

Observing if the patient had any reaction, talking to the patient again and checking if the entire bag was transfused.

NT2.

In the event of a reaction, you must make the appropriate notifications and send the blood sample from the bag to the blood center.

N13.

Some speeches highlighted the communication barriers and failures between the service and the blood center related to the investigation of transfusion reaction cases, as well as the importance of communication between the multidisciplinary team and the inclusion of information about the transfusion in the shift change.

[...] according to protocols, we should collect this bag and return it to the blood center to do an analysis together with the report of the reactions that the patient had, but the staff often discards this bag and it is not sent [...]

N2.

[...] all the times we tried to forward the bag were in vain, because the center did not receive it. So, what we've been doing here is, we've been discarding these bags and recording in the medical record what happened [...] but the orientation is that we really should send them for testing, but they don't always receive it [...].

N15.

[...] remembering to communicate to the next colleague, because as they have late reactions, we must always remember to communicate to the staff that the patient had a blood transfusion, took so many concentrates, took plasma [...].

N2.

Discussion

The pre-transfusion care reported by participants involves identifying the patient, checking data on the request and the recipient with the blood component label and making sure that the blood ty-

ping has been carried out. These care procedures contribute to the prevention of reactions due to incompatibility [4] and are present in ICNP® as the nursing interventions: To Check Patient Identity; To Implement Security Regime; To Collect Venous Blood Sample (or Specimen).

In a survey conducted in the southern region of Brazil, nurses' communication with the blood center was highlighted to avoid irregularities, as well as confirming the availability and feasibility of this product [7], which can be recorded as an intervention as To Collaborate with Health Care Providers [12].

Another care procedure reported in the pre-transfusion stage, which corroborates with the literature, is to obtain a venous access with a large catheter, described as the intervention: Venipuncture or To Insert Vascular Access Device [12]. It is known that a small lumen catheter causes slow transfusion, hemolysis of erythrocytes and, consequently, disposal of the blood component [5].

The use of specific equipment for this procedure was also a care measure reported by nursing technicians in the present study. On the subject, other authors point out that the equipment with a 170µ filter aims to prevent clots and aggregates from reaching the bloodstream [1, 15]. This care procedure associated with the inspection of the bag for the presence of air bubbles and consistency [8] can be understood as the interventions: To Check Device Security and To Implement Security Regime [12].

However, a care little discussed by nurses was to check the indication for transfusion in the perioperative period. A study developed in Frankfurt, Germany, showed as a high degree of recommendation the pathologies such as preoperative anemia before major surgery, as well as hemoglobin concentration <7g/dL in intensive care patients and hemoglobin concentration <7.5g/dL in patients undergoing cardiac surgery [15].

The identification of transfusion needs in the perioperative period must be planned according to the individuality of each patient and can be related to the nursing interventions present in the ICNP®: To

Identify Physiological Condition; To Identify Tissue Perfusion, before Surgery; To Identify Risk of Hemorrhage; To Confirm (or prove) Consent, before Surgery and To Orient Patients [3, 12-14,6].

As for the intra-transfusion stage in the perioperative period, the procedures focused on transfusion reactions stood out. Evidence points out that the professional must remain at the bedside for the first ten minutes, in order to identify possible reactions early, as well as the checking of vital signs, seeking to avoid or minimize complications to the receiver [18-20], corroborating the findings of the present study and related to the nursing interventions: To Measure (or check) Heart Rate; To Measure (or check) Respiratory Movements; To Measure (or check) Blood Pressure; and To Measure (or check) Body Temperature.

The infusion time of blood components is another key question at this stage [6]. Although the study professionals did not report considerations about the recommended time for each type of blood component. As for the infusion speed, a study highlights that administration should be started slowly, making sure that the peripheral venous access is adequate and paying attention to the possible risks of circulatory overload [21].

Patients with cardiac and renal dysfunctions, premature and elderly people are more vulnerable to having circulatory overload. In these patients, infusion rates of less than 100 ml/hour for up to four hours are indicated, and if possible, avoid transfusing other bags on the same day [16]. For the others, the infusion rate of packed red blood cells should be on average 15 drops/minute; platelet concentrate should not exceed 20 to 30 mL/kg/hour, cryoprecipitate and fresh frozen plasma, between 10 and 20 mL/kg/hour [22].

Other authors emphasize that fluid or medication must not be added to the product to be transfused, corroborating the reports of the nursing technicians who took part in this research. Except for red blood cells, which can be infused in shared venous access with 0.9% sodium chloride solution [1, 15].

Regarding post-transfusion care in the perioperative period, nurses and nursing technicians emphasized the care of checking and monitoring vital signs. At this stage, it is essential to ensure that vital signs are measured and compared with previous reference measurements, contributing to analyzing the response and effectiveness of the procedure and the patient's health condition [6]. These care procedures can be recorded as the nursing interventions: To Monitor Vital Signs; To Monitor Response to Treatment; and To Monitor Response to Blood Products [12].

At this stage, other authors consider crucial the records of the start and end time of the transfusion. If it is not completed within the expected time, the bag must be interrupted and discarded, since the blood may undergo changes in its functions, due to uncontrolled temperature exposure, with a potential risk of bacterial growth, [4, 7, 23], which can be related to the nursing interventions: To Prevent Infection and To Use Aseptic Technique [12].

In the face of transfusion reactions, some care procedures mentioned in the study refer to the availability of equipment for emergency and ventilatory support, interruption of the transfusion, maintaining permeable venous access and communicating the reaction to the blood center by sending the bag and blood equipment for analysis [16-19], as well as a compulsory notification of transfusion reaction in Brazil [24].

Regarding the disposal of the material in an appropriate place, it is possible to notice that this was a care procedure little mentioned in this study by both categories. Despite this, a study on the subject reveals that it is up to nurses to guide the team as to how to organize, maintain and dispose of health care waste. [22].

Some of these care procedures can be related to the nursing interventions: To Maintain Intravenous Access; To Check Device Security; To Take Care with Invasive Device Location; To Suspend Use of Intravenous Therapy; To Administer Medication and Solu-

tion; To Treat Allergic Reaction; To Report Condition to the Interdisciplinary Team; To Notify; Response to Blood Products; and To Discard [12].

Conclusion

It was understood that nursing care in the transfusion of blood components to surgical patients is planned and implemented following an ordering of practices in a logical sequence compatible with the use of terminology due to the characteristics of the procedure in the perioperative period. It was evidenced that, while nurses demand indirect care, nursing technicians engage in direct patient care.

As a limitation, the study shows that the high demand of activities in the sectors of the unit where the research was carried out caused the participants to answer the questions succinctly. This limitation was circumvented by paying attention to measures to encourage speech and the constant inclusion of new participants, as guided by GT, which increased the number of participants.

As for contributions, it is highlighted that the study can be used to organize permanent education and support nurses who enter the clinical-surgical specialty and assist patients in the perioperative period, as it is a detailed and systematic approach to care procedures in the light of standardized nursing terminology.

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