PERIPHERALLY INSERTED CENTRAL CATHETER: CONTRIBUTIONS TO ONCOLOGICAL NURSING

CATETER CENTRAL DE INSERÇÃO PERIFÉRICA: CONTRIBUIÇÕES PARA A ENFERMAGEM ONCOLÓGICA

CATÉTER CENTRAL DE INSERCIÓN PERIFÉRICA: CONTRIBUCIONES PARA LA ENFERMERÍA ONCOLÓGICA

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ABSTRACT

Objective: to analyze the evidence about the care for the correct use of the Peripherally inserted central catheter by the nurse to the patient with cancer. **Method:** this is a bibliographical study, type integrative review. Scientific articles were searched in the databases LILACS, BDNF and MEDLINE, published between the years 2010 and 2016. The results are presented in table and figure form. **Results:** 422 articles were found, 175 were analyzed and, of these, 15 were selected. Two categories were listed for discussion: the importance of nursing professional knowledge for the use of PICC and patient safety through safe practice. **Conclusion:** it was concluded that due to the autonomy of the nurse, supported by the law, the indications of use, patient comfort, benefits for professionals, cost-effectiveness and low complication rates, selection of PICC in the treatment of cancer patients is a very intelligent and reliable option, however, the nurse must be attentive to the improvement of the knowledge of the entire nursing team. **Descriptors:** Oncology; Nursing Oncology; Central Venous Catheters; Nursing care; Nursing; Catheters.

RESUMO

Objetivo: analisar as evidências acerca dos cuidados para o correto uso do cateter central de inserção periférica pelo enfermeiro ao paciente portador de câncer. **Método:** trata-se de um estudo bibliográfico, tipo revisão integrativa. Realizou-se a busca de artigos científicos nas bases de dados LILACS, BDNF e a MEDLINE, publicados entre os anos de 2010 a 2016. Apresentam-se os resultados em forma de tabela e figuras. **Resultados:** encontraram-se 422 artigos, analisaram-se 175 e, destes, 15 foram selecionados. Elencaram-se duas categorias para discussão: a importância do conhecimento do profissional de Enfermagem para o uso do PICC/CCIP e a segurança do paciente por meio da prática segura. **Conclusão:** concluiu-se que, devido à autonomia do enfermeiro, respaldada pela lei, às indicações de uso, ao conforto proporcionado aos pacientes, aos benefícios para os profissionais, ao custo-efetividade e às baixas taxas de complicações, a seleção do PICC/CCIP no tratamento de pacientes oncológicos é uma opção muito inteligente e confiável, porém, o enfermeiro deve estar atento ao aperfeiçoamento do conhecimento de toda a equipe de Enfermagem. **Descritores:** Oncologia; Enfermagem Oncológica; Cateteres Venosos Centrais; Cuidados de Enfermagem; Enfermagem; Cateteres.

RESUMEN

Objetivo: analizar las evidencias acerca de los cuidados para el correcto uso del catéter central de inserción periférica por el enfermero al paciente portador de cáncer. **Método:** se trata de un estudio bibliográfico, tipo revisión integrativa. Se realizó la búsqueda de artículos científicos en las bases de datos LILACS, BDNF y MEDLINE, publicados entre los años 2010 a 2016. Se presentan los resultados en forma de tabla y figuras. **Resultados:** se encontraron 422 artículos, se analizaron 175 y, de éstos, 15 fueron seleccionados. Se establecieron dos categorías para discusión: la importancia del conocimiento del profesional de Enfermería para el uso del PICC / CCIP y la seguridad del paciente por medio de la práctica segura. **Conclusión:** se concluyó que, debido a la autonomía del enfermero, respaldada por la ley, a las indicaciones de uso, al bienestar proporcionado a los pacientes, a los beneficios para los profesionales, al costo-efectividad y a las bajas tasas de complicaciones, la selección del PICC / CCIP en el tratamiento de pacientes oncológicos es una opción muy inteligente y confiable, sin embargo, el enfermero debe estar atento al perfeccionamiento del conocimiento de todo el equipo de Enfermería. **Descriptores:** Oncología Médica, Enfermería Oncológica, Catéteres Venosos Centrales, Atención de Enfermería; Enfermería; Catéteres.

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INTRODUCTION

It is known that, with population aging and various lifestyle changes and increased exposure to risk factors, the incidence of cancer has been increasing daily, according to the World Cancer Report 2014, International Agency for Research on Cancer (IARC) of the World Health Organization (WHO). It is expected that in the coming decades, the impact of cancer on the population will account for 80% of the more than 20 million new cases estimated for 2025.¹

It is understood that, with the rapid evolution of health knowledge, it is incumbent upon Nursing to aggregate the necessary technical and scientific knowledge to develop quality care, especially with regard to Oncology, a complex discipline in the area of health, which has a great evolution in the diagnostic and therapeutic techniques, thus enabling an increase in the survival and quality of life of patients with cancer.

In this interim, the importance of Nursing in the field of Oncology, which occurs at several levels of health care is perceived, permeating the promotion, prevention, cure and rehabilitation, is the only category to provide care to the patient 24 hours a day.

Among the different oncologist nurse practices, the technical and legal competence to insert and manipulate the Peripherally inserted central catheter (PICC), defined by COREN-RJ as a catheter long central venous, made of flexible material (silicone or polyurethane), considering its various benefits, mainly for high risk patients, stands out.²

In this context, the development of this study is justified by the interest in analyzing the use of the Peripherally inserted central catheter performed by the nurse, since its correct use is directly reflected in the quality of the oncological client's assistance.

OBJECTIVE

- To analyze the evidence about care, for the correct use of the Peripherally inserted central catheter by the nurse, to the patient with cancer.

METHOD

The work was developed from an integrative review approach, which intends to reflect on the use of PICC in the care of the nurse to the cancer patient. It is based on the integrative review of literature in the analysis of relevant research that can aid in decision making and improvement in clinical practice,

enabling the synthesis of the knowledge state of a given topic, as well as pointing out knowledge gaps that need to be fulfilled by the conducting new studies.³

Therefore, the steps of an integrative review were: to identify the research theme for the elaboration of the integrative review; establish criteria for inclusion and exclusion of studies and their sampling; data collection and categorization of studies; critical analysis of included studies, discussion of results and presentation of knowledge review/synthesis.³

The first step was the elaboration of the following research question: "How should the central peripheral insertion catheter be used correctly in a patient with an oncologic disease?".

The second phase was started with a rigorous exploratory search in the Virtual Health Library (VHL), using, as databases, LILACS (Latin American and Caribbean Literature in Health Sciences), BDENF (Databases of Nursing) and MEDLINE (Medical Literature Analysis and Retrieval System online). The following inclusion criteria were selected for the data collection: studies published in the form of an article, available in the original Portuguese and English languages, published in said databases between 2010 and 2016, considering the last eight years of publications, addressing the central catheter of peripheral insertion. The following exclusion criteria were established: unavailability of access, double publications, abstracts, texts in the form of projects, in other languages or outside the time frame defined in the inclusion criteria and all articles that are not articulated to the theme.

The following words were used in the research: PICC, CCIP; oncology; oncology; Nursing; nursing and nurse.

The data was collected in January 2017. A total of 422 articles were selected and, as the texts were found, the abstracts were read, selecting those that had an interface with the subject of study for reading posterior. At the end, 175 articles related to the subject were analyzed, as can be seen in figures 1 and 2.

Descriptors	Total	Filters	Selection	2010	2011	2012	2013	2014	2015	2016
(PICC OR CCIP) AND oncol\$	44	20	04	01	0	01	0	01	01	0
(PICC OR CCIP) AND (nurs\$ OR enfer\$)	349	144	08	0	0	03	01	02	0	01
(PICC OR CCIP) AND (nurs\$ OR enfer\$) AND (oncol\$)	29	11	03	01	0	0	0	02	01	0
Total	422	175	15	02	0	04	01	05	02	01

Figure 1. Cross-referencing of descriptors. Rio de Janeiro (RJ), Brazil, 2017.

Figure 2. Prism flowchart of the study’s selection. Rio de Janeiro (RJ), 2015.⁴

The terms PICC and CCIP were used, together with the Boolean operator OR, in all research modalities, since, among the inclusive criteria, articles were found in the Portuguese and English languages, and when using the terms Oncology and Nursing , thousands of articles appeared that did not fit the objective of this study.

The terms PICC and CCIP were chosen, which, even without being part of the descriptors indexed in the DeCs, are the ones that most resemble the terms "central venous catheter" and "catheters", elements

considered vague for the specificity of this study.

The descriptor "oncol \$" was used in two of the three research modalities, to encompass all words with this radical, as well as "nurs \$" and "enfer \$", to achieve more exact and specific results. Included in all search modalities were the "full text", "language" and "year of publication".

In the third step, a data collection instrument was used to extract key information from each selected article. At this stage, the studies were evaluated in full.

RESULTS

Journal	Qualis	Database	Year	Location	Authors' Profession	Authors	Title	Search Type	Document Type
Int J Nurs Stud	A1	MEDLINE	2014	China	Nurses	Qiu, Guo, Fan, Shao, Zhang. ⁵	Incidence, risk factors and clinical outcomes of peripherally inserted central catheter spontaneous dislodgment in oncology patients: a prospective cohort study	Prospective cohort study	Original article
Support Care Cancer	B1	MEDLINE	2015	Italy	Doctors	Cotogni, Barbero, Garrino, Degiorgis, Mussa, Francesco, et al. ⁶	Peripherally inserted central catheters in non-hospitalized cancer patients: 5-year results of a prospective study	Observational and prospective study	Original article
J Pediatr Hematol Oncol	B2	MEDLINE	2015	Pakistan	Doctors	Fadoo, Nisar, Iftikhar, Ali, Mushtaq, Sayani. ⁷	Peripherally Inserted Central Venous Catheters in Pediatric Hematology/Oncology Patients in Tertiary Care Setting: A Developing Country Experience	Qualitative and retrospective	Original article
Int J Nurs Pract.	A1	MEDLINE	2014	China	Nurses	Song, Li, Guo, Ye, Ma, Guo, et al. ⁸	Malposition of peripherally inserted central catheter: experience from 3012 cancer patients	Quantitative and retrospective	Original article
Electr Nurs Journal	B1	LILACS	2013	Brazil	Nurses	Swerts. ⁹	Nursing care for complications of Peripherally inserted central catheters in neonates	Observational	Original article
J Am Coll Radiol	B2	MEDLINE	2014	Canada	Nurses and Doctors	O'Brien. ¹⁰	Insertion of PICCs with Minimum Number of Lumens Reduces Complications and Costs	Observational	Original article
Eur J Oncol	B1	MEDLINE	2014	China	Nurses	Li, Fan, Xin, Yan, Hu, Huang, et	A randomized,	Randomized,	Original article

Nurs						al.. ¹¹	controlled trial comparing the long-term effects of peripherally inserted central catheter placement in chemotherapy patients using B-mode ultrasound with modified Seldinger technique versus blind puncture	descriptive and observational	
J res fundam care online.	B2	BDENF	2016	Brazil	Nurses	Von Jakitsch, Carvalho, Posso, Machado, Giaretta. ¹²	Peripherally inserted central catheter: the use in Vale do Paraíba Paulista	Observational, descriptive, with quantitative approach	Original article
Anna Nery Nurs School Journ	B1	LILACS	2012	Brazil	Nurses	Costa, Paes. ¹³	Applicability of nursing diagnoses as subsidies for indication of peripherally inserted central catheter	Descriptive, of mixed typology, appropriating quantitative and qualitative precepts	Original article
OBJN Online Brazilian Journal of Nursing	B1	LILACS	2016	Brazil	Nurses	Souza, Alves, Rodrigues, Dames, Medeiros, Paiva. ¹⁴	The knowledge of nurses in terms of the peripherally inserted central catheter: a descriptive study	Descriptive, exploratory and qualitative study, interviews based on semi-structured script	Artigo Original
UFSM Nurs Journ	B1	MEDLINE	2017	Brazil	Nurses	Marcon, Argenta, Metelski, Schorr, Adamy. ¹⁵	Characterization of patients in radiotherapeutic treatment from the nursing consultation	Quantitative, exploratory and descriptive type study	Original article
J Nurs UFPE on line	B2	LILACS	2015	Brazil	Nurses	Cruz, Stube, Benetti, Gomes, Kirchner, Stumm. ¹⁶	Evaluation of pain in newborns hospitalized to a neonatal intensive care unit	Cross-sectional research	Original article
J Vasc Access	B1	MEDLINE	2014	USA	Nurses, Doctors	Sainathan, Hempstead, Andaz. ¹⁷	A single institution experience of seven hundred consecutively placed peripherally	Quantitative, descriptive and retrospective	Original article

J Nurs UFPE on line	B2	LILACS	2016	Brazil	Nurses	Silva, Lui, Ferreira, Franca, Lala, Vieira. ¹⁸	inserted central venous catheters Analysing the use of peripherally inserted central catheter in neonatology	Descriptive, retrospective study with a quantitative approach	Original article
Health Debate	B2	MEDLINE	2016	Brazil	Nurses	Silva, Alves, Sanches, Terra, Resck. ¹⁹	Nursing care and the focus on patient safety in the Brazilian scenario	Integrative literature review that includes the analysis of relevant research aimed at supporting decision making and improving clinical practice	Review article

Figure 2. Instrument of data collection of articles. Rio de Janeiro (RJ), Brazil, 2017.

In the fourth stage, the articles selected for the integrative review were analyzed to verify their authenticity, methodological quality, importance of information and representativeness, which led to the construction of Figure 3.

Title	Objective	Evidenced data	Level of evidence
A randomized, controlled trial comparing the long-term effects of peripherally inserted central catheter placement in chemotherapy patients using B-mode ultrasound with modified Seldinger technique versus blind puncture ¹¹	To compare PICC insertion using B-mode ultrasound with the modified Seldinger technique versus blind puncture.	The use of B-mode ultrasound with the Seldinger technique reduced complications and maintenance costs and improved patient comfort; therefore, this procedure should be more widely used.	01
Insertion of PICCs with Minimum Number of Lumens Reduces Complications and Costs ¹⁰	Determine current patterns of PICC insertion and, if present, PICC or patient characteristics have been associated with venous thrombotic complications.	There was a decrease in the rates of reinsertion of peripheral central venous catheters from the beginning of data collection in 2002, which pointed to significant reductions in central bloodstream infection and catheter-related thrombosis, reduced maintenance costs, and reinsertion into a general economy of US\$ 1.1 million.	01
Peripherally Inserted Central Venous Catheters in Pediatric Hematology/Oncology Patients in Tertiary Care Setting: A Developing Country Experience ⁷	Assess feasibility and identify PICC-related complications in a resource-poor environment.	PICC is feasible in a resource-poor setting, and its use is recommended for the administration of chemotherapy and prolonged venous access.	01
Malposition of peripherally inserted central catheter: experience from 3012 cancer patients ⁸	To analyze the causes of the malposition of 237 PICCs in 3012 patients and to explore prevention methods.	Malposition was observed in 237 cases (7.87%). The most frequent site was the jugular vein, followed by the axillary. Strict rules of manipulation, operator skill and experience and patient cooperation are necessary for the safe use of PICC.	01
Nursing care for complications of	To evaluate the nursing care for complications related to	The study resulted in the provision of subsidies to nursing	04

peripherally inserted central catheter in neonates ⁹	central peripheral insertion catheter (CCIP) in neonates.	professionals, attention to interventions in the face of complications of CCIP use, as well as to the importance of providing qualification courses when aiming at good nursing care practices.	
Incidence, risk factors and clinical outcomes of peripherally inserted central catheter spontaneous dislodgment in oncology patients: a prospective cohort study ⁵	To examine the incidence, risk factors and clinical outcomes of spontaneous displacement of PICC in cancer patients to facilitate early diagnosis, prophylaxis and management.	The incidence rate of spontaneous displacement of PICC / CCIP significantly increases the risk of thrombosis and shortening your life. Vigorous coughing and severe vomiting were independent risk factors for spontaneous displacement of PICC among cancer patients.	01
Characterization of patients in radiotherapical treatment from the Nursing consultation ¹⁵	To characterize the sociodemographic and clinical profile of patients undergoing radiotherapy treatment from the Nursing consultation.	The majority of the patients were female, aged between 50 and 79 years, with complete elementary education, married and with one to three children, being breast cancer in women and prostate cancer in men, the most incidental.	01
Analysing the use of peripherally inserted central catheter in neonatology ¹⁸	To analyze the use of the central peripheral insertion catheter in an neonatal intensive care unit.	The catheter was inserted predominantly in newborns with less than 1,500 kg (60%), with gestational age less than 32 weeks (71.8%), indicated for total parenteral nutrition (71.8%). The baseline vein was prevalent (44.1%), with the tip of the catheter positioned at a central location (70.3%), with an average stay of 18.63 days and non-elective withdrawal motif (35.9%). The infection rate was 0.5%, caused by Enterobacter sp.	04
High risk newborns usisng peripheral venous catheters ²⁵	Describe the profile of infants who use CIP and present the risk factors related to this clientele that increase the probability of developing complications at CIP.	Among the 145 neonates, who used 677 peripheral intravenous catheters and 95 had complications. Statistical significance was found for complications in neonates: preterm infants with central venous catheters and orotracheal intubation, mean use of more catheters, mean birth weight, and mean time of major hospitalization. Using a peripheral intravenous catheter exposes neonates to risks, but knowing the complications and evidence-based triggering risk factors qualifies care.	04
Evaluation of pain of neonates during invasive procedures in intensive care ¹⁶	To evaluate the pain of neonates hospitalized in a neonatal intensive care unit during invasive procedures.	The procedures that most triggered pain were aspiration of orotracheal tube, airway and venous puncture. Infants presented severe pain during orotracheal intubation and peripherally inserted central catheter passage.	04
The knowledge of nurses in terms of the peripherally inserted central catheter: a descriptive study ¹⁴	To analyze the knowledge of the nurses of the Neonatal Intensive Care Unit about the insertion, handling,	Nurses' knowledge regarding the indication, insertion, maintenance and withdrawal of the catheter, norms and protocols, and the	01

Peripherally inserted central catheter: the use in Vale do Paraíba Paulista ¹²	maintenance and withdrawal of the peripherally inserted central catheter. Check the use of the PICC catheter in the Health Care establishments of Vale do Paraíba Paulista: how, from when they do it and the professionals involved in the process.	professional qualification for the care process are decisive for the safety of care to the newborn. The PICC has been widely used since 2005. The competence of the registered nurse is recognized, and this professional is responsible for the performance related to this device.	04
Applicability of nursing diagnoses as subsidies for indication of peripherally inserted central catheter ¹³	To verify ownership in the applicability of Nursing Diagnoses by nurses as a subsidy for the indication of PICC / CCIP.	Qualified nurses presented greater flexibility in the association of risk factors and nursing diagnoses, which highlights the relevance to continuing education and the implementation of the Nursing process, for the theoretical and practical advancement of the team.	04
A single institution experience of seven hundred consecutively placed peripherally inserted central venous catheters ¹⁷	Describe an experience with more than 700 PICC inserts by bedside trained nurses and determine the success rate, malpositioning, the degree of support needed by the radiologist and the factors that affect their placement.	The insertion of the PICC by trained nurses is an effective method with a high success rate, low rate of poor positioning and requires minimal interventional radiology support.	04
Peripherally inserted central catheters in non-hospitalized cancer patients: 5-year results of a prospective study ⁶	To assess the reliability and safety of PICCs over five years of use in non-hospitalized cancer patients requiring long-term intravenous therapy.	After 269 PICC / CCIPs were followed in 250 patients, it was found that PICC / CCIPs can be successfully used as safe and long-term venous access devices in non-hospitalized cancer patients.	01

Figure 3. Level of Evidence of Studies. Rio de Janeiro (RJ), Brazil, 2017.

Evidence from the meta-analysis of multiple controlled and randomized clinical trials and at level 4 - evidences from descriptive (non-experimental) studies or with

a qualitative approach is evidenced by the research design.
In the fifth stage, the interpretation and discussion of the data and results found, related to the research objective.

Thematic analysis	Study themes		
	Categories	Title	Evidenced data
The care for the use of the peripherally inserted central catheter by the nurse to the patient with cancer.	1st SUBCATEGORY The importance of Nursing professionals in the use of PICC / CCIP.	The knowledge of nurses in terms of the peripherally inserted central catheter: a descriptive study ¹⁴	Nurses' knowledge regarding the indication, insertion, maintenance and withdrawal of the catheter, norms and protocols, and the professional qualification for the care process are decisive for the safety of care to the newborn.
		Peripherally inserted central catheter: the use in Vale do Paraíba Paulista ¹²	The PICC has been widely used since 2005. The competence of the registered nurse is recognized, and this professional is responsible for the performance related to this device.
		Applicability of nursing diagnoses as subsidies for indication of peripheral central insertion catheter ¹³	Qualified nurses presented greater flexibility in the association of risk factors and nursing diagnoses, which highlights the relevance to continuing education and the implementation of the Nursing process, for the theoretical and practical advancement of the team.

2nd SUBCATEGORY The importance of professional development	<p>A single institution experience of seven hundred consecutively placed peripherally inserted central venous catheters¹⁷</p> <p>A randomized, controlled trial comparing the long-term effects of peripherally inserted central catheter placement in chemotherapy patients using B-mode ultrasound with modified Seldinger technique versus blind puncture.¹¹</p>	<p>The insertion of the PICC by trained nurses is an effective method with a high success rate, low rate of poor positioning and requires minimal interventional radiology support.</p> <p>O uso do ultrassom B-mode com a técnica Seldinger reduziu as complicações e os custos com manutenção e melhorou o grau de conforto dos pacientes; portanto, este procedimento deve ser mais amplamente utilizado.</p>
3rd SUBCATEGORY Comparison of the best ways of handling PICC / CCIP	<p>Insertion of PICCs with minimum number of lumens reduces complications and costs¹⁰</p>	<p>There was a decrease in the rates of reinsertion of peripheral central venous catheters from the beginning of data collection in 2002, which pointed to significant reductions in central bloodstream infection and catheter-related thrombosis, reduced maintenance costs, and reinsertion into a general economy of US \$ 1.1 million.</p>
4th SUBCATEGORY Durability and safety of PICC / CCIP	<p>Peripherally inserted central catheters in non-hospitalized cancer patients: 5-year results of a prospective study⁶</p>	<p>After 269 PICC / CCIPs were followed in 250 patients, it was found that PICC / CCIPs can be successfully used as safe and long-term venous access devices in non-hospitalized cancer patients.</p>
	<p>Analysing the use of peripherally inserted central catheter in neonatology¹⁸</p>	<p>The catheter was inserted predominantly in newborns with less than 1,500 kg (60%), with gestational age less than 32 weeks (71.8%), indicated for total parenteral nutrition (71.8%). The baseline vein was prevalent (44.1%), with the tip of the catheter positioned at a central location (70.3%), with an average stay of 18.63 days and non-elective withdrawal motif (35.9%). The infection rate was 0.5%, caused by Enterobacter sp.</p>
5th SUBCATEGORY Safe practice	<p>Nursing care and the focus on patient safety in the Brazilian scenario¹⁹</p>	<p>The publications show the existence of positive actions of Nursing in patient safety. The research reflects, on the importance of identifying the error and the use of tools to improve the safety culture in Brazilian institutions.</p>
	<p>Evaluation of pain of neonates during invasive procedures in intensive care¹⁶</p>	<p>The procedures that most triggered pain were aspiration of orotracheal tube, airway and venous puncture. Infants presented severe pain during orotracheal intubation and peripherally inserted central catheter passage.</p>
6th SUBCATEGORY Complications about PICC / CCIP use	<p>Peripherally Inserted Central Venous Catheters in Pediatric Hematology/Oncology Patients in Tertiary Care Setting: A Developing Country Experience⁷</p> <p>Malposition of peripherally inserted central catheter: experience from 3012 cancer patients⁸</p>	<p>PICC is feasible in a resource-poor setting, and its use is recommended for the administration of chemotherapy and prolonged venous access.</p> <p>Malposition was observed in 237 cases (7.87%). The most frequent site was the jugular vein, followed by the axillary. Strict rules of manipulation, operator skill and experience and patient cooperation are necessary for the safe use of PICC.</p>

7th SUBCATEGORY Prevention complications	of	Nursing care for complications of central peripheral insertion catheter in neonates ⁹	The study resulted in the provision of subsidies to nursing professionals, attention to interventions in the face of complications of CCIP use, as well as to the importance of providing qualification courses when aiming at good nursing care practices.
		Incidence, risk factors and clinical outcomes of peripherally inserted central catheter spontaneous dislodgment in oncology patients: a prospective cohort study ⁵	The rate of spontaneous displacement of PICC / CCIP significantly increases the risk of thrombosis and shortens your life. Vigorous coughing and severe vomiting were independent risk factors for spontaneous displacement of PICC among cancer patients.
		Characterization of patients in radiotherapical treatment from the Nursing consultation ¹⁵	The majority of the patients were female, aged between 50 and 79 years, with complete elementary education, married and with one to three children, being breast cancer in women and prostate cancer in men, the most incidental.

Figure 4. Categorization of the Thematics of the Study. Rio de Janeiro (RJ), Brazil, 2017.

During the search for studies, it was considered necessary to include articles other than those that met the inclusion and

exclusion criteria, to support the discussion (Figure 5).

Year	Journal, Editor	Authors	Title	Type of document
2013	Coren-RJ	Coren-RJ ²⁰	PAD n. 1695/2013 Opinion GT n. 001/2014	Opinion
2003	Anvisa	Brasil ²¹	RDC no. 45	Resolução
2018	Online braz j nurs	Medeiros FVA, Alves VH, Valete COS, Paiva ED, Rodrigues DP, Souza RRB. ²²	Invasive care and produceres and neonatal sepsis in newborns with very low birth weights: a retrospective descriptive study.	Retrospective descriptive study
2017	Brazilian Vascular Journal: vascular, endovascular and angiology surgery	Di Santo, Takemoto, Nascimento, Nascimento, Siqueira, Duarte, et al. ²⁶	Peripherally inserted central venous catheters: alternative or first choice vascular access?.	Study prospective study
2016	Journal of Infusion Nursing	Infusion Society ²⁸	Nurses Infusion Therapy Standards of Practice	Review and update of standardization of the practice of infusion therapy

Figure 5. Supporting articles for data discussion. Rio de Janeiro (RJ), Brazil, 2017.

In the sixth stage, the review and synthesis of the knowledge obtained in articles with adherence to the theme was carried out. The data analysis was constructed based on the selected articles, through which it was possible to observe, count, add, describe and qualify the data to agglomerate the knowledge produced through the thematic in this review.²⁸

After analyzing the articles, the information contained in the subcategories was grouped into two categories: 1) The importance of the Nursing professional in the use of PICC / CCIP and 2) Patient safety through safe practice.

DISCUSSION

Category 1 - The importance of Nursing professionals in the use of PICC / CCIP

It is noted that the use of PICC / CCIP is expanding because of the positive results obtained with its use, coupled with the growing interest in finding ways to make health care safer for patients, a process in which nurses are elements- key when it comes to customer care in order to prevent mistakes and poorly made decisions, as well as taking a leading role in advancing and using strategies to promote safety and quality of care.^{14,20}

It is recommended, therefore, by RDC 45, that nurses should participate in the choice of central venous access in agreement with the doctor responsible for patient care, considering the rules of the Commission for

the Control of Infection in Health Services.²² It is important to emphasize the nurse's responsibility in establishing peripheral venous access. In this sense, it is also related to the Federal Law n. 7,998 / 1986, which regulates the exercise of Nursing, according to which nursing care is of the highest technical complexity and requiring scientifically based knowledge, as well as the ability to take immediate decisions, which reaffirms the technical and legal competence for the nurse to insert, manipulate and remove the PICC / CCIP.²⁶

The resolution of the PICC / CCIP by the nurse is allowed by resolution 258, complementing that for the accomplishment of such a procedure, it should be subject to the specific qualification and / or qualification, where it is observed that the nurse has legitimacy to indication of the IPCC, appropriating theoretical and scientific bases.²²

The qualification of the professionals to guarantee a quality assistance is necessary, since it is a theoretically new device, since the handling of the PICC / CCIP requires knowledge, skill and skill on the part of all the nursing team.^{7,12-3}

It is pointed out in studies that one of the limiting factors of the expansion of the use of PICC / CCIP is the lack of technical knowledge of health professionals. The innumerable benefits for the patient and for the professionals who use it, such as the reduction of the stress of the team and the optimization of the working time.¹⁶

It is recommended, internationally, to promote the education of professionals who insert and manipulate intravenous catheters, given their complexity. In this context, the role of the nurse as an educator of the team is reiterated, who is responsible for periodically evaluating the knowledge about the guidelines and the competence to insert and manipulate catheters, delegating these functions only to professionals competent for such.^{17,24}

It is considered that permanent education implies an essential strategy for transformations in the work sector, making it a place of critical and reflexive action, with a committed and technically competent team that represents, for the professional, opportunities for self-development, motivation and self-realization. It is understood, therefore, the need of a program of qualification of the nurses to adopt the permanent education, because this supports the growth of the team.^{9,17}

It is also noted that NR 32 contains the plan for the prevention of risks of accidents with sharps, which emphasizes the importance of the training of professionals in the use of the safety device and the replacement of security system.²⁷

It is argued that the production of good evidence on the use of the PICC may also help practitioners and institutions to make better use of this resource, benefiting the quality of care, since the insertion of the PICC by trained nurses is an effective method with a high success rate.^{5,8, 12,14-7,19}

It is emphasized that the choice of vascular access is considered a crucial detail in the treatment of clients who must undergo intravenous therapy, which should take into account the underlying disease, type and duration of therapy, venous capital and the socioeconomic situation, in addition to the adequate place of use and desire of the client, since a large part of hospitalized patients remains with intravenous devices.²⁰

The advantages of using PICC / CCIP compared to other central catheters are documented: reduction of the risk of insertion pneumothorax and sepsis by colonization of the skin around the insertion; the reduced cost of insertion when compared to other tunneled catheters; the minor discomfort reported by patients and easy maintenance. It is pointed out that the equipment provides a greater hemodilution of the IV therapy administered and the reduction of the risks associated with infiltration, bruises, hematomas and extravasations in the subcutaneous, besides allowing safe outpatient and / or home care, with highest cost / benefit ratio.^{6,12-4}

It is necessary to know what the PICC / CCIP is, through its historical process. It is known that its appearance dates back to the mid-1970s when, in the United States of America, a device was created that, after its insertion into a peripheral vein, progressed to the central vessels, acquiring a catheter characteristic central. It was first implanted in ICUs, expanding its use around 1980, with the appearance of programs for the professional qualification of nurses in hospital settings and, later, for home care. The PICC was used in Brazil, starting in 1990, first in Neonatology and later in adults in 1995.

This is an intravenous device inserted through a superficial end vein and progressing through an introducer needle to the mid-distal third of the superior vena cava, the second intercostal space or third costal cartilage, or the inferior vena cava in the hemidiaphragm level when used in neonatology (when

inserted through the saphenous vein). It is pointed out that the catheter has one or two lumens, ranging from 14 to 24 Gauge or one to five French (Fr) gauge, with 20 to 60 centimeters.

The catheter is characterized by being flexible, radiopaque, with smooth and homogeneous walls, accompanied or not with internal guide in flexible stainless steel and markings every five centimeters or every inch in its extension. It is constituted by polyurethane or silicone, these being more biocompatible and flexible, causing less irritation to the wall of the vessels, less adhesion of microorganisms and less memory for folds, however, they are less resistant.²¹⁻⁶

Of note among these devices is the Power PICC®, non-valved polyurethane catheter that supports greater pressure in the infusion of medicines.²⁵

It should be pointed out, in line with the PICC / CCIP durability and safety discourse, that the main route of administration of chemotherapeutics is intravenous, however, most antineoplastic agents are considered vesicant or vascular irritants because they present hyperosmolarity or differences (pH) in relation to the medium in which they will be administered or even direct toxicity, thus producing free radicals, causing aggression and inflammatory reactions to the vessel wall and, in some cases, surrounding tissues. The PICC / CCIP is understood as suitable for use in cancer patients, and the chemotherapeutic can be applied directly to a large vessel, favoring hemodilution and preservation of the peripheral venous network, which is due to the fact that a number of patients is subjected to chemotherapy for prolonged periods and / or uses vesicant drugs that damage the peripheral vascular system.^{6-7,15,19}

It has been reported in studies that the PICC / CCIP has low levels of infections and complications both at the time of insertion and during its maintenance and removal and can be used successfully as a safe and long-lasting venous access device, including in non-hospitalized cancer patients.^{5-6,8,12,14-7,19}

The use of PICC / CCIP should be avoided as the first option for intravenous access in hospitalized patients, for which it is indicated only when intravenous therapy is performed for a period equal to or greater than five days. It is a safe and comfortable option for patients who will require multiple blood collections, infusion of hyperosmolar, vesicant, vasoactive drugs, with extreme pH values, hemodynamic monitoring and difficult venous access. It is known that catheters inserted in an emergency situation and

without the use of a maximum barrier should be changed to another site as soon as possible, not exceeding 48 hours. Among the contraindications, blood dyscrasias, malformations, venous network damaged or difficult to visualize, such as sclerosis and hematomas due to previous punctures, skin lesions at the insertion site, the need to administer large bolus volumes, solid tumor or pronounced lymph node enlargement.^{14,20-21,26}

Among the disadvantages are: the need for a trained professional who has undergone special training and the absence of sutures, which leads, according to the evidence presented in studies, to an increased risk of infection and, as a result, risks its traction. Calibrate and intact peripheral veins are necessary and the restriction of certain activities is something that is worrisome, since the equipment allows a long stay and the majority of the studies evidence vast use in Pediatrics.^{5-7,9,12,16-7}

Category 2 - Patient safety through safe practice

It should be noted that in order to carry out the PICC / CCIP insertion, the nurse should use maximum barrier precautions that include the use of mask, glasses, cap, sterile apron, gloves and sterile field, as well as hand hygiene with water and soap associated with the antiseptic 2% chlorhexidine gluconate or 10% PVPI, or the alcoholic preparation for the hands. A solution of 0.5% to 2% alcoholic chlorhexidine should be used to prepare the patient's skin in adults and neonates above 1,500 grams, and in the case of lower weight neonates, aqueous chlorhexidine to 1%.^{21,24,27-8}

The basilic vein is indicated as the first choice, due to its favorable anatomical characteristics, greater caliber, smaller number of valves, and a location that facilitates manipulation to change dressings; in relation to the cephalic vein, this is used as the second option. The right upper limb shows the greater ease of progression and centralization for the use of PICC / CCIP, and it is necessary to measure the circumference of the limb to be punctured.^{21,24,27-8}

The amount of catheter to be inserted should be measured according to the place of puncture, namely:²⁷ in the case of upper limbs, measure from the insertion point, following the supposed path of the vein, passing through the axillary region to the head of the clavicle, followed by the external one, to the right, and from there to the third intercostal space; ²⁷ in the lower limbs, measure from the insertion point, following the supposed path of the vein, passing through

the inguinal region to the umbilical scar, on the right, and reaching the xiphoid appendix;²⁷ in the head, measure from the insertion point, following the supposed path of the vein, passing through the neck, down to the junction of the head of the clavicle with the external, on the right, and from there until the third intercostal space.²⁷

It is instructed, after evaluating and puncturing the selected vein, to perform the venipuncture with the catheter's own introducer and to check the blood return, to start the catheter progression with the aid of the anatomical clamp, noting that it is devoid of a tooth to avoid damage to the catheter, remove the introducer after advancing the catheter to the previously defined mark, check the venous return, aspirate the blood through the catheter, and then perform irrigation with physiological solution.^{21,24,26,28}

It should be cleaned with saline solution at the insertion site, being necessary to place a small piece of gauze below the insertion ostium to absorb possible bleeding, carefully evaluating the need to use the most appropriate dressing. It is pointed out that, after insertion of the catheter, the exchange of this dressing should be performed in the first 24 hours; subsequent dressings may remain in place for seven days, such as transparent polyurethane dressing, which should be identified with date, time, type of catheter and signature.^{18,24,27}

It is recommended to verify the location of the catheter tip after insertion, for which there is evidence that ultrasound provides precise information about the position of the device tip.^{5,8,11}

It is observed that it is incumbent on the nurse to perform the procedures related to Nursing care for the patient using the PICC, being exclusive to this the maintenance of the same - care with the site of insertion, dressing and collection of blood in special situations. It should be emphasized that, when supervised by a trained nurse, the duties of the Nursing technician can perform the irrigation of the PICC / CCIP (flushing) and the administration of intravenous parenteral solutions, safeguarding the particularities of the drug therapy.^{13,21,28}

Avoid handling and, when necessary, wear sterile gloves. Studies have shown that reinsertion rates, central line bloodstream infection, catheter-related thrombosis, and maintenance and reinsertion costs were reduced by switching the multiple lumens catheter to the single lumen catheter.^{10,21,24,26}

The side injector should be disinfected by rubbing alcohol at 70% before being punctured for 15 seconds; the equipment and extension must be changed every 96 hours, and the dressing should be changed when it is dirty or damp, out of place or when the ostium has phlogistic signs.^{24,27-8}

Constant positive pressure should be maintained by infusion pump at a minimum of 0.5 ml / hr when only one infusion is used to ensure its patency.²⁸

The use of one, three or five ml syringes is contraindicated, because the smaller the volume of the syringe, the greater the pressure exerted on the lumen of the catheter, exposing the patient to the risk of rupture thereof, and the pressure up to 14.5 psi - pounds per square inch or 750 mmHg in bolus infusion up to 17.4 psi (900 mmHg), with a risk of breaking between 58 and 72 psi (3000 - 3700 mmHg).²⁶

It is noted that the dressing should be performed with a strictly aseptic technique using preferably a semipermeable transparent membrane to allow visualization of the puncture site thereby facilitating its inspection. It is indicated that the first dressing should be performed within 24 hours and the routine of exchange may be every seven days, except in pediatric patients, when the risk for exteriorization of the catheter exceeds the benefit of changing the dressing or in case of membrane detachment, presence of blood, secretion and / or dirt, however, if the dressing was made with gauze, it is necessary to change it every two days.¹⁸

It is suggested, considering the possible interurrences in the withdrawal of the PICC, that its removal be done by a trained nurse, through the multiprofessional decision. It should be noted that PICC / CCIP should not be removed based on fever alone, therefore, using clinical judgment is essential for the decision to remove the catheter, and it is necessary to evaluate if there is a case of infection elsewhere.²⁸

It is noted that the withdrawal of the equipment in patients who have not received blood, blood products or fat emulsions should comply with a 96 hour interval, when any non-essential intravascular catheters should be removed immediately and, if so, perfusors and connectors, doing the circuit washing with saline solution, remembering that this practice should be avoided to the maximum.

It is added that, despite the numerous benefits attributed to the PICC / CCIP, nurses should be aware of complications related to their use, which may occur at insertion times,

during maintenance and removal. These complications originate from mechanical problems such as obstruction, catheter rupture, vessel perforation, extravasation, thrombosis, infectious problems, catheter-related sepsis, hematoma, inadequate catheter position and pneumothorax.^{9,14-5,17,19}

It is pointed out in studies that infection is the most frequent complication and is the main cause of withdrawal of PICC / CCIP. The main mechanisms of colonization and infection are identified as the connections of the catheter (hub), in which the inadequate manipulation at the moment of the infusions generates the intraluminal colonization of the catheter, which can become a source of bacteremia; the migration of microorganisms from the cutaneous flora through the external surface of the catheter; colonization of the catheter through the hematogenous source from other infectious foci and infusions of liquids or parenteral nutrition solutions contaminated at the time of handling.^{8-10,14-5,17,19}

Obstruction has been shown to be a relatively common complication, and may be caused by the precipitation of incompatible drugs or the formation of intraluminal clots, making it impossible to infuse solutions or aspirate blood through the catheter. It is noted that obstructions caused by poor placement of the catheter in the vein wall should be corrected by repositioning the catheter or the patient himself. It is noted that aspiration of the catheter causes the tip to function as a suction cup in the vein wall, preventing the outflow of blood through the catheter. Displacement of the catheter, trauma and perforations are also observed.^{9,15,17}

It is considered, with respect to complications precautions, that the use of PICC / CCIP by Intravenous Therapy Nursing Groups has been used as a strategy to reduce complications, which is efficient when performing direct care for patients in use of infusion therapy and to perform the standard operating procedures and permanent education, considering the best practices of patient safety.^{17,21}

In studies, it is suggested that as a means of preventing complications, the use of a PICC / CCIP with the minimum number of lumens is essential to meet the patient's needs.¹⁰

When the catheter is not in use, each route with heparin blockade or heparinization according to the protocol of the institution should be maintained or catheters with a pressure-activated safety valve in which the valve closes after infusion, requiring only of

saline solution to maintain its permeability. It is indicated, if the client has intermittent therapy, the prescription of a maintenance hydration.^{21,24,28}

It is important, after administration of medicinal products, to irrigate the route with two to ten ml of 0.9% physiological solution, always carrying out this procedure with syringes with a volume greater than or equal to 10 ml, and never infuse medications incompatible blood flows, avoiding accidental blood.^{21,24,28}

As important factors, it is important to avoid trapping the catheter by manipulating it, as well as avoiding folding and using blades or scissors during the dressing. It is pointed out that its fixation must be made properly to the skin, preventing the use of plasters, which, in addition to making it impossible to see the point of insertion of the catheter, still increase the risk of traction. It is also emphasized the importance of properly orienting the patient and the relative regarding the risks of complication.¹⁸

It is stated that the use of ultrasound with the Seldinger technique contributed to reduce complications and maintenance costs, which was reflected in the improvement of patients' comfort level; therefore, this procedure should be widely used.¹¹

CONCLUSION

In conclusion, considering the indications of use and the comfort provided to patients, considering the benefits to the professionals involved in the care, the cost-effectiveness, besides the low complication rates, that the selection of PICC / CCIP in the treatment of patients is an opportune and viable option.

It is demonstrated, taking into account the autonomy supported by the law on the insertion and maintenance of the PICC / CCIP by the nurse, its role in the choice together with the assistant team, and the choice of vascular access being an important step in the treatment of patients with cancer, the oncologist should be aware of the underlying disease, type and duration of therapy, venous capital and socioeconomic status, as well as the place of use and the client's desire.

It is considered essential to rethink the practice and know that it is possible to reduce complications for the patient by improving the knowledge of the entire nursing team about the catheter for quality care in which nurses play a crucial role in lifelong education, where it is necessary to continuously update it on new health technologies.

In this way, the use of PICC / CCIP is a safe and reliable option for intravenous therapy in cancer patients, even for non-hospitalized patients, contributing significantly to their quality of life, since it results in physical and psychological pain and allows the Nursing team adequate assistance, optimizing the time of care. However, it is necessary to carry out other studies in Brazil on this subject.

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