

PRACTICES DEVELOPED BY NURSES IN THE MANAGEMENT OF PERIPHERALLY INSERTED CENTRAL CATHETERS: AN INTEGRATIVE REVIEW

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ABSTRACT

Objective: to identify, in the scientific literature, the practices developed by nurses in the management of peripherally inserted central catheters (PICC) in hospitalized adults. **Methods:** this is an integrative literature review. The following descriptors were used for the search: *Adulto* (Adult), *Cuidados de Enfermagem* (Nursing Care), *Planejamento de Assistência ao Paciente* (Patient Care Planning), *Competência Profissional* (Professional Competence), *Credenciamento* (Credentialing), *Enfermeiras e Enfermeiros* (Nurses), *Cateterismo Periférico* (Catheterization, Peripheral), *Dispositivos de Acesso Vascular* (Vascular Access Devices), *Cateterismo Venoso Central* (Central Venous Catheterization), *Pacotes de Assistência ao Paciente* (Patient Care Bundles) and their synonyms, without the use of filters, in the databases of the Virtual Health Library (VHL); Medical Literature Analysis and Retrieval System Online (MEDLINE); National Library of Medicine (PubMed) and the Coordination for the Improvement of Higher Education Personnel (CAPES) journal portal. Only primary articles were included. **Results:** of 2,130 initial publications, only six constituted the final sample. They were published between January 1998 and April 2021, and there was only one Brazilian study. Most of the publications were related to continuing and permanent education, the use of chlorhexidine, hand hygiene, the use of personal protective equipment, dressing changes, the use of ultrasound, insertion and handling times, and the saline flush technique. **Conclusion:** Highlights included continuing and ongoing education, the use of X-rays and ultrasound to locate the catheters, dressing care, sterile technique, hand hygiene and care when handling the catheters.

Descriptors: Adult; Peripheral catheterization; Nursing care; Hospitalization.

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INTRODUCTION

Worldwide, there has been a change in healthcare delivery methods. We now have various technologies aimed at providing safer patient care, including intravenous therapy devices. This is one of the areas that has demanded careful nursing care, due to the constant need for safe and long-lasting venous access for the administration of antimicrobials, venous hydration, parenteral nutrition, vasoactive drugs, among others⁽¹⁻²⁾.

An alternative for stable and effective venous access is the peripherally inserted central catheter (PICC)⁽³⁾.

In Brazil, PICCs began to be used in the 1990s. It should be noted that PICCs gained prominence in the 1970s because it enabled parenteral nutrition in Neonatal Intensive Care Units (NICUs). Strict vigilance in the use of PICCs is essential for patient safety, which is the most critical and decisive dimension of quality, since it corresponds to reducing the risk of unnecessary harm associated with health care to the lowest acceptable level⁽⁴⁾.

In addition to the theoretical basis and technical skills that support the promotion of effective care outcomes from the indication, insertion, management and removal of the PICC, legal support is also required. In this sense, the Federal Nursing Council in Brazil, through Resolution 258/2001, defines nurses who are duly qualified and/or professionally trained for this procedure as having technical and legal competencies⁽⁵⁾.

Health services have been organizing and creating study groups to discuss, propose, and improve protocols for invasive procedures. The standardization of nursing procedures, discussion strategies, training and the implementation of routines for the use of PICCs can help reduce catheter-related complications and promote better quality of care and patient safety^(6,2).

According to the Infusion Therapy Standards of Practice of the Infusion Nurses Society (INS), update 2021⁽³⁾, the management of PICCs consists of the following items: flushing (before and after each infusion), clamping (after each flushing), changing filters and needleless connectors, changing complementary fixation and stabilization devices, changing dressings (every seven days), antimicrobial coverage, changing the management set and elective removal of the device, hand hygiene, adopting the practice of hub asepsis, handling it with sterile gloves, releasing the catheter for use when its location is verified by radiographic imaging, and skin protection⁽³⁾.

In this sense, it is necessary to gather scientific evidence on the management of PICCs by nurses, so they can support the practice of nurses and bring new perspectives for research, especially since it is a procedure that falls within the competence of this professional. Therefore, the aim of this study is to

learn about the scientific production on the practices developed by nurses in the management of PICCs in hospitalized adults.

METHOD

In order to construct this integrative review, six stages were followed: elaboration of the research question, establishment of eligibility criteria, literature search, definition of the information to be extracted from the selected studies, data collection, critical analysis of the selected publications, interpretation of the results and knowledge presentation/synthesis⁽⁷⁻⁸⁾.

The research question was based on the acronym PICo, with the "population" (P) being hospitalized adults, the phenomenon of "interest" (I) being PICCs and the "context" (Co) being the practices developed by nurses in the management of PICCs⁽⁹⁾. This question was therefore: "What are the practices developed by nurses in the management of PICCs in hospitalized adults?".

The search for studies took place in the Virtual Health Library (VHL), in the central library system of the State University of Londrina (UEL), in the Journal Portal of the Coordination for the Improvement of Higher Education Personnel (CAPES), based on identification through the Federated Academic Community (CAFe) and in the Medical Literature Analysis and Retrieval System Online (MEDLINE) database via the National Library of Medicine (PubMed). The estimated time limit of the search was from January 1998 to April 2021, in Portuguese and English, a date which marks the beginning of this practice in hospital units under the responsibility of professional nurses. A manual search was also carried out on the references of the articles selected for full reading.

The search strategy consisted of descriptors and their synonyms identified in the Health Science Descriptors (DeCS) and their English equivalents identified in the Medical Subject Headings (MeSH). The Boolean operators "AND" and "OR" were used between the descriptors and their synonyms within the sets of terms in the PICo strategy, and the Boolean operator AND was used to cross-reference the groups of descriptors (Chart 1).

To manage the studies, all the titles and abstracts initially selected were imported from each database into the Endnote program version 9 (Thomson, Reuters, Carlsbad, USA). Later in this stage, we used the State of the Art through Systematic Review (StArt®) software, a tool used in systematic reviews, developed by the Software Engineering Research Laboratory of the Department of Computing at the Federal University of São Carlos. Titles and abstracts were assessed by two independent reviewers, based on the eligibility criteria, and a third reviewer resolved any disagreements⁽¹⁰⁾.

Chart 1 - Search strategy in Portuguese and English used in the databases of the Virtual Health Library (VHL) and the Medical Literature Analysis and Retrieval System Online via National Library of Medicine, Londrina, Paraná, Brazil. 2021.

Database	Search strategy used
VHL	(Adults) AND (“Vascular Access Devices”) AND (“Patient Care Bundles”); (Adult) AND (“Nursing Care”) AND (“Catheterization, Peripheral”); (“Nursing Care”) AND (“Vascular Access Devices”) AND (Adults); (Hospitalization) AND (“Catheterization, Peripheral”) AND (“Nursing Care”); (“Catheterization, Peripheral”) AND (Adults) AND (“Professional Competence”); (“Hospitalization”) AND (“Catheterization, Peripheral”) AND (“Nursing Care”); (“Catheterization, Peripheral”) OR (“Catheterization, Peripheral”) OR (“Vascular Access Devices”) AND (Adults) AND (“Nursing Care”); (Adult) OR (Adults) AND (“Catheterization, Peripheral”) OR (“Catheterization, Peripheral”) AND (“Nursing Care”) OR (“Nursing Care”); (“Catheterization, Peripheral”).
CAPES	(“Catheterization, Peripheral” AND Adults); (“Catheterization, Peripheral”).
PubMed	(Adult) AND (“Nursing Care”) AND (“Catheterization, Peripheral”); (“Patient Care Bundles”) AND (“Catheterization, Peripheral”) AND (Adults); (“Catheterization, Central Venous”) AND (“Nursing Care”) AND (Adult).

Indexed original articles published free of charge in the last 23 years (between January 1998 and April 2021), in Portuguese and English, and related to the guiding question, were included. For the selected articles, information was extracted into an Excel spreadsheet developed by the authors based on the adaptation of an already validated instrument with the following variables: title and objective of the article, database where it was identified, title of the journal, name of the authors, country, language, year of publication, institution where the study was carried out, design, sample, inclusion/exclusion criteria, results, data analysis, conclusions and level of evidence (LE)⁽¹¹⁾.

The following classification was used to determine the level of evidence: level 1 (strongest) - evidence from systematic reviews or meta-analyses of randomized clinical trials; level 2 - evidence derived from well-designed randomized clinical trials; level 3 - evidence obtained from well-designed nonrandomized clinical trials; level 4 - evidence from well-designed cohort and case-control studies; level 5 - evidence from systematic reviews of descriptive and qualitative studies; level 6 - evidence from single descriptive or qualitative studies; and level 7 (weakest) - evidence from expert opinions⁽¹²⁾.

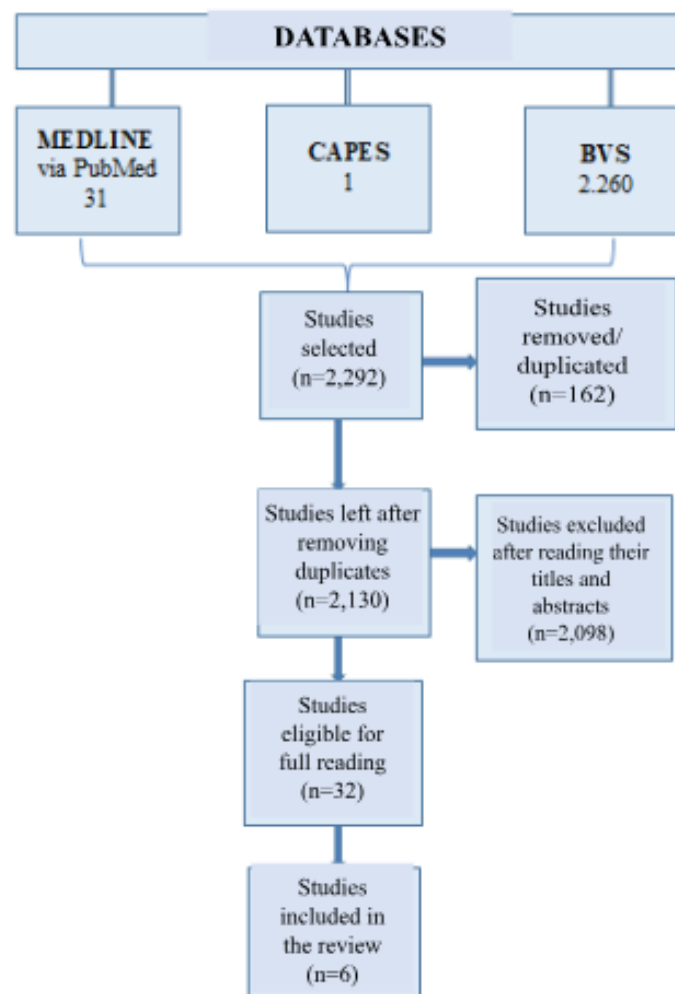
A total of 2,292 publications were identified, of which 162 were duplicates and 2,098 were excluded after analyzing their titles and abstracts. Thirty-two articles were eligible to be read in their entirety. After reading, 26 were excluded because they did not address the management of PICCs in hospitalized adults (Figure 1).

The critical analysis and synthesis of knowledge was carried out descriptively based on the data collected. Using thematic analysis, the variables were described and then interpreted, looking for common threads between the studies, which were then categorized into continuing and permanent health education, catheter tip positioning, hand hygiene, maximum protection barrier, skin antiseptics with chlorhexidine, avoiding access to the femoral vein, removing catheters, changing dressings, and assessing the catheter exit site, dressings and connections on a daily basis⁽¹³⁾.

RESULTS

The results of the identification and selection of studies are described according to the database. After selecting 2,292 studies, 162 were removed because they were duplicates, leaving 2,130 articles. Subsequently, the title and abstract were read and 2,098 studies were excluded. Thirty-two articles were read in full and six were included for discussion of the topic, as illustrated in the flowchart (Figure 1).

Figure 1 - Flowchart of the selection of primary studies included in the integrative review according to databases, 2022. Prepared by the authors



The six studies selected were published in 2010 (n=1), 2015 (n=2), 2016 (n=1) and 2018 (n=2) and grouped according to Chart 2.

Chart 2 - Synopsis of the data collected in the articles of the integrative review from 1998 to April 2021. Londrina, Paraná, Brazil, 2021.

STUDY	OBJECTIVE	AUTHOR / STUDY DESIGN / SETTING	JOURNAL / YEAR	LE
E1	Evaluate the effectiveness of multifaceted interventions in reducing PICC complications in adult oncology patients.	TIAN, G et al./Intervention The Second People's Hospital of Shenzhen	Support Care Cancer/2010	4
E2	Pilot study to compare silicone foam dressing with gauze as a cushioning material to protect the skin and appendages from PICC.	CURTIS, K et al./Intervention Setting: Not informed.	Clinical Journal of Oncology Nursing/ 2015	2
E3	Analyze current PICC practices for burn patients, identify PICC-related complications, and provide clinical indication for care management according to PICC manuals.	YOUNGHWAN, C et al./Retrospective Cohort Burn center in Korea	Burns/2015	4
E4	Evaluate the incidence rate of PICC-related complications in a hospital in northern Spain with a cohort of mostly onco-hematological patients.	Parás-Bravo, Paula et al./Retrospective Cohort North Spain Hospital	PLoS One/2016	4
E5	Randomized clinical trial to verify the differences between two washing methods in PICC.	LIU, F et al./Prospective Randomized West China Hospital of Sichuan University	The National Medical Journal of India/2018	2
E6	Promote evidence-based practice in the management of PICC in pediatric and adult patients in an intensive care unit.	OLIVEIRA. L. B. et al./Intervention Hospital das Clínicas de São Paulo	JBI Database of Systematic Reviews and Implementation Reports/2018	3

Legend: LE: Level of Evidence; PICC: Peripherally Inserted Central Catheter.

A summary of the primary studies included in the review, in terms of the PICC management measures developed by nurses and the main limitations, can be found in Chart 3.

Chart 3 - Summary of PICC management measures and the respective limitations presented in each article. Londrina, Paraná, Brazil, 2021.

STUDY	PICC MANAGEMENT MEASURES	LIMITATIONS
E1	<p>Mandatory reeducation by a multidisciplinary team to highlight the correct practices to prevent complications; chest X-ray before removing the guide; replacement of 10% iodine with 2% chlorhexidine for skin antisepsis and hand washing before insertion and always before handling the catheter; use of gloves to handle the catheter; use of sterile drapes during insertion and handling of the catheter; after insertion of the catheter, a sterile gauze dressing is applied and changed within the first 24 hours and every 7 days thereafter; a weekly information form is drawn up for each patient, containing: demographic data, clinical data, place and date of insertion, date of removal, date of dressings, length of stay, reason for removal, and complication; instructions on catheter care are given to the patient, covering the topics: the importance of hygiene, what they should and should not do on a daily basis, and seeking nursing or medical assistance if there is pain, swelling, itching or erythema; a copy of the insertion form is provided to the patient so that they can consult it whenever necessary; definition of complications: central line-associated bloodstream infection, isolation of the microorganism, antibiogram, culture, blood culture, start of antimicrobial within 48 hours of catheter removal, local infection (presence of exudate), phlebitis (pain, heat, erythema, tenderness, palpable cord along the vein, or visualized using ultrasound, edema of the extremity).</p>	<p>It was not possible to determine which components of the intervention were responsible for the significant decrease in the rate of PICC-related complications. The previous cohort may have been influenced by reporting bias such as catheter line revision. Safe practice was only initiated after adverse events occurred. Clinical availability and potential complications deserve further investigation in large-scale studies.</p>
E2	<p>Nurses were assigned to evaluate dressing sites and changes during the four weeks of the study. Itching, discomfort, ease of removal and skin condition were noted. Silicone group: the dressing was changed with aseptic technique without touching according to the organizational procedure, including a chlorhexidine-impregnated dressing at the insertion site, Mepilex® 7.5x7.5 was used, the edge was placed under the axis of the PICC; there was a higher probability of removal of this type of dressing when compared to gauze; skin irritation was reduced by 44% with the use of silicone foam when compared to gauze; pruritus was reported by the patient in 29% of cases, although no statistical significance was found. Gauze group: sterile gauze in the standard dressing pack was placed under the PICC shaft and protected with TSM (Smith & Sobrinho, IV3000).</p>	<p>Further studies are needed to generate evidence of the effectiveness of silicone foam compared to gauze, including the cost-effectiveness of both materials.</p>
E3	<p>Ultrasound was not routinely used for catheter insertion; the use of ultrasound was indicated for PICC insertion with 4 or 5 non-valved French; catheter insertion with the aid of ultrasound is safer and more effective, such as choosing deep veins, like the basilic and brachial veins, in order to reduce the risk of complications; the catheter was inserted prioritizing a distance (11 to 15 cm) from open burns; sterile barrier precautions (mask, cap, glove, apron, surgical drape) were used during insertion; dressing management was compatible with gauze and transparent film with 2% chlorhexidine; daily dressing changes with gauze were necessary; tegaderm® TM was indicated when the catheter was inserted close to the burn site. Approximately 62% (n = 65) had their dressing changed every 48 hours, and 37.5% (n = 39) had their dressing changed daily.</p>	<p>Study carried out in a single burn center, with a small cohort. Memory and selection bias.</p>

To be continued...

Continued Table 3.

E4	<p>The catheters were inserted by trained nursing staff, using sterile technique and guided by ultrasound; the vein of choice and its caliber were proportional to the caliber of the catheter; the location of the distal tip of the catheter was confirmed using a chest X-ray; fixation and stabilization were carried out using a sterile latex-free device designed for this purpose (StatLock® PICC Plus Stabilization Device®); weekly sterile dressing with transparent films and cleaning with chlorhexidine solution were performed as recommended by the United States Centers for Disease Control and Prevention (CDC); the criteria for diagnosing thrombosis and phlebitis were the presence of symptoms and confirmation by ultrasound; fixation devices were changed when detachment occurred; the catheters were sealed with heparin after use; flushing with 0.9% saline is recommended.</p>	<p>Memory bias. Cleaning the catheter with saline is recommended. However, this study was carried out between October 2010 and December 2013, and the protocol at the time consisted of the prophylactic use of heparin.</p>
E5	<p>The PICCs were inserted by trained nursing staff using aseptic precautions; the position of the PICCs was confirmed by chest X-ray. Intervention group: use of two flushing techniques: VAMP system: First, 5 ml of saline solution was placed in the reservoir, which was closed. Secondly, the catheter was opened and all the fluids were reinfused into the venous line under positive pressure and impulse mode. Control group: traditional flushing: the infusion tube was disconnected and saline solution was inserted using a 10ml syringe. Both procedures were repeated every 4 hours. Flushing should be done before and after drug administration, before clamping the device, after obtaining blood samples and after parenteral nutrition or blood products. The VAMP flushing protocol can be effective in reducing the occlusion rate.</p>	<p>Selection bias. Reports on the use of VAMP for washing PICCs are scarce. The VAMP system is more expensive than traditional equipment. Long-term patient outcomes were not evaluated, and the study was single-center and therefore may not be generalizable to other institutions, which have a different workflow and patient profile.</p>
E6	<p>Structuring of a team made up of a lead nurse, ICU nurse and head of nursing, together with the nursing directorate; use of transparent dressings; changing of the dressing every seven days or whenever the dressing becomes damp, dirty and/or when inspection of the site is necessary, by bedside observation; use of a pulsed flushing technique (push-pause technique); when clamping the catheter, a positive pressure technique should be used when disconnecting the syringe; the PICC is flushed with a 10ml or larger syringe before all drug administration, after drug administration, blood product infusions, lipid infusions and blood sampling to avoid occlusion; administration sets, including secondary sets and complementary devices, are not changed more frequently than every 96 hours interval, unless a catheter-related infection is suspected by bedside observation and verified through nursing records; blood and hemocomponent administration sets are changed every 12 hours, or when the transfusion procedure is complete; administration sets are changed every 24 hours with the administration of parenteral nutrition containing lipids; professionals involved in the process have received educational training on PICC management every six months.</p>	<p>Difficulty in providing training for the nursing team. As the scenario took place in an ICU, it was not possible to place the professionals in an appropriate location, and most of the meetings were held inside the ICU. Availability of the implementation project team members, who also conducted the educational program during their working hours. Due to the high ICU work demand, they made every effort to provide the educational program to the entire nursing team.</p>

Legend: PICC: Peripherally Inserted Central Catheter; VAMP: Venous Arterial blood Management Protection; ICU: Intensive Care Unit).

DISCUSSION

This study sought to observe the practices developed by nurses in the management of PICCs, according to the following categories: Continuing Education, Permanent Health Education, Catheter Tip Positioning and central line-associated bloodstream infection.

The Society for Healthcare Epidemiology of America and the Centers for Disease Control and Prevention (CDC) recommend implementing a central venous catheter (CVC) insertion and management checklist, using chlorhexidine for skin antisepsis, dressing appropriately with sterile personal protective equipment (PPE), evaluating daily and requesting removal when no longer necessary and at the end of intravenous therapy. In addition, educating health professionals about best practices, both of which are the exclusive responsibility of nurses⁽¹²⁾.

In this context, the relevance of *Continuing Education* (CE) is characterized⁽¹³⁾ to qualify professionals in the technical-scientific knowledge of each area, with emphasis on theoretical-practical courses including training, based on specific diagnoses and treatment protocols.

Consequently, the authors⁽¹⁴⁾ point to *Permanent Health Education* (PHE) with a view to improving the quality of care, guided by the problematization of common cases in the workplace in order to provoke transformations in clinical practice. They also point out that CE and PHE are different in terms of methodology and the professional group assisted.

Meanwhile, researchers⁽¹⁵⁾ have reflected on their study's contributions to the principles of the national PHE policy as a tool in the work process, corroborating institutional changes. They also conclude that it enhances the autonomy of health professionals; however, some challenges are recurrent, such as the turnover of workers in the sectors and the adequate infrastructure to carry out such training.

This confirms the considerations that were also pointed out in another study⁽¹⁶⁾, emphasizing that a simulator should be used to train health professionals, with the aim of improving the techniques for inserting and handling PICCs before providing care to patients. More than 60% of hospitals in the United States with over 50 beds have a PICC team made up of nurses⁽¹⁷⁾.

As for *positioning the tip of the catheter*, the literature shows that US-guided catheterization has provided better results when compared to insertion by blind puncture. Its use promotes more assertive insertion, as it allows visualization of the depth of the vein and identification of adjacent vessels and structures, reducing the duration of the procedure⁽¹⁸⁻¹⁹⁾. Its use is recommended by national and international bodies and societies such as INS, ANVISA, the National Institute for Clinical Excellence (NICE) and the Agency for Healthcare Research and Quality (AHRQ)^(2,20-22).

In addition, microintroduction and US techniques are recommended, which provide greater assertiveness and lower complication rates^(2,19-20). Different methods for confirming tip positioning are

currently available, such as US and the electrocardiogram (ECG) guided method, which is considered the best, but with restrictions for patients with cardiac arrhythmia⁽²⁾.

A Chinese study, which evaluated the cost-effectiveness of PICC placement using a US- and ECG-guided system versus external measurements and confirmatory chest X-rays, noted that in the first few months the costs of using US were higher, but considering the costs of treating complications, the cost-effectiveness for insertion with US was better⁽²³⁾.

The National Health Surveillance Agency⁽²⁴⁾ recommends a number of procedures with the aim of ensuring care, including: hand hygiene, selection of the catheter and insertion site, skin preparation, stabilization, coverings, flushing and handling, evaluation, care of the insertion site, and removal of the catheter.

One of the reasons for serious complications following PICC insertion is related to the incidence of central line-associated bloodstream infection, which can be reduced by adopting preventive measures, such as *hand hygiene* before handling the catheter and its connections, using a *maximum protection barrier* during catheter insertion, *antiseptis of the skin with chlorhexidine*, *avoiding access to the femoral vein*, *removing catheters* when they are no longer needed, *changing dressings* as recommended, and *evaluating the catheter exit site, dressings and connections on a daily basis*⁽²⁵⁾.

One strategy for reducing central line-associated bloodstream infection is to use a dressing with a gel or disk impregnated with chlorhexidine⁽²⁶⁻²⁷⁾. This dressing is effective in reducing skin colonization by microorganisms that cause extra-luminal contamination of the catheter⁽²⁸⁻²⁹⁾.

In some studies⁽³⁰⁻³¹⁾, chlorhexidine gel dressings were found to be superior in terms of their ability to suppress bacterial growth. The advantages of chlorhexidine gel dressings are that they are applied in a single step, allow direct contact of 2% chlorhexidine with the skin and the fact that the gel is translucent allows visualization of the exit site⁽³¹⁾.

On the other hand, it is essential to have well-established protocols for dressing changes, since the inherent adhesiveness of any type of dressing used to cover the CVC can cause skin lesions due to the removal of the stratum corneum from the skin⁽³²⁻³³⁾.

It is worth noting that dressing is a private activity for nurses who have received training and have the technical skills to prevent displacement and infection of the PICC due to manipulation. Permeabilization with 0.9% saline solution should take place before and after drug infusion and every six hours to prevent obstruction. Only syringes with a volume of 10 milliliters or more should be used, as smaller volumes can cause rupture and embolism of the catheter lumen⁽³⁴⁾.

As for the maximum barrier during insertion, the authors⁽³⁴⁾ emphasize the importance of hand hygiene before and after handling PICCs; disinfecting the connections and the hub with 70% alcohol

before infusing any solution; periodically replacing the infusion system (equipment, polyfix) according to the routine established by the manufacturer or the unit; protecting PICCs and connections during bathing and removing PICCs as soon as they are no longer needed.

Nurses' identification of complications at an early stage is extremely important, and they should periodically observe the catheter insertion ostium to identify the presence of redness, secretion and signs of dislodgement. They should also be on the lookout for hyperthermia, phlebitis, cellulitis, fractures and obstruction of the device. Routine replacement of PICCs to prevent central line-associated bloodstream infection is not recommended, nor is their removal due to fever alone⁽³⁵⁾.

Therefore, educating and training the healthcare team on how to insert and handle PICCs includes advising them to avoid routinely changing the catheter, having a specific team that is properly trained, and raising awareness that wearing gloves does not exclude hand washing⁽²⁴⁾.

A study⁽³⁶⁾ revealed that setting up teams to insert PICCs can influence the total costs of the procedure and the team can have different roles to be defined according to the demand and resources of each institution. In general, the team is responsible for performing PICC insertions, providing refresher training and continuing education for professionals and contributing to the development of protocols using the best evidence and lowest costs.

CONCLUSION

Few studies were identified that addressed the issue of PICC management in hospitalized adult patients. The low number of publications was a limiting factor in the study, as it makes it difficult to analyze other elements that may be important in nurses' knowledge of PICC management. Continuing and ongoing education, the use of X-rays and US to locate the catheter, dressing care, sterile technique, hand hygiene and care when handling the catheter stood out.

The need for new discussions on the subject was pointed out through the guidelines established. There was a lack of national studies on the subject, which reveals a gap in national scientific production. In view of this, it was found that knowing how nurses manage PICCs at a national level is a challenge for the systematization of care in the country.

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