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Original Article

SABERES E PRÁTICAS DA ENFERMAGEM NA UTILIZAÇÃO DO CATETER CENTRAL DE INSERÇÃO PERIFÉRICA EM NEONATOLOGIA

NURSING KNOWLEDGE AND PRACTICES IN THE USE OF PERIPHERALLY INSERTED CENTRAL CATHETER IN NEONATOLOGY

CONOCIMIENTOS Y PRÁCTICAS DE ENFERMERÍA EN EL USO DEL CATÉTER CENTRAL DE INSERCIÓN PERIFÉRICA EN NEONATOLOGÍA

Leonardo Bigolin Jantsch[1], Eliane Tatsch Neves[2], Maria Ribeiro Lacerda[3].

RESUMO

Objetivo: Descrever os saberes e as práticas que sustentam o manejo do cateter central de inserção periférica pela equipe de enfermagem em terapia intensiva neonatal. **Método**: Trata-se de um estudo qualitativo que teve como participantes 11 integrantes da equipe de enfermagem de uma Unidade de Terapia Intensiva Neonatal. Os dados foram coletados, por meio de entrevistas semiestruturadas, posteriormente, transcritos sob dupla transcrição e submetidos à análise temática de conteúdo com discussão teórica, a partir dos padrões do conhecimento em Enfermagem. **Resultados**: Foram descritas quatro categorias que representam os saberes e práticas: indicativos para inserção na prática neonatal; cuidados que precedem o procedimento de inserção; cuidados que contribuem para a manutenção da terapêutica; indicativos para retirada precoce do cateter: o sofrimento com o retorno da prática periférica. **Conclusão**: Os saberes da Enfermagem emergem e estão pautados no fazer cotidiano, constituindo-se práticas empíricas em prol da qualificação do cuidado.

Descritores: Enfermagem Neonatal; Cuidados de Enfermagem; Conhecimentos, Atitudes e Prática em Saúde.

ABSTRACT

Objective: To describe the knowledge and the practices supporting the management of the peripherally inserted central catheter by the nursing team in neonatal intensive care. **Method**: This is a qualitative study involving 11 members of the nursing team from a Neonatal Intensive Care Unit. Data were collected through semi-structured interviews, later transcribed under double transcription and submitted to content thematic analysis with theoretical discussion based on the knowledge patterns in Nursing. **Results**: Four categories representing the knowledge and practices were described: indications for the insertion in neonatal practice; care that precedes the insertion procedure; care that contributes to the therapeutic maintenance; indications for early withdrawal of the catheter: the suffering with the return of the peripheral practice. **Conclusion**: Nursing knowledge emerges and is based on daily routine, constituting empirical practices for the qualification of care.

Descriptors: Neonatal Nursing; Nursing Care; Health Knowledge, Attitudes, Practice.

RESUMEN

Objetivo: Describir los conocimientos y las prácticas que sustentan el manejo del catéter central de inserción periférica por el equipo de enfermería en terapia intensiva neonatal. **Método**: Se trata de un estudio cualitativo que tuvo como participantes 11 integrantes del equipo de enfermería de una Unidad de Terapia Intensiva Neonatal. Los datos fueron recolectados por medio de entrevistas semiestructuradas, posteriormente transcriptos bajo doble transcripción y sometidos al análisis temático de contenido con discusión teórica a partir de los patrones del conocimiento en Enfermería. **Resultados**: Se han descrito cuatro categorías que representan los conocimientos y las prácticas: indicativos para inserción en la práctica neonatal; los cuidados que preceden al procedimiento de inserción; cuidados que contribuyen al mantenimiento del tratamiento; indicativos para la retirada temprana del catéter: el sufrimiento con el retorno de la práctica periférica. **Conclusión**: Los saberes de la Enfermería emergen y están pautados en el hacer cotidiano, constituyéndose prácticas empíricas en pro de la calidad del cuidado.

Descriptores: Enfermería Neonatal; Atención de Enfermería; Conocimiento, Actitudes y Práctica en Salud.

[1]Doutor em Enfermagem. Professor Adjunto do Departamento de Ciências da Saúde da Universidade Federal de Santa Maria - UFSM/Palmeira das Missões. [2]Pós-Doutora em Enfermagem. Professora do Departamento de Enfermagem da UFSM. [3]Doutora em Enfermagem. professora permanente do programa de Pós-graduação em Enfermagem da Universidade Federal do Paraná.

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INTRODUÇÃO

The Nursing body of knowledge has been consolidating itself as a Science, from a movement of construction of a specific language, assigning meaning of its knowledge to being and doing[1]. Building knowledge for Nursing means seeking new concepts, transposing barriers looking for foundations that support the development of theories that underpin the care. As a source of theoretical construction, nursing is based on empiricism, since much of its knowledge comes from its practice[2].

In the face of the daily demands of care, the nurse builds his/her own knowledge, which, sometimes, is limited to his/her workplace, relating only to that reality. In nursing practice, the construction or ownership of knowledge, whether from experience or scientific, requires constant updating and reflection about the impact of the actions, in the decision-making. In this perspective, the knowledge comes from two concepts: theoretical knowledge that contributes to decision-making; and practical knowledge, which is embedded in the development of care practices - practical learning[3].

In the context of care, the use of various technologies, knowledge and practices of pre-natal, obstetric and neonatal care are contributing to the reduced mortality of newborns, especially premature ones, considered as the population most vulnerable to early neonatal death and in the first year of life[4]. Many premature newborns, or with other pathological conditions, require intravenous therapy during their treatment in the hospital. The adoption of technologies that qualify care in intravenous therapy is essential for the success in neonatal rehabilitation[5]. Some of these technologies include the Peripherally Inserted Central Catheter (PICC) as technological advances in neonatal intensive care[6].

The PICC is a central intravenous device that is inserted through a peripheral vein and, with the help of movements of insertion and blood flow, has its end allocated at the distal third of the vena cava[7]. The legal support for the practice of the PICC insertion, by the nurse, is found in Article 1 of Resolution 258/2001 of the Federal Nursing Council (COFEN). However, only those qualified by specific training for this purpose can perform this technique[8]. The legislation that legitimizes nurses to the insertion of the catheter permeates not only the insertion technique itself, but also the whole process that involves the decision of insertion, techniques and behaviors in the insertion and maintenance, as well as in decision-making for its withdrawal. From this perspective, the nursing technician is responsible for assisting the nurse regarding procedures of his/her competence, as well as manage and carry out the nursing care in the administration of parenteral drugs, either through peripheral or central route[9].

The nurse has legal autonomy and responds for the use of the PICC; however, there is still little knowledge built on care practices, although there is a body of scientific knowledge that guides some care techniques. Nursing knowledge and practices, in the context of intravenous therapy with the PICC, still lives a reality in which nurses without the training and/or qualification to the indication and insertion of the PICC assume the role of care; nurses and other members of the team are unaware of the benefits and indications offered by the catheter; lack of investment in the source of funding of hospital units; Teams with low adherence to the practice of Permanent Education at health services[10].

Beyond these barriers experienced, under an overall context, in neonatology, there are still details such as: increased risk of infections, exclusive criteria of indication and withdrawal, need for inclusion in family care, with co-responsibility of the family in the process and the analgesia and sedation. These situations reinforce the necessary discussion about knowledge and care practices, and their direct implication in the daily routine of neonatal intravenous therapy[11].

The Nursing body of knowledge, as a science of care, is based on patterns of expertise described initially by Carper, in 1978[12]. The four patterns she presented were: empirical, aesthetic, personal and ethical[12]. They intend to organize the theoretical/practical knowledge of doing and learning in nursing with the aim of contributing to its construction in a profession that seeks visibility and recognition as a Science.

The empirical knowledge, based on scientific knowledge, is based on scientific research aimed to describe the phenomena of interest for the most varied fields of knowledge. The aesthetic knowledge is intimately related to the creation and/or appreciation of a singular, private and subjective expression of possibility to provide care. The personal knowledge is the process of empathy, when the nurse puts him/herself in the patient's place. The ethical

knowledge goes far beyond what is established in the code of ethics; it is based on what is right and should be carried out, in the perspective of who cares for and who receives the care[12].

In this perspective, studies that seek to consolidate the nursing knowledge and practice in the use of peripherally inserted central catheter, having in view their discussion with patterns of nursing knowledge described by Carper (1978)[12], are intended to contribute to the consolidation of the science of Neonatal Nursing. The knowledge and practice of the nursing team implies, directly, in the implementation of the nursing process, which involves the different professional categories. In this perspective, discussing the knowledge that guides nursing professionals' practice, within the processes, is essential for consolidating care practices[13]. Giving voice to the different nursing professional categories approaching them the standards of knowledge[12] allow for enlarging the look over the care and determining the potential of each professional within the legal competence.

Therefore, this study aimed to describe the knowledge and practices that support the management of peripherally inserted central catheter by the nursing team in neonatal intensive care.

METHOD

This is a descriptive, exploratory study, with qualitative approach whose theoretical reference were the Standards of Nursing Knowledge, according to Carper (1978)[12].

The study participants were nurses and nursing technicians who had at least one year of experience in a Neonatal Intensive Care Unit of a teaching hospital in south Brazil. The study scenario is a reference service for the central region of Rio Grande do Sul and has used PICC for 18 years. From these criteria, seven nurses and 24 nursing technicians were selected to participate in the study. From this selection, the likely participants were sorted, and an order was established to begin the invitations and interviews. The data collection period ended when the theoretical saturation was reached by means of repetition and similarity of interviews. This saturation occurred only with the category of nursing technicians. Thus, 11 members of the nursing team participated in the study, being five nurses and six nursing technicians. Two nurses did not agree to participate in the study.

The selection of the nursing team [nurses and nursing technicians] as participants in the research, is justified by the following criteria: Nurses: professionals responsible for intravenous practice, responsible for the indication, insertion, maintenance and removal of the catheter. Nursing Technicians: Professionals who have responsibility, under the nurse's supervision, for the handling and maintenance of the catheter, being the first ones to identify potential problems related to the therapy. Furthermore, listening to this professional category and discussing their knowledge and practices contributes to the construction of nursing care, with the understanding that the practice of the Nursing Technician is inherent to the practical knowing.

For data production, semi-structured interviews were conducted in the second half of 2014. The semi-structured interview, for the category of Nursing Technicians was based on the following questions: What do you know about the Peripherally Inserted Central Catheter? When assisting the Nurse in the Insertion of the Catheter, what do you consider essential? What are the care you have for the safe maintenance of the catheter? For the category of Nurses, in summary, the questions of the semi-structured interview were: What are the criteria of indication for insertion of the catheter? What practices do you use before the insertion procedure? What is essential for the insertion procedure? What are the safe maintenance practices? Indicative of withdrawal and care? The interviews were recorded by means of electronic recorder, lasting an average of 15 minutes (minimum 6 minutes and a maximum of 32 minutes), and subsequently fully transcribed, under double transcription and independent review. After transcribed, the study corpus was submitted to thematic content analysis, following the three established steps[14].

The subjects' anonymity was preserved through the alphanumeric identification using the letter N for Nurses and T for Nursing Technicians, followed by random numerical sequence of interviews (N1, N2, N3, T1, T2, T3, etc.).

The development of the study has met the requirements of Resolution 466/2012, which involves researches with humans, being approved by the Research Ethics Committee of the Federal University of Santa Maria under protocol number: CAAE 13149613.3.0000.5346, under opinion number: 556415.

RESULTS AND DISCUSSION

From the answers, it was possible to carry out the thematic categorization, through the recurrence of themes and by thematic affinity, which, in the end, originated four categories that will be presented below.

Indications for the insertion of the PICC in neonatal practice

The indications used by the nurses for the insertion of the PICC are present in the statements:

"Firstly, the one that will have prolonged hospitalization, use of PN [Parenteral Nutrition] or prolonged use of antibiotics, I think this is the greatest reason! A premature or extremely premature baby! [...] by experience, these babies with prognosis of intestinal surgery, they will need parenteral nutrition for a long time!" (N3)

"If a baby is quite premature, who will be needing IV therapy, for a long time, when his antibiotic therapy is above six days, when the baby needs parenteral nutrition, or some solution fairly concentrated, and some medications that are irritants, with very basic pH or hyperosmolar, which need a central access [...] there are other solutions, dopa [dopamine]... fentanyl [fentanyl], used to serious babies, who are unstable, it's already an indicative!"(N8)

"[...] extreme prematurity, premature too, does not need to be extreme! Low birth weight unstable, serious NB, using parenteral nutrition, inotropic agents, antibiotics, hydration[...]" (N10)

"[...] if he's also a baby with a bad vein, in the first days of hospitalization, usually children of diabetic mothers, or with difficult veins, impaired venous network, which are difficult for you to see for puncturing, sometimes they are born and remain with edema, if you don't indicate PICC as soon as possible, you lose opportunities after the exhaustion of the venous network"(N1)

The empirical knowledge permeates this category, in which, in summary, the participants highlighted three main reasons suggestive for the insertion of the PICC: diagnostic, morphological and clinical factors. In terms of diagnostic factors in the service of this study, they are: Prematurity, Extreme prematurity, low birth weight (less than 2500 g) and newborns (NBS) with prognosis of surgical procedures, in particular intestinal surgery, due to the long duration of parenteral nutrition. The characteristics of fluids, such as prolonged antibiotic therapy as well as hyperosmolar, blister and irritant infusions, are also factors considered when indicating the catheter.

Indicative factors for the insertion of the catheter are determined by several factors related to the therapy used. Studies corroborate the findings and describe that prematurity and low birth weight are their main indications. Corroborating other authors, in this study, the use of parenteral nutrition is the factor most cited as indicative for the PICC insertion, as well as the prolonged antibiotic therapy, both resulting from the characteristics of high osmolarity and pH changes[7].

Regarding morphological indications, these are associated with NB with impaired venous network and/or with little viewing, considered the "bad-vein" NB (N1). These NB are often children of diabetic mothers, due to the characteristic of Large for Gestational Age (LGA) and the poor peripheral venous visualization. In addition, the subjects believe that all those "[...] with difficult veins, impaired venous network, which are difficult for you to see for puncturing [...]" (N1), are early indications for insertion.

Regarding morphological characteristics, the NB, with difficult venous network, represent, for the peripheral practice, a frequent challenge and stressor for the team, when the peripheral puncture should be performed. The loss of the peripheral venous access is constant in the daily routine of the NICU and the need for new venipuncture and maintenance of the safe access, using about 75% of the time of the nurse's work in this service. Authors highlight that most of the time spent in the neonatal intensive care unit involves the intravenous therapy[15]. Thus, the PICC represents comfort and easy deployment of a safe intravenous therapy that represents no stress for the team and optimizes time.

The clinical characteristics are also factors suggestive for using the PICC. A clinically serious NB requires central venous access, and the PICC is considered the first option. The serious clinical condition usually is associated to the long period of hospitalization, as well as characteristics of the fluids to be administered. The three main indicative factors for insertion are associated to the long period of hospitalization, as well as to the physiological and pharmacological characteristics, and are considered isolated or associated indications for insertion.

Moreover, in the context of the indication of the PICC, the ethical knowledge in nursing is

identified through the ethical commitment of the professionals: "[...] before inserting the PICC I need to know or predict the time will stay here in the ICU, because you may need to use the PICC, you will expose the child to central therapy [recognizes the risks of a central intravenous therapy], and then you will realize this child did not need it, as she will stay here four or five days only!" (N2). The ethical and moral commitment of the nursing team with the success in neonatal intravenous therapy are implicit in the statements, through the construction of empirical knowledge, which guides the predictors of insertion, sustained by a safe practice. The nurses recognize that the PICC, as a central access, poses risks and has specific indications.

The criteria for indication of the PICC in neonatal practice are established by empirical and ethical knowledge[12], and the nurses demonstrated knowledge about the characteristics of the fluid to be infused in intravenous therapy, and how it becomes indicative for insertion. The participants also demonstrate a knowledge built through their practical experience, when mentioning the morphological characteristics of the NB and considering them "bad-vein" (N1).

Care that precedes the PICC insertion procedure

After the decision of catheter insertion, the nurses highlight important practices, which precede and, thus, allow for success in the insertion procedure. Establishing and maintaining the NB warmed are considered important factors that facilitate the insertion procedure. The participants consider the ideal axillary temperature to start the procedure of 37.5ºC. The affirmation of this practice occurs through the statements:

"Warmed, for me, a warmed eated baby is around 37 degrees... first I warm him well, 37ºC... 37.5ºC... well warm, because we will expose [open] the incubator, and the baby will get colder quickly!" (N2)

"Temperature...37.5°C! 37ºC, if it's a not so serious baby, it has to be 37.5ºC to succeed! Because when you open incubator he freezes! When you pass the chlorhexidine, he gets colder a little more!" (T3)

"A warmed baby is first thing [...] Increase the incubator temperature before... the [axillary] temperature has to be more than 37.5ºC [...] he gets cold to fast!" (T6)

"First thing is warming the baby very well! Above 37.5, the baby has to be well warmed! (...) and this happens because of the dilation of blood vessels!" (N9)

"The baby has to be well warmed, temperature around 37.5, if the baby is cold, there is no way to visualize the vein, it leads to vasoconstriction, then we cannot see anything and the catheter takes too long to progress or doesn't even progress and we lose the PICC [...]." (N11)

"The baby must be well warmed, temperature around less 37.5ºC, if he's cold, we cannot see the vein, it leads to vasoconstriction and he gets colder when you open the incubator." (T7).

Assessing the axillary temperature is the beginning of the procedure. The temperature control occurs from the adjustment of the NB incubator. According to the nursing team, a suitable temperature contributes to peripheral vasodilation, which facilitates the visualization for venipuncture and progression of the catheter. It is worth mentioning the necessary strict control of the thermal curve, once changes such as hyperthermia or hypothermia, in addition to affecting the NB, hinder the venous visualization and the peripheral venous return, hindering the progression of the catheter. This knowledge, empirical[12], is defined as they know the consequences of vasoconstriction and vasodilation for venous viewing and progression of catheter.

The intense concern of the team with the temperature of the NB is due to the opening of the incubator for the procedure and, consequently, the decreased ambient temperature to which the NB will be exposed. Regarding the initial temperature of 37.5ºC and its maintenance, during the procedure, it is a knowledge built from the practical experience of the team, as the aforementioned statements.

The vasoconstriction, which happens when the NB is hypothermic, can impede the progression of the catheter[16]. The practice of keeping the newborn warm allows for a better visualization of the portal vein for puncture, by means of the peripheral vasodilation, which contributes to the success in the puncture, as well as in the progression of the catheter. The increased temperature of the incubator results in peripheral vasodilation and decreased blood return[17]. Therefore, a vein with greater blood flow becomes more visible to puncture and,

during the progression of the catheter, the vessel is with a greater blood volume, which can collaborate with the opening of the blood valves and facilitate the progression of the catheter.

Besides the temperature control, another care established before the insertion procedure is the execution of measures of comfort for the NB, aiming to calming the baby him down for the procedure and providing analgesia, since the participants consider the insertion of the PICC as a painful procedure. Performing the procedure with a restless, tearful NB is a factor that contributes to difficulties in the procedure.

"[...] the baby, in fact, feels pain, if necessary, I give him painkillers! I only have to be more careful with the babies who are not with tube, the risk of respiratory pressure." (N2)

"[...] to assess the baby's condition, see if this baby needs to be sedated, because some babies cry a lot and are too restless, which hinders the procedure!" (T5)

"[...] a few, [name of a nurse] likes when the baby is very calm, with dimorf, [morphine] always a medication, the dimorf they [doctors] prescribe, but I think another person calming the baby down, staying there with the gloved finger [non-nutritive sucking] [...] this is also important! And it helps! I think that it is good to keep the patient calmer not crying too much!" (T4);

"Let him very warm! He has to be very calm! Giving glucose [25% glucose] before or if you have any prescribed medication."(T7)

"[...] medication for pain, because I believe this procedure is painful, like a peripheral puncture. We usually use dimorf, [morphine], prescribed by the doctor! For the most agitated babies we administer midazolam, those we cannot hold, so we perform the procedure with midazolam, to organize the baby! For a baby without intubation, we cannot administer much medications, then you have to swaddle him, calm, preferably for him to sleep!" (N11)

The most used pharmacological practice in the service is the administration of IV morphine, by means of medical prescription. There is a concern regarding the use of opioids as analgesic due to possible complications, which represents an ethical commitment of the team. With respect to the non-pharmacological measures used, it is worth noting the non-nutritive sucking, with gloved finger, the administration of glucose 25% by oral route and swaddling, considered by the team effective practices and often used.

Pharmacological practice of pain management in neonatal intensive care corresponds to only 3.4% of the control measures of pain in newborns, with the remainder corresponding to non-pharmacological practices. As to these practices, it is possible to realize that non-pharmacological measures are present in the daily routine of care in the insertion of the PICC and there is concern and commitment form the team. The practice of pharmacological analgesia for the insertion of the PICC has the primary purpose of calming the NB for a successful procedure, and not, directly, for comfort measures[21]. Studies highlight and confirm that the risk in using pharmacological analgesia, in case of opioid or fentanyl, identified by the participants as a possibility, exists and that it should be carefully used, especially for newborns without intubation. There are several options for sedation and analgesia, which require using caution, since there is a relationship between their use and longer ventilation time in infants with intubation and higher number of days of hospitalization[19].

Regarding the administration of 25% glucose orally for analgesia, it is recommended to administer one ml of 25% glucose solution, one to two minutes before performing the procedure, and the non-nutritive sucking can be used as auxiliary, which contributes to the practical effectiveness. The sucking with glucose and sucrose are non-pharmacological practices widely used to control pain and are considered efficient and safe[18,20]. A study also points out that, when compared the pharmacological practice with intravenous paracetamol to sucking with sucrose, sucking has been shown to be more effective in reducing pain in procedures with NB[20].

The non-nutritive sucking is considered a practice used as institutional routines, and represents percentages that vary from 34% to 5% of the measures carried out in pain management. It does not directly contributes to reducing pain, by physiological means, but also, helps reorganizing the NB before the stress situation to which he/she is exposed, and thus minimizes the physiological and behavioral effects of pain[20].

It is incipient to affirm that the pharmacological or non-pharmacological practice of pain control of NB in the insertion of the PICC is carried out, exclusively, with the aim of providing comfort to the NB, or keep him/her quiet during the procedure. However, this is a

concern and a recurring practice in the service scenario of the study.

The practice of pharmacological analgesia or not, in the procedure of insertion of the PICC, is based on personal knowledge[12], because there is an inference of personal experience in practice; ethical commitment[12], as they recognize that the patient feels pain during the procedure, and performs analgesic practices; and empirical[12], when portraying the complications/side effects of pharmacological practices. The nursing predicts and recognizes the obstacles in the practice of insertion, and, to this end, establishes a unique and individualized care, before the procedure, since it uses the technologies of analgesia, recognizes the benefits and guarantees a humanized care in reduction of pain, in addition to favoring a successful procedure as it calms the NB down.

Care that contributes to the intravenous therapeutic maintenance through the PICC

Care that contributes to the maintenance of the PICC refers to an appropriate technique to change the dressing on the site of insertion of the catheter, as well as its good stabilization. Some essential characteristics in the dressing are highlighted: undamaged, well-secured edges, without moisture or secretion in the insertion site and a good fixation, in order to prevent accidental traction. This characteristic is perceived when: *"When the dressing is starting to become loose, we have to change it!"* (N4) "[...] [dressing] if it's dirty, wet, unsticking, until the second or third day, it has to be changed, it depends on the dressing state" (N5)

"[...] making the dressing, cleaning with chlorhexidine, waiting for it to dry, placing the transparent [transparent film dressing], after it, I stick the flap, usually with the transparent. It's a micropore®, then a "little surgical tape" to make the tie, which should stick to the micropore® and not to the transparent, otherwise you will rip it all...after another micropore on top with the date, the dressing is tightly sealed, tightly closed and ready, you can pull it, it won't move [...] I just stick it for safety, the mothers pick up their babies, and sometimes can pull it [...]." (N1)

The practice of the dressing establishes through the personal experience of each nurse, as well as the singularity of each patient for evaluation and implementation of the best and most appropriate coverage. The maintenance of the dressing represents not only the coverage of the catheter, but also the maintenance of the catheter, as conservation of the intravenous therapy. This relationship can be perceived in the following statement:

It cannot be dirty, cannot be loose, it cannot have moisture [...] if it's dirty, it has to be changed, because for me, that becomes a growth medium. If it's always loose, a dressing not so well done is a risk of losing the PICC, why do you find PICC within the incubator, loose? Because the dressing was not attached! And the nurse does it! We lose the PICC because of a dressing badly done, unsticking, but the baby ends up damaged by losing an important access in treatment." (N3)

The maintenance of the catheter through the dressing ensures an adequate stabilization of the catheter, besides giving an important role in protecting the insertion site. Evaluating the signs of inflammation at the site of insertion of the PICC, such as the presence of secretions and dirt, is a knowledge and practice that permeates the assessment of maintenance of the PICC. The participants of the study suggest some characteristics such as dirt, moisture and secretion as contributors to the increased rate of infection. The guidelines of the Centers for Disease Control and Prevention (CDC)[21] state that a clean dressing film can be maintained in NB, or a period of up to 10 days, in order to reduce the manipulation of this catheter and complications and injuries that these tapes can cause to the skin of NB.

The maintenance of the catheter is necessary for a lasting and safe permanence of the catheter, in order to avoid its early removal, since there is no maximum time of permanence of the catheter[25]. This assessment of the conditions of the dressing is responsibility of the entire nursing team and is established by an ethical knowledge, in the perspective of recognizing the importance of changing and asepsis of the insertion site, and the empirical knowledge, moderated by the practice of evaluation and decision-making for the execution of the dressing.

Another care established in the routine with the PICC, in neonatal catheters, is the characteristic of medications that can be administered through it, as well as the important permeability of the catheter with saline solution 0.9% in turbulence, "For catheter maintenance, only with flush, washing it with 0.5 ml from 6/6 hours!" (N10). The participants also highlight the

importance of the permeability of the catheter, in particular, those with low flow of infusion (less than 1ml/h) or those that remains saline/heparinized.

Other aspects highlighted by the participants, regarding the use of drugs, can be perceived in the following statements:

"[...] the forbidden medications, like phenobarbital, it crystallizes..., phenytoin, Lasix [furosemide], those you know are forbidden, how are you going to administer them through the PICC, no! No! No! Don't use these medications [...] ah...these blood components, don't use them too." (T2)

"[...] the team lacks a bit of awareness, washing before and after, not using medication that surely has risk of obstruction, hidantal [Phenytoin], diazepam, [...] it has already happened, they insisted the baby had a terrible vein, and would not puncture peripherally, and decided to administer through the catheter, which ended up obstructed! (N4)

The category establishes the standards of knowledge defined by Carper, as they consider the empirical standard when nurses use international protocols[21] for indication/execution of dressings, as well as contraindication of infusion of blood components through neonatal catheters; ethical knowledge in the commitment to maintain, for a longer period of time, the PICC as a safe care technology; aesthetic knowledge, implicit in the singularity in the practice, by means of individual practices of care and maintenance of the catheter [dressing]; personal knwoledge, explicit in the lived experience, by means of the decision not to administer some medications, for risk of obstruction or other complications.

Indications for early withdrawal of the catheter: the suffering with the return of the peripheral practice

The criteria for withdrawal are established by the standard of ethical knowledge in which the complexity of moral judgments, to withdraw or not to withdraw, requires an understanding of what is good and right for the NB.

"The withdrawal of the PICC is usually confirmation of infection, when it is confirmed! When the blood culture test has already been made, confirmed it was from the PICC, or in case of fungus confirmed through blood culture test, we remove... when there is secretion, we withdraw, secretion in the insertion, in case of evident clinical worsening, of a very intense worsening, we remove the PICC and there is no time to collect [...]" (N4).

The main reasons for catheter removal, before finishing the therapy, are mostly related to: Infiltration, due to mid-line or peripheral positioning; rupture of the catheter; suspected or confirmed infection related to the catheter, highlighting the withdrawal by infection as the main reason at the service.

Studies revealing that the greater the number of days using the PICC, the greater the incidence of infections related to therapy, guide empirically the need for early withdrawal of the catheter, in case of confirmed infection or imminent clinical worsening[15,22]. Therefore, the practice of early withdrawal is established empirically, by means of the indications already expressed in the literature that guide the care practice.

The literature highlights that there is a diversity of practices adopted in scientific and institutional protocols, which agree with the evidence as disagree with the scientific findings[23]. These results allow for different interpretations regarding the use of care protocols or practices, which are guided by empirical and aesthetic knowledge performed by nurses.

Nursing identifies the factors and recognizes the need for early withdrawal of the catheter. This practice reflects suffering for both the team as the NB, resulting in return to peripheral therapy. These feelings are evident in the statements:

"To remove a PICC, oh God, it's an investment of ours to remove a PICC, so I ask [...] are you really sure? Our arguments [nurses] are the best! [Laughs] [...] I am very annoying in this sense! Because, there is too much investment to put a PICC, too much! Money, risk of exposing the child, insertion procedure, stress, to manage to put the PICC! We will evaluate well evaluated to withdraw this PICC! In case of an early withdrawal of a, I always wonder where was the mistake? When did the mistake happen, if it was infection, obstruction, rupture..." (N2)

"Nursing is a bit tough to withdraw the PICC and doctors prefer to withdraw! Any clinical worsening leads to PICC withdrawal [doctors]... Because the nursing teams knows well the difficulty to insert a PICC, the difficulty to puncture and the nurse "was with the stars" and manages to insert the PICC in that baby whose

peripheral puncture was difficult, so we try to preserve it and know that baby needs that access for antibiotics, will have more time for parenteral nutrition, will spend a long time hospitalized... Sometimes we are too resistant.... This nursing resistance to remove comes from the difficult insertion, poor baby being subjected to pain, manipulation, the nurse is much calmer to work when he knows there is a safe access, so he will try to hold the PICC."(N8)

The withdrawal of the catheter is also established in a sense of devaluation of its practice and knowledge, as the withdrawal is considered a failure in the care. For the nurse, it means that the care was insufficient, which generates the denial of withdrawal and subsequent feeling of guilt. Moreover, one of the reasons that lead to stress is the necessary peripheral venipuncture, in particular in NB with difficult venous network, considered by the participants the main stressor in neonatal intensive care.

The practices that lead to the early withdrawal of PICC catheters corroborate the findings and come from errors in the process, which sometimes result from infections related to catheters, obstructions and rupture[29-30]. Maintenance is a crucial step of using the PICC, especially regarding the care that provide greater durability of the device, preventing loss of the catheter before the end of the indication[15].

Furthermore, it is possible to highlight the recognition of the suffering of the NB with the need to return to the peripheral circulation, the return of the peripheral venipuncture and the risks of this practice, such as the infiltration and administration of medicines through central route. Recognizing the practice of withdrawal of the PICC reflects the nurse's personal knowledge, as he/she puts him/herself in the place of his/her patient, which brings pain and discomfort that intravenous therapy may present. Recognizing this compromise makes him/her the holder of an ethical commitment with the care, based on a personal knowledge of self-knowledge and empathy.

CONCLUSION

The knowledge and practices of the nursing team denote that the standards of knowledge are present in the neonatal practice and permeate the nursing care in intravenous therapy with the use of the PICC.

Based on the empirical and ethical standards, the indicative criteria for using the catheter come from the characteristics of the NB, through diagnostic, morphological and clinical factors. Before starting the procedure, they are supported by empirical, personal and ethical standards: keeping the NB at 37.5ºC, considered ideal temperature for insertion, as well as the use of analgesic measures, aiming to calm the NB down during the procedure. The most used nonpharmacological analgesic measures are the non-nutritive sucking, the swaddling and 25% glucose. The maintenance of the catheter comes from the principle of practice of asepsis in the manipulation of the catheter, stabilization of the catheter, through a whole and clean dressing, guided by the empirical, aesthetic, ethical and personal knowledge. The indications for early withdrawal of the catheter depart from the principle of obstruction, rupture, and the main: catheter-related infection, implicit in the ethical and empirical knowledge.

A description of the knowledge and practices of nursing professionals in the use of the PICC allows for concluding that nursing has a body of knowledge built and that has been consumed by Nursing. Building a practical knowledge, which can be implemented and adapted to other realities, allows for the strengthening of neonatal nursing in intravenous practice. Knowing the knowledge and practice of neonatal nursing care strengthens the construction of knowledge that goes beyond the thought/performed individually, and thus can be consumed by other teams/other nurses.

A limitation of the study is the local description of characteristics of practices and knowledge; however, it encourages the development of new studies, in other scenarios, that seek to consolidate practices and knowledge of care and thus strengthen the nursing science.

The four standards of knowledge described by Carper are current/active in the neonatal nursing practice. They are inseparable, and depart from the principle that all knowledge, in neonatal intravenous practice with the PICC, comes from an original principle, whether empirical, ethical, personal or aesthetic.

REFERENCES

1- Brito L, Sousa N, Alencar A, Rebouças V, Pinheiro P, Gonçalves Júnior J. Concepts, theoretical models and nursing theories:

Integrative review. Int Arch Med. 2017;10(166):1-8. DOI: 10.3823/2436

2- Barbosa LBA, Motta ALC, Resck ZMR. Os paradigmas da modernidade e pós-modernidade e o processo de cuidar na enfermagem. Enfermería Global 2015 [citado em 2 dez 2018]; 37:342-9. Available in: http://scielo.isciii.es/pdf/eg/v14n37/pt_reflexion2.pdf

3- Vale EG, Pagliuca LMF, Quirino RHR. Saberes e práxis em enfermagem. Esc Anna Nery Rev Enferm. 2009;13(1):174-80. DOI: 10.1590/S1414-81452009000100024

4- Stensvold HJ, Klingenberg C, Stoen R, Moster D, Braekke K, Guthe HJ, et al. Neonatal morbidity and 1-year survival of extremely preterm infants. Pediatrics 2017;139(3):100-9. DOI: 10.1542/peds.2016-1821

5- Lin HJ, Du LZ, Ma XL, Shi LP, Pan JH, Tong XM, et al. Mortality and morbidity of extremely low birth weight infants in the mainland of china: A multi-center study. Chin Med J. 2015;128(20):2743-50. DOI: 10.4103/0366-6999.167312

6- Araújo FL, Manzo BF, Costa ACL, Corrêa AR, Marcatto JO, Simão DAS. Adherence to central venous catheter insertion bundle in neonatal and pediatric units Rev Esc Enferm USP 2017;51:1-8. DOI: 10.1590/S1980-220X2017009603269

7- Santo MKD, Takemoto D, Nascimento RG, Nascimento AM, Siqueira E, Duarte CT, et al. Peripherally inserted central venous catheters: Alternative or first choice vascular access? J Vasc Bras. 2017;16(2):104-12. DOI: 10.1590/1677-5449.011516

8- Brasil, Conselho Federal de Enfermagem (COFEN). Resolução nº 258, 12 de julho de 2001. Rio de Janeiro: Cofen; 2001.

9-Brasil, Conselho Federal de Enfermagem (COFEN). Lei nº 7.498/86, de 25 de junho de 1986. Dispõe sobre a regulamentação do exercício da Enfermagem e dá outras providências. Diário Oficial da União 1986.

10- Sá Neto JÁ, Silva ACSS, Vidal AR, Knupp VMAO, Barcia LLC, Barreto ACM. Nurses' knowledge of the peripherally inserted central catheter: Local realities and global challenges. Rev Enferm UERJ 2018;26:1-6. DOI: 10.12957/reuerj.2018.33181

11-Lui AML, Zilly A, França AFO, Ferreira H, Toninato APC, Silva RMM. Care and limitations in the management of the peripherally inserted central catheter in neonatology. Rev Enferm Cent-Oeste Min. 2018; 8:1-11. DOI: 10.19175/recom.v7i0.1918

12- Carper B. Fundamental patterns of knowing in nursing. Adv Nurs Sci. 1978;1(1):13-24. DOI: 10.1097/00012272-197810000-00004

13- Carvalho EC, Dalri MCB, Napoleão AA, Ramos LAR, Salvador M, Reis PED. The contribution of members of the nursing team to the nursing process according to nurses. Rev Min Enferm. 2008;12(1):71-8. DOI: 10.1590/S0080-62342008000400006

14 - Bardin L. Análise de conteúdo. São Paulo: Edições 70; 2011.

15-Souza B, Rangel R, Alves H, Rodrigues VP, Dames DP, Dórea PE, et al. The knowledge of nurses in terms of the peripherally inserted central catheter: A descriptive study. Online Brazilian Journal of Nursing 2016 [citado em 2 dez 2018]; 15(1):21-31. Available in: http://www.redalyc.org/articulo.oa?id=361453977003

16 - McSwain JR, Yared M, Doty JW, Wilson SH. Perioperative hypothermia: Causes, consequences and treatment. World J Anesthesiol. 2015;4(3):58-65. DOI: 10.5313/wja.v4.i3.58

17 - AquinoI WKM, Lopes MVO, Silva VM, Fróes NBM, Menezes APM, AlmeidaII AAP, et al. Accuracy of the defi ning characteristics in nursing diagnoses of Hyperthermia in newborns. Rev Bras Enferm. 2018;71(2):357-62. DOI: 10.1590/0034-7167-2017-0037

18 - Querido DL, Christoffel MM, Almeida VS, Esteves APVS, Andrade M, Amim Júnior J. Assistance flowchart for pain management in a Neonatal Intensive Care Unit. Rev. Bras. Enferm. 2018;71(Suppl 3):1281-9. DOI: 10.1590/0034-7167-2017-0265

19 - Carbajal R, Eriksson M, Courtois E, Boyle E, Avila-Alvarez A, Andersen RD, et al. Sedation and analgesia practices in neonatal intensive care units (EUROPAIN): Results from a prospective cohort study. Lancet 2015; 3(10):796-812. DOI: 10.1016/S2213-2600(15)00331-8

20 - Roofthooft DWE, Simons SHP, Lingen RAV, Tibboel D, Anker JNVD, Reiss IKH, et al. Randomized controlled trial comparing different single doses of intravenous paracetamol for placement of peripherally inserted central catheters in preterm infants. Neonatol. 2017;112:150-8. DOI: 10.1159/000468975

21 - Sharpe E, Pettit J, Ellsbury DL. A national survey of neonatal Peripherally Inserted Central Catheter (PICC) practices. Adv Neonatal Care

2013;13(1):55-74.DOI: 10.1097/ANC.0b013e318278b907
22 - Martín-Rabadán P, Pérez-García F, Flores EZ, Nisa ES, Guembe M, Bouza E. Improved method for the detection of catheter colonization and catheter-related bacteremia in newborns. Diagn Microbiol Infect Dis. 2017;87(4):311-4. DOI: 10.1016/j.diagmicrobio.2017.01.001
23 - Curan GRF, Rossetto EG. Interventions to decrease catheter-associated bloodstream infections in newborns: An integrative review. Texto Contexto-Enferm. 2017;26(1):1-9. DOI: 10.1590/0104-07072017005130015
24 - Tsai MH, Hsu JF, Lien R, Huang HR, Chiang CC, Chu SM, et al. Catheter management in neonates with bloodstream infection and a percutaneously inserted central venous catheter in situ: Removal or not? Am. J Infect Control. 2017;40(1):59-64. DOI: 10.1016/j.ajic.2011.04.051
25 - Van den Berg J, Astroom JL, Olofsson J, Fridlund M, Farooqi A. Peripherally inserted central catheter in extremely preterm infants: Characteristics and influencing factors. J Neonatal Perinatal Med. 2017;10(1):63-70. DOI: 10.3233/NPM-16105

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Mailing address:
Leonardo Bigolin Jantsch
Avenue Independência, 3751 – Vista Alegre.
ZIP CODE: 98300-000 – Palmeira das Missões/MG - Brazil
E-mail: Leonardo.jantsch@ufsm.br