

USE OF THE PERIPHERALLY INSERTED CENTRAL CATHETER IN ADULT PATIENTS: A PERSPECTIVE FOR ONCOLOGY NURSING

USO DO CATETER CENTRAL DE INSERÇÃO PERIFÉRICA EM PACIENTES ADULTOS: UMA PERSPECTIVA PARA A ENFERMAGEM ONCOLÓGICA

USO DEL CATÉTER CENTRAL DE INSERCIÓN PERIFÉRICA EN PACIENTES ADULTOS: UNA PERSPECTIVA PARA LA ENFERMERÍA ONCOLÓGICA

René Rodrigues Pereira¹, Sara Lourrane Carneiro de Andrade Cavalcante², Givanildo Carneiro Benício³, Aurora Pinheiro do Vale⁴, Dayane dos Reis Araújo Rocha⁵

ABSTRACT

Objective: To identify the perspective for oncology nursing of the PICC use in adult patients. **Method:** Integrative review structured by studies indexed in LILACS, MEDLINE, and SciELO databases, including articles published between the years 2015 and 2019 covering the experience of the PICC in adult oncology patients. **Results:** Initially, a total of 140 publications were identified, nine of which comprised the final sample. The content allowed the structuring of four subthemes: comparison with other vascular access devices; physicians' and nurses' perceptions of venous access; patient experience; and catheter-related adverse events. Thus, the use of PICCs for anticancer treatment was compiled, obtaining a clear picture of the scenario of their use in oncology nursing care. **Conclusion:** The PICC has grown in the scope of oncology nursing as a technology for vascular access. However, the longevity of its success is undeniably linked to the appropriate classification of the client as to vulnerability to develop complications and to the post-insertion nursing care. Depending on the personal preference of oncologists and users, the future scenario of the PICC in the treatment of adult cancer patients is uncertain.

Descriptors: Neoplasms. Oncology. Peripheral Venous Catheterization. Central Venous Catheterization. Oncologic Nursing. Nursing Care.

RESUMO

Objetivo: Identificar a perspectiva para a enfermagem oncológica da utilização do PICC em pacientes adultos. **Método:** Revisão integrativa estruturada por estudos indexados nas bases de dados LILACS, MEDLINE e SciELO, incluindo artigos publicados entre os anos de 2015 e 2019, que abrangessem a experiência do PICC em pacientes adultos oncológicos. **Resultados:** Identificou-se inicialmente um total de 140 publicações, das quais nove compuseram a amostra final. O conteúdo permitiu a estruturação de quatro subtemas: comparação com outros dispositivos de acesso vascular;

percepções de médicos e enfermeiros sobre o acesso venoso; experiência do paciente; e eventos adversos relacionados ao cateter. Assim, epilogou-se o aproveitamento de PICCs para o tratamento anticâncer, obtendo uma imagem clara do cenário de sua utilização na assistência de enfermagem oncológica. **Conclusão:** O PICC cresceu no escopo da enfermagem oncológica como tecnologia para acesso vascular. Entretanto, a perenidade do seu sucesso está inegavelmente vinculada à classificação adequada do cliente quanto à vulnerabilidade em desenvolver complicações e aos cuidados de enfermagem pós-inserção. A depender da preferência pessoal de oncologistas e usuários, o cenário futuro do PICC no tratamento de pacientes adultos com câncer é incerto.

Descritores: Neoplasias. Oncologia. Cateterismo Venoso Periférico. Cateterismo Venoso Central. Enfermagem Oncológica. Cuidados de Enfermagem.

RESUMEN

Objetivo: Identificar la perspectiva para la enfermería oncológica del uso de PICC en pacientes adultos. **Método:** Revisión integradora estructurada por estudios indexados en las bases de datos LILACS, MEDLINE y SciELO, incluyendo artículos publicados entre los años 2015 y 2019, que abarquen la experiencia de PICC en pacientes oncológicos adultos. **Resultados:** Se identificó inicialmente un total de 140 publicaciones, de las cuales nueve conformaron la muestra final. El contenido permitió estructurar cuatro subtemas: comparación con otros dispositivos de acceso vascular; percepciones de médicos y enfermeros sobre el acceso venoso; experiencia del paciente; y eventos adversos relacionados con el catéter. Así, se epilogó el uso de los PICC para el tratamiento del cáncer, obteniendo un panorama claro del escenario de su uso en los cuidados de enfermería oncológica. **Conclusión:** El PICC ha crecido en el ámbito de la enfermería oncológica como tecnología para el acceso vascular. Sin embargo, la continuidad de su éxito está innegablemente ligada a la adecuada clasificación del cliente en cuanto a la vulnerabilidad en el desarrollo de complicaciones y a los cuidados de enfermería tras la inserción. Dependiendo de las preferencias personales de los oncólogos y de los usuarios, el escenario futuro del PICC en el tratamiento de pacientes adultos con cáncer es incierto.

Descriptores: Neoplasias. Oncología. Cateterismo Venoso Periférico. Cateterismo Venoso Central. Enfermería Oncológica. Cuidados de Enfermería.

^{1,2,5} Centro Universitário UNINASSAU. Fortaleza (CE), Brazil. ¹<http://orcid.org/0000-0002-2019-3263>, ²<http://orcid.org/0000-0001-5827-0482>, ⁵<http://orcid.org/0000-0002-1902-5019>

³ Universidade Federal do Ceará/UFCE. Fortaleza (CE), Brazil. ³<http://orcid.org/0000-0001-9642-5617>

⁴ Universidade Estadual do Ceará/UECE. Fortaleza (CE), Brazil. ⁴<http://orcid.org/0000-0001-6246-4829>

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INTRODUCTION

The peripherally inserted central venous catheter (PICC, as it is internationally recognized by its abbreviation in English) constitutes a device with great applicability in the care of patients who need access to central circulation^{1,2}. Throughout almost a century in the scope of catheterization, PICCs, understood today as central venous catheters made of biocompatible material inserted by ultrasound guidance into deep veins in the arm, were introduced in the market in the mid-1990s, having since then been the subject of study for delivering a safe and effective health care service³.

The fundamental attribute of these accesses is that, despite generally presenting an insertion site located in the middle third of the upper limbs, their tip emerges at the cavoatrial junction, that is, the confluence of the superior vena cava and the right atrium, providing the perfused solutions with greater hemodilution, thus being able to be used in any type of infusion regardless of pH, osmolarity or potential harmful effect on the endothelium, as well as for hemodynamic monitoring⁴.

Moreover, according to Pittiruti and Scoppettuolo⁵, who consider the device whose health benefits exceed the expected negative consequences in clinical patients in general as adequate, these catheters demonstrate feasibility of application as early as the sixth day of the proposed length of Intravascular Therapy (IV Therapy). In addition, even with the adequacy of other devices, periods longer than 31 days, for example, do not make it unfeasible; on the contrary, it should be noted that more invasive mechanisms should be reserved for scenarios where the PICC is not feasible, such as inadequate vein caliber or episodic infusions over several months.

In view of its opportune particularities, this catheter has quickly become appreciated for the therapy of a wide range of oncology patients^{6,7}. As the nursing professional, besides being legally qualified for its insertion⁸, is the team component that mostly remains in contact with this public in the management of feasible care to the resolute and qualified practice, his/her deep involvement with such an emerging technology becomes unquestionable. Nevertheless, just like with traditional central access, the use of the PICC is also associated with a considerable incidence of Adverse Events (AEs), with emphasis on infectious and thrombotic complications^{9,10}.

On legitimate theory in contemporary times, Virchow (1821-1902) was the first to describe the mechanisms of the development of cancer and thrombosis. His triad delineates three major causal elements that influence the pathophysiology of Deep Vein Thrombosis (DVT), signaling changes in

blood flow, vascular injury, and hypercoagulability as triggering principles of the activation process of coagulation factors, whose outcome results in the formation of thrombus¹¹.

In addition, the risk of infection caused by PICCs is deeply related to the length of stay of the catheter and the care applied by the professional team responsible for handling it, indicating, besides the need for specialized care, the relevance of familiarity with the latest scientific recommendations on the theme^{12,13}.

The approach of thrombotic complications to oncology patients with a catheter that can reach 60 cm in length, whose comorbidities and clinical conditions, along with the tumor-related aspects, destabilize hemodynamic homeostasis, would not be unbelievable^{9,14,15}. Neither would a tool designated for prolonged IV Therapy, implanted in immunocompromised patients, susceptible to constant manipulation by professionals with the most heterogeneous training rigor, be expected to be free of any contamination episode. In this sense, the disastrous concurrence of all these elements in a single group of patients would favor catastrophic consequences.

Even in the face of infamous AEs, in the absence of sufficient scientific evidence, national and international guidelines are curiously limited to requiring central line catheters for the infusion of irritant and/or vesicant drugs, while not advocating a specific device for the administration of chemotherapy^{4,16}, making the choice for the type of access a shared decision between oncologists, nurses and patients¹⁷.

It is in the meantime, permeated by benefits and complications, and due to the speed of technological development and transience of clinical indications, that the need for a compilation of scientific evidence on the use of PICCs for the IV Therapy of anticancer treatment is emphasized, regulating a survey with the following guiding question: What is the perspective, for oncology nursing, of the PICC use in adult patients?

Promoting a better understanding of the commitment of evidence-based researchers to the delivery of quality health care, as well as of the progress being made to mitigate adverse therapeutic effects will guide these professionals in their routine conduct, providing access to information rapidly and concisely.

In view of this, especially considering the safety and well-being of the public in this clinical specialty, this review study aims to identify the perspective for oncology nursing regarding the use of the PICC in adult patients.

OBJECTIVE

To identify the perspective for oncology nursing regarding the use of the PICC in adult patients.

Study design

To identify the productions, an integrative review (IR) was chosen, having as one of its objectives to provide healthcare professionals undergoing long working hours and with limited time with the effective dissemination of information¹⁸.

This method remains an important instrument of Evidence-Based Practice (EBP), signaling an approach to care and teaching based on pre-existing research, conducted within the scientific precepts, which is actually understood as evidence¹⁹.

Given the divergence among many authors regarding its definition and systematization²⁰, this study considers IR as a broad approach, which contemplates experimental and non-experimental studies for the full understanding of a specific topic, determining its current concept through the analysis of theories and evidence that contribute to a fruitful discussion about the quality of patient care, having the potential to play an important role in nursing EBP²¹.

In line with Souza, Silva and Carvalho¹⁹, the elaboration process was guided by six stages and their respective methodological complements: Elaboration of the Guiding Question; Literature Search or Sampling; Data Collection; Critical Analysis of the Included Studies; Discussion of the Results; and Presentation of the Integrative Review - as detailed below.

Elaboration of the guiding question

Seen as the most significant moment and intended to develop the same rigor as any other scientific method¹⁸, in the first stage of this review, for the construction of the research question, the PICO strategy was used, as proposed by the EBP for the decomposition and organization of impasses that arise in care, teaching or research practice²².

According to Santos, Pimenta and Nobre²², the PICO strategy represents, in the clinical setting, an acronym for Patient, Intervention, Comparison and Outcomes, providing greater accuracy of the available information and reducing time spent on unnecessary searches. In non-clinical research, however, the "I" stands for Interest, while the letters "C" and "O" come together to represent the word Context. From this perspective, all components related to the problem are described in the table below (Table 1):

Table 1. Presentation of the PICO strategy for the identification of controlled descriptors

P	Adult patients diagnosed with any type of cancer, including oncological and hematological neoplasms in hospital or home care.
I	Peripherally inserted central devices. No limitation as to manufacturing company, quantity of lumens, presence of valve, caliber, size, professional responsible for the insertion procedure, location of the puncture site or protective dressing.
Co	Oncology nursing in medium- to long-term antineoplastic treatment, where the characteristics of the solutions are incompatible with peripheral perfusion.

Source: Authors' own elaboration.

Given the categorically constituted core, the following guiding question was defined: What is the perspective, for oncology nursing, of using the PICC in adult patients?

Literature search or sampling

In order to facilitate the research process, the determination of search terms followed consultation with the Health Sciences Descriptors (DeCS) used to locate the articles, based on the constituent elements of the strategy in use in the previous step. It is noteworthy that, in international research territory, their equivalents in English took over the space in the search tools. Thus, six controlled descriptors were considered: Neoplasms; Oncology; Catheterization, Peripheral; Catheterization, Central Venous; Oncology Nursing; and Nursing Care.

To ensure the representativeness of the sample and aiming at the breadth of findings, a comprehensive search of the electronic literature was conducted during the months of February and March 2020, consisting of a search of studies indexed in the Latin American and Caribbean Literature on Health Sciences (LILACS), the Medical Literature Analysis Retrieval System Online (MEDLINE) and the Scientific Electronic Library Online (SciELO) databases.

At this point, the first treatment of the findings was carried out, including only articles whose publications covered the period between 2015 and 2019, as well as those available for free in full text. Due to the convenience of online translation tools, the language did not impose obstacles to the understanding of the content. Thus, all were considered adequate for the composition of the sample. Accordingly, with the cross-referencing of the previously identified descriptors and using the Boolean logic, a total of 140 publications were initially identified, of which 131 were references obtained from the MEDLINE database, 04 from LILACS, and 05 from SciELO.

From the collected material, 37 publications were excluded for being duplicates of the corresponding combinations in different databases, totaling 103 articles for further analysis. Then, a careful reading of the titles and abstracts followed, a step that excluded two scientific review approaches, 28 studies for discussing only other central vascular access devices, 13 for treating pediatric oncology patients, and 32 for not contemplating the proposed theme. Finally, within the remaining 28 productions, those that indicated an answer to the guiding question composed a final sample of nine articles (Table 2).

It is notable that, in these considerations for the sample composition, some productions were suitable for more than one exclusion factor. Hence, the items were excluded and accounted for according to the aforementioned order of the applied criteria. Also, in this search, no review study addressing exclusively the experience of the PICC in adult patients during anticancer treatment was identified, safeguarding the originality of the research.

Table 2. Prisma Flow Diagram

Identification	Search Results (n=140)	MEDLINE (n=131)
		LILACS (n=04)
		SciELO (n=05)
Selection	Total (n=140)	Publications excluded because they are duplicates (n=37)
	Total (n=103)	Publications excluded after reading titles and abstracts (n=75)
Elegibility	Articles with full content analysis (n=28)	
Included	Total studies included in the sample (n=09)	

Source: Galvão, Pansani, Andrade²³.

Data Collection

To compile the relevant information contained in the deliberate sources, the adapted Ursi Instrument was chosen. According to Ursi²⁴, in addition to providing the reviewer with access to information in a practical and compiled form, the existence of a previously prepared questionnaire allows to evaluate the individuality of each article, to determine the methods employed and the subsidy it provides to the research problem in question, mitigating the risk of errors in the transcription of results and fostering veracity and reliability in face of the reader's critical analysis.

Thus, in extracting the identification data of the article, the following information was used: title, authors, year of publication, journal name, language and country of publication (Table 3).

In turn, the methodological characteristics of the studies comprised another session, containing the following items: method, level of evidence, objectives, and research findings (Table 4).

Critical analysis of the included studies

As from the adopted methodological approach, a hierarchical system of evidence consisting of six levels was considered¹⁹:

Level 1: evidence from the meta-analysis of multiple randomized controlled studies.

Level 2: evidence from individual studies with experimental design.

Level 3: evidence from quasi-experimental studies.

Level 4: evidence from descriptive (non-experimental) studies or with a qualitative approach.

Level 5: evidence from case or experience reports.

Level 6: evidence based on expert opinion.

RESULTS

Nine articles met the inclusion criteria by reporting aspects of clinical practice and/or patient experience regarding the use of the PICC. With 44.4% (n = 4) of the publications, China showed undisputed preponderance over other nationalities (studies 1, 2, 3 and 8), while the remainder of the sample was composed of 22.2% (n = 2) of studies originating from Italy (studies 4 and 9) and 33.3% (n = 3) equally distributed between Canada (study 7), Spain (study 6) and the United States (study 5). With the exception of a single study published in Chinese (study 1), all others were available in English.

Table 3. Identification of the studies included in the sample

Order	Title	Authors and year of publication	Journal	Country and language
1.	Retrospective Analysis of Peripherally Inserted Central Catheter-related Vein Thrombosis in Lung Cancer Patients	CHEN; YU; LI, 2015	Chinese Journal of Lung Cancer	China, Chinese
2.	High risk of deep vein thrombosis associated with peripherally inserted central catheters in lymphoma.	ZANG et al., 2016	Oncotarget	China, English
3.	Comparison of three types of central venous catheters in patients with malignant tumor receiving chemotherapy.	FANG et al., 2017	Patient preference and adherence	China, English
4.	Clinical management of peripherally inserted central catheters compared to conventional central venous catheters in patients with hematological malignancies: A large multicenter study of the REL GROUP.	FRANCCHIOLA et al., 2017	American Journal of Hematology	Italy, English
5.	Incidence of and factors associated with catheter-related bloodstream infection in patients with advanced solid tumors on home parenteral nutrition managed using a standardized catheter care protocol.	VASHI et al., 2017	BMC Infectious Diseases	Unites States, English
6.	Living with a peripherally inserted central catheter: the perspective of cancer outpatients - a qualitative study.	BRAVO et al., 2018	Support Care Cancer	Spain, English
7.	Optimizing vascular access for patients receiving intravenous systemic therapy for early-stage breast cancer - a survey of oncology nurses and physicians.	LEVASSEUR et al., 2018	Current Oncology	Canada, English
8.	Risk analysis on infection caused by peripherally inserted central catheter for bone tumor patients.	HE; WAN; XIAN, 2018	Journal of Cancer Research and Therapeutics	China, English
9.	Can Peripherally Inserted Central Catheters Be Safely Placed in Patients with Cancer Receiving Chemotherapy? A Retrospective Study of Almost 400,000 Catheter-Days.	CAMPAGNA et al., 2019	The Oncologist	Italy, English

Source: Adapted from the Ursi Instrument²⁴.

Two studies compared the safety and efficiency of the PICC with other central devices used for chemotherapy (studies 3 and 4). Two described the patient's experience using the catheter (studies 3 and 6), while expert opinion was presented only in the article by Levasseur et al.¹⁶, this also being

the only one with level 6 of evidence. All other publications presented level 4. The AEs related to the PICC, in turn, were carefully explored in five of the publications (studies 1, 2, 5, 8 and 9).

Table 4. Content analysis of the studies in the sample

Order	Method and evidence	Objective	Conclusion
1.	Retrospective analysis, level 4	To analyze the factors that cause PICC-related venous thrombosis and find appropriate nursing interventions for its mitigation.	The longevity of catheter use depends on the implementation of individual nursing care that involves the evaluation of the patient's condition regarding gender, resident vein and fibrinogen level, reducing the occurrence of PICC-related venous thrombosis.
2.	Retrospective study, level 4	To contrast the incidence of PICC-associated thrombosis in lymphoma with other types of cancer.	Catheter use can be minimized in patients with lymphoma due to their greater predisposition to develop PICC-related thrombosis.
3.	Prospective cohort study, level 4	To compare the complications, cost and quality of life of patients using three types of Central Venous Catheters (CVC) for chemotherapy purposes.	Fully implanted devices (port-a-caths) can be selected in place of the PICC for evidencing fewer complications and better quality of life and patient satisfaction, which may be strategies used by nursing.
4.	Observational study, level 4	To compare the incidence of infectious and thrombotic events in PICC and conventional CVC in onco-hematologic patients.	The PICC demonstrates a positive expectation for use as it is a safe and effective alternative to CVCs, featuring a longer lifetime and catheter-related AE-free survival.
5.	Retrospective study, level 4	To evaluate the incidence of and factors associated with Catheter-Related Bloodstream Infection (CRBSI) in cancer patients undergoing Total Parenteral Nutrition (TPN).	Standardized nursing care protocols for catheter maintenance predict a low rate of CRBSI and increase the use of the device, showing that its incidence may not be related to the type of venous access, but to the need for specialized care after insertion.
6.	Qualitative and phenomenological study, level 4	To describe the experience of using the PICC in cancer patients.	Most patients considered having a PICC line as a positive experience that they would recommend to other patients since they found that it did not change their quality of life.
7.	Expert opinion survey, level 6	To evaluate the practices, perceptions of complications and risk of venous access among oncology nurses and physicians.	There is no predilection for PICC. Therefore, the type of venous access used for treatment may vary significantly, as well as perceptions about risks and complications.
8.	Retrospective analysis, level 4	To explore the factors that increase the risk of infection caused by PICCs in bone tumor patients.	Infections caused by PICCs were related to the experience of the professionals responsible for the insertion and to the catheter permanence time.
9.	Retrospective study, level 4	To verify the AEs related to PICC in patients with oncologic or hematologic neoplasms.	Optimistic prospect of using the PICC for administering chemotherapy, as it was associated with a low rate of all AEs.

Source: Adapted from the Ursi Instrument ²⁴.

The content mapping allowed the structuring of four subthemes: comparison with other vascular access devices; catheter-related adverse events; patient experience; physicians' and nurses' perceptions about venous access.

The incidence of thrombotic and infectious episodes was reported in 100% of the studies that included the identification of central access device-related complications among their objectives. Other described inconveniences were linked to phlebitis, lumen occlusion, rupture, poor tip position, and

pinch-off syndrome, defined as the kinked, compressed or even fragmented catheter in the narrow space between the clavicle and the first rib (study 3).

The reviewed articles involved the analysis of 13,464 individuals. A total of 13,382 oncology patients were investigated regarding the frequency of catheter-related AEs and/or quality of life, comfort and satisfaction. Two studies did not distinguish between the gender of the participants who joined at the beginning of data collection (studies 4 and 8). However, out of the remaining 12,541 patients, 57.3% (n = 7,194) were men and 42.6% (n = 5,347) were women. Only one publication focused on questioning oncologists and oncology nurses about access practices, perceptions of complications and risk, thus presenting another clientele as the object of study (study 7).

In addition to the clear indication for prolonged or continuous intravenous infusion of chemotherapeutic agents, the use of the PICC was also convenient for patients with limited venous access, intermittent blood sampling (study 6), Total Parenteral Nutrition - TPN (study 5) and vascular structure not suitable for the desired therapy (study 2).

In 66.6% (n = 6) of the studies, the nurse, adequately specialized, was referred to as the professional responsible for the insertion procedure (studies 7, 1, 5, 2, 3 and 6). The used PICCs varied in conformation, presenting diameters between 4 and 6 Fr (studies 2, 3 and 9), 25 to 55 cm long (study 9), with valved or open distal tip (studies 2 and 9) and single or double lumen (studies 2, 3 and 4).

The basilic, cephalic, brachial, and median cubital veins were reported as the choice for cannulation in 44.4% (n = 4) of the articles (studies 1, 2, 3, and 5), with the basilic vein being favored in 50% (n = 2) of them (studies 2 and 3). There was no specificity regarding the punctured peripheral vessel in the other studies.

DISCUSSION

Comparison with other vascular access devices

In the absence of a specific recommendation determining the type of Vascular Access Device (VAD) for adult patients during antineoplastic treatment, whether solid or hematologic tumors, the PICC stands as a persistent alternative in the choice process^{17,25}.

This category of catheter, whose advantages lie from the moment of insertion, with the reduction of the hospital burden in operation theater scheduling, once the procedure can be performed at the bedside, guarantees the reduction of chemotherapy leakage, avoids repeated venipunctures⁵ and, despite being continuously shrouded in controversy about its safety and effectiveness, provides convenient vascular access for oncology patients¹³.

In a straight comparison of AEs between conventional and peripherally inserted CVCs, the study by Fracchiolla et al.² exhibits a considerably longer PICC lifespan, relating it to a lower rate of infectious

episodes and removal due to complications, with no statistical significance, even in the development of thrombi.

Corroborating these findings, among the 2,477 patients included in the seven-year period study by Campagna et al.³, only 419 AEs were related to the PICC, indicating a low rate of complications during the administration of chemotherapy. The authors, however, highlight the importance of implementing catheter care protocols and training programs for the nursing staff who deal with these devices on a daily basis, since episodes of occlusions and infections may be directly associated with the quality of post-insertion care.

Another prerogative of such catheters widely documented in the international literature is that their insertion, previously an exclusive competence of physicians, consists of a lawful conduct to the nursing professional's actions^{6,14}, reducing the waiting time for the procedure and consequent initiation of treatment¹⁷. In Brazil, however, despite COFEN's Resolution No. 258/2001, which addresses the legitimacy of the performance of qualified nurses in this area, the practice is still marked by physician hegemony in surgical centers^{26,27}, hindering the benefits of the PICC implantation and mitigating the clinical evidence of its use, considering the scarcity of related scientific publications.

In view of the plurality of devices, each intravenous administration route is admitted as having its own merits and complications, thus these factors need to be weighed for any patient, with an individualized approach. Therefore, during the decision-making process, which is usually linked to the oncologist's personal preference^{17,28}, it is suggested that some factors be considered, such as: the patient's clinical peculiarities^{6,14}, characteristics of infusion solutions, the professional available for insertion¹⁶, length of access¹³, and continuation of IV Therapy in the home environment¹².

Physicians' and nurses' perceptions about the Venous Access

In LeVasseur et al.'s study¹⁷, considering the opinion of oncologist physicians alone and the infusion characteristics compatible with peripheral perfusion during chemotherapy regimens, PICCs are only recommended after the preference for peripheral access. Furthermore, for incompatible regimens, given the patient's freedom to perform daily life activities without limitations and due to the long-term nature of the therapy, these professionals recommend the device only after the preference for ports. Thus, depending on such assessment, the PICC in no situation constitutes a first-choice device. Despite agreeing with the medical professionals on the choice of the device in these different scenarios, nurses point out important advantages of the PICC use related to fewer venipuncture attempts in problematic accesses, providing greater comfort and reducing patient anxiety.

Patient's experience

As the user is the direct target of the benefits and complications associated with the selection of the catheter, the sovereignty of his or her point of view is recognized, as well as the importance of including him or her in the therapeutic plan²⁸, making him or her an active subject in this process and providing important conceptual subsidies for his or her self-care practice, thus developing a suitable scenario for the good progress of the treatment¹².

In this regard, the study conducted by Fang et al.²⁵, which also compared the complications and cost of three commonly used chemotherapy VADs, investigated the quality of life and comfort of the patient in eight aspects: quality of sleep, psychological status, personal image, clothing, worrying complications, daily life activities, social life, and work activities. In conclusion, the authors report that the port-a-cath provides a better standard usage compared to the PICC or the conventional central catheter, as the implanted device does not require a change in clothing, offering minimal risk of damage or mispositioning due to the absence of an external line.

On the other hand, Bravo et al.¹² state that patients living with a PICC line describe positive experiences from the moment of insertion, when they recognize it as a quick and rarely painful procedure, to the adaptation of living with the catheter. Considering the benefits greater than the drawbacks, they would recommend it to other patients.

It is important to point out that this study is composed of a sample of only 18 individuals and that even though the final observation has been considered optimistic regarding the use of the PICC, some restrictions in the activities of daily living were recorded, namely, the patients revealed, for example, discomfort related to the physical presence of the catheter, presenting limitations to hygiene, quality of sleep, physical activities, the wearing of clothes and even regarding the positive perception of their own appearance, since the use of the device implied the need for a dressing on the arm.

As important as the well-being it provides, the financial implications have also been considered regarding the user's choice of the device. Such costs, which range from the catheterization procedure, maintenance, treatment of complications, and removal, determine many patients' preference for the PICC over the port-a-cath. In an isolated analysis, the study by Fang et al.²⁵ also signals that for treatments lasting less than 12 months, the cost of the port is much higher than that of the PICC. However, there is no significant difference when it comes to a longer period.

Catheter-related adverse events

Among the early and late drawbacks associated with the PICC, thrombosis was recurrent in all articles that documented AEs. This type of complication, when responsible for the prior removal of the device, interrupts the intended course of treatment and has the potential to cause financial losses, as well as compromising the prognosis of the disease¹⁴.

The classification of cancer patients as members of the risk group for the development of thrombosis is already well documented in the literature. The invasion of the host organism by neoplastic cells is considered to cause an imbalance between procoagulant and anticoagulant factors. In a complex mechanism, these cells trigger the synthesis of the molecules involved in the growth of the tumor mass, such as the Tissue Factor (TF), for example, which induces the production of inflammatory cytokines, determining a higher level of expression by the endothelium of this primary coagulation activator. Thus, the increased manifestation of TF, directly or indirectly determined by the neoplasm, affects the thrombotic events²⁹.

It should be noted that different carcinomas have different influences on the development of DVT. A study carried out in China, with a total of 8,028 patients receiving antineoplastic treatment by PICC for more than 22 cancer types indicates that, although there is a need for further studies to support this association, lymphoma presents a four times greater hegemony in developing thrombotic episodes than other types of malignancies⁶.

The choice of the ideal caliber of the insertion vein consists of adequate handling to prevent thrombotic events. According to the Infusion Nurses Society⁴, before insertion, by means of ultrasonographic evaluation, the vessel whose catheter corresponds to 45% or less of its diameter, preserving the good blood flow, is considered adequate. In addition, the selection of basilic, cephalic, median cubital or brachial veins is recommended, with preference for the first one due to the lowest number of valves and largest lumen⁵.

With regard to this, Chen, Yu and Li¹⁴ recognize the importance of a qualified nursing team in the PICC implementation, who, in addition to theoretical knowledge, develop technical skills to a single and successful puncture, reducing vascular lesions and consequent risk of DVT. They also show that over 50-year-old women, due to the reduction of estrogen, present increased blood viscosity and, therefore, should be seen as a potential risk group.

Finally, this same study found that the Fibrinogen (FIB) level is also directly correlated to venous thrombosis. Blood hypercoagulability, secondary to the concentration of plasma FIB, determines the need for constant monitoring of the patient's coagulation function, aiming at early detection and treatment of possible AEs. Thus, the use of PICC should be avoided as much as possible when the FIB is higher than 4 g/L. On the other hand, age, limb laterality, platelet count, and Prothrombin Time posed no threat to the functionality of the device¹⁴.

Another important complication with serious systemic consequences, such as bacteremia or sepsis, with high morbidity and mortality is the Catheter-Related Bloodstream Infection (CRBSI)^{13,28}. As a diagnosis for this type of infection, the Difference in Time to Positivity method and the paired quantitative blood culture are used. For this purpose, two blood collections of the same volume are

undertaken with a maximum 15-minute interval, one taken from the catheter lumen and the other from a peripheral site. Based on the time difference between positive blood cultures, a possible CRBSI is understood to happen when the difference in time to positivity between central and peripheral blood cultures is over 120 minutes, noting that the isolated microorganism must be the same. Two other aspects that can be observed for this definition are the identification of the same microorganism in the catheter tip and in the peripheral blood culture, as well as the presence of purulence in the insertion site coexisting with Primary Bloodstream Infection³⁰.

For the prevention of this AE, the observation of three types of VADs inserted in 335 patients with TPN indication, in home care regime, highlights the value of detailed instructions to the patient about catheter maintenance, besides the need of implementing a strict standardized protocol that includes aseptic washing procedure of the device, weekly changes of sterile dressings, and application of connectors with hemostatic valve in all lumens that are not in use²⁸.

Hence, Vashi et al.²⁸, after finding a low rate of CRBSI, suggest that its incidence in immunocompromised patients receiving TPN may not be related to the type of device, but to the care protocol used, not showing prevalence between ports, PICC or tunneled central catheters for the development of the condition.

Not exempt from limitations, it is noteworthy that the origin of the aforementioned articles may not translate the national reality, considering that the applicability of clinical conducts is related to the professionals' closeness to the theme, which obviously varies from one place to another. Moreover, the selection of only free publications may have neglected divergent information.

CONCLUSION

The outcome revealed that the PICC has grown as a technology in the treatment of adult patients and plays an important role for oncology nursing in the long-term chemotherapy infusion against multiple types of cancers, offering reliable vascular access and convenience to the user, especially because it is a central catheter whose placement is not characterized as an exclusive procedure for one single professional category, sustaining and simplifying its choice.

However, the continuity of its success is undeniably linked to the proper classification of the patient as to vulnerability in developing thrombotic and infectious complications, as well as to post-insertion nursing care. Thus, the importance of diligent maintenance protocols and of continuous training of clients and carers on self-care practices with the catheter increases.

Due to these clinical complications and to a quality of life associated with impairments in performing daily activities as well as in the perception of one's own appearance, depending on the personal preference of oncologists and patients when faced with other more successful devices, the future scenario of the PICC in the therapy of adult patients is uncertain.

Brazil lacks content of this nature and, considering the certainty of evidence to be moderate, it is recommended that further studies be encouraged and developed to assess the degree of user satisfaction and expert opinion on the subject.

CONTRIBUTIONS

All authors contributed equally to the study design, data collection, analysis and discussion, as well as in the writing and critical review of the content with intellectual contribution and approval of the final version of the study.

CONFLICTS OF INTERESTS

There are no conflicts of interests.

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Corresponding Author

René Rodrigues Pereira

E-mail: renemscruises@yahoo.com.br

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