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RESEARCH

Cateter central de inserção periférica: utilização no vale do paraíba paulista

Peripherally inserted central catheter: the use in vale do paraíba paulista

Catéter central de inserción periférica: la utilización en el valle de paraíba paulista

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ABSTRACT

Objective: to check the use of the PICC catheter in health institutions in the Vale do Paraíba Paulista, how it is done, when it started and the professionals involved in the process. **Method:** observational, descriptive with a quantitative approach. A questionnaire was designed to collect the data, and a pre-test was run with three volunteers. The sample was formed by ten health institutions. **Results:** the PICC Catheter is used by 70% of the sample which presented: use of protocols throughout the process, investment in team training, control of complications, use of professional nurses for the device insertion and removal and the extensive use in their ICUs. The minority uses the image guided puncture for the device insertion. **Conclusion:** the PICC has been widely used since 2005. The competence of the qualified nurse is recognized, being that professional responsible for performing with such device. **Descriptors:** Indwelling catheters, Peripheral catheterization, Nursing.

RESUMO

Objetivo: verificar nos Estabelecimentos Assistenciais de Saúde do Vale do Paraíba Paulista a utilização do cateter PICC, de que forma, desde quando o fazem e os profissionais envolvidos no processo. **Método:** observacional, descritivo com abordagem quantitativa. Elaborou-se um questionário para coleta de dados e realizou-se pré-teste com três voluntários. A amostra constituiu-se de 10 instituições de saúde. **Resultados:** o cateter PICC é utilizado por 70% da amostra que apresentou: uso de protocolos para todo o processo, investimento em treinamento para a equipe, controle de complicações, utilização do profissional enfermeiro para a inserção e remoção do dispositivo e ampla utilização em suas UTIs. A minoria utiliza a punção guiada por imagem para inserção do dispositivo. **Conclusão:** o PICC é amplamente utilizado desde o ano de 2005. A competência do enfermeiro habilitado é reconhecida, sendo este profissional o responsável pela atuação diante deste dispositivo. **Descritores:** Cateteres de demora; Cateterismo periférico; Enfermagem.

RESUMEN

Objetivo: verificar junto a las instituciones de salud del valle del Paraíba Paulista la utilización del catéter CPIC, de qué forma y desde cuando lo hacen, y los profesionales involucrados en el proceso. **Método:** estudio observacional, descriptivo con enfoque cuantitativo. Se elaboró un cuestionario para recolección de datos y se realizó un pre-test con tres voluntarios. La muestra resulta de la consulta realizada en 10 instituciones de salud. **Resultados:** el Catéter CPIC es utilizado en el 70% de la muestra presentada: uso de protocolos para todo el proceso, inversión en entrenamiento del equipo, control de complicaciones, participación del profesional enfermero en la inserción y remoción del dispositivo y amplia utilización en las UTIs. La minoría utiliza la punción guiada por imagen para la inserción del dispositivo. **Conclusión:** el CPIC es ampliamente utilizado desde el año 2005. La competencia del enfermero habilitado es reconocida, siendo este profesional el responsable por el uso de este dispositivo. **Descriptor:** Catéteres de Permanencia; Cateterismo Periférico; Enfermería.

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INTRODUCTION

The Peripheral Insertion Central Catheter (PICC) is a vascular access device of peripheral insertion central located and can be situated in the distal part of the upper subclavian vein or proximal part of the inferior cava vein, with a single or double lumen (from 5 French). It may be made of silicone or polyurethane. It has parameters such as size, length, inner diameter, outer diameter and priming (internal volume).¹

The CPIC is inserted by trained nurses and the preferred sites are the veins of the upper limbs (cephalic or median basilica). After its placement, the x-ray should be performed to confirm the catheter position and start its use.² It can be inserted in Surgical centers, ICUs, Medical-surgical units, Outpatient Clinics and Home Cares.¹

The use of the CPIC catheter is needed in therapies where there are extremes of osmolarity and pH, in therapies using vesicant substances and continuous or intermittent therapy. Also, it is necessary for prolonged therapy and antibiotic therapy for more than six days. However, it is necessary to pay attention to the patient's diagnosis, the conditions of the venous access, the duration of the proposed therapy, the site of insertion, the patient's conditions, especially the potential for instability to the patient with continued sedation, the patients using vasoactive and immunosuppression drugs.¹

The main contraindications to using this type of catheter are: Peripheral venous network not preserved, swollen newborns, very serious newborns, emergency procedure, blood-concentrated administration, veins difficult to access, infiltration, hematoma, previous venous punctures, past history (previous punctures unsuccessfully), phlebitis and thrombosis, presence of fistulas and arteriovenous shunts, previous injuries or surgery that may have altered the anatomy or venous return (for example phlebotomy, mastectomy), allergies to silicone or polyurethane, coagulation disorders (there should be consensus with the team treating the patient) and immunosuppression.¹

The nurse as a leader of the nursing team has some exclusive competence such as the implementation of assistance as the prescribed intravenous therapy. Thus, the device selection to obtain venous access is an important and necessary step³, once the insertion of peripheral intravascular catheters is one of the most frequently performed operations in hospitalized patients.^{4,5,6}

Considering the indications of use, benefits, cost-effectiveness, the very small rates of associated complications and especially the comfort provided to patients and the safety of staff, the selection and appointment of a Peripheral Insertion Central Catheter (PICC) at the beginning of the treatment proves to be a very rational and feasible option.³

In this study, it is intended to check the use of the PICC with the Health Care Institutions (HCI) of Valle do Paraíba Paulista, in what form and since when they do it, the professionals involved in the process if it includes protocols for all process and the investment in staff training.

METHOD

It is an observational study with a quantitative approach. To obtain the data for this research, a data collection structured instrument, self-explanatory with objective questions was created with the following variables: if the institution uses the PICC catheter; for how long; environments that use to catheter insertion; which sectors use the catheter; the existence of standardized documentation by the institution on the insertion, maintenance and removal of the catheter; if this documentation is available to the team; if it provides training for the teams involved in the insertion, maintenance, and removal of catheters; if there is use of guided biopsy image for insertion of catheters; professionals responsible for integration, maintenance and removal of catheters; if there are clinical parameters used for the election of patients using this catheter and to remove them; control of complications related to the utilization of the PICC catheter.

The construction of the instrument was carried out by the researcher, based on the Resolution of COFEN-258/2001 which deals with the legality of the nurse inserting the PICC catheter when enabled for this procedure and the Guidelines for the Prevention of Intravascular Catheter-related Infections.⁷ The research protocol was submitted to the Research Ethics Committee of the University of Cruzeiro do Sul and was approved by the opinion CE/UCS-026/2014.

For the reliability of the instrument about clarity and relevance, there was a pre-test with three volunteers where manager nurses from different institutions answered the questionnaire and after that, they assessed it answering three questions they analyzed: the instrument clarity; ease to answer it and if there was any suggestion to change it. Managers who participated in the pilot testing agreed for clarity, ease to respond to the questionnaire and did not show any suggestion for changes. Thus, these questionnaires were included in the results of this research.

The sample consisted of 10 nurses responsible for Health Care Facilities located in the Vale do Paraíba Paulista region from June to October of 2014 who completed the questionnaire. The establishments having sectors that could use the PICC catheter were considered. Among them, there are neonatal, pediatric and/or adult ICUs; Emergency rooms, hemodynamics; Surgical centers or Medical-Surgical units. Hospitals not using this catheter were excluded from the study.

Nurses who participated in the research were contacted by email or phone and after the first contact, they received the consent form. By agreeing to participate in the study, the questionnaire to answer it and the date for returning this answered agreed between the parties were sent by email.

The data collected through the questionnaires were entered and tabulated electronically. Sequentially, a consolidation of data through Microsoft Excel program was held.

RESULTS AND DISCUSSION

It was found that 70% of surveyed health institutions use the Peripheral Inserted Central Catheter (PICC) and value the professional nurse acting with this device widely used in their Intensive Care Units.

The use of the PICC catheter by the surveyed institutions, the percentage of institutions that use it is 70% (7) of the sample, followed by 30% (3) that do not use it.

Table 1 can show that the early use of the catheter in this region began in 2005, 15 years after the start of using this device in Brazil.

Table 1 - Starting year using the PICC catheter by health institutions interviewed. Taubaté-SP 2011.

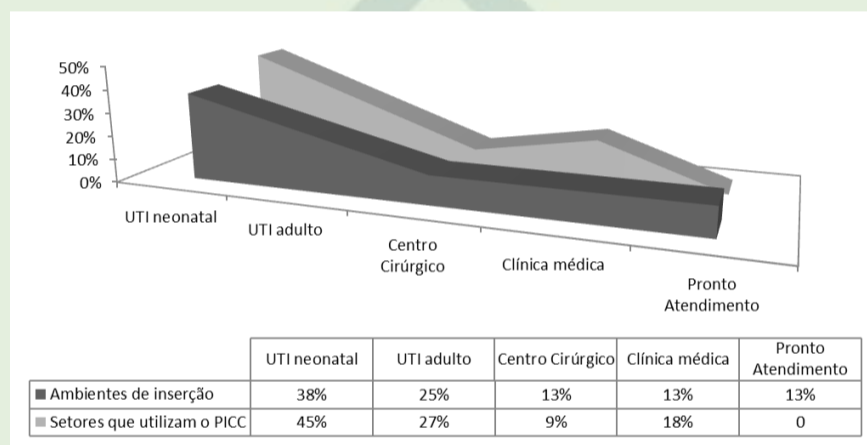
Institutions	Start year using the PICC							
	2005	2006	2007	2008	2009	2010	2011	2012
I 1								
I 2								
I 3								
I 4								
I 5								
I 6								
I 7								
I 8								
I 9								
I 10								

The 70% (7) institutions using this device will have their variables presented in Tables 2 and 3 and Figure 1.

Table 2 - Variables analyzed in the interview to health institutions. Taubaté-SP 2011.

Variables analyzed	n	%
Use of protocols	6	86
Protocols available for the team	6	86
Use of the puncture by image	2	29
Offering treatment to the team involved	6	86
Complication control	7	100
Cost-effectiveness control	4	57

Neonatal ICUs and adult ICUs were among the most places using the catheter insertion. A minority uses Surgical Centers for catheter insertion. These data are in agreement with the sectors that use the PICC, most of them used in neonatal ICUs and adult ICUs as shown in Figure 1.

**Figure 1** - Environments used for catheter insertion PICC X Sectors using the PICC catheter in health institutions interviewed. Taubaté-SP 2011.

A relevant data found was the professionals involved with the insertion, maintenance, and removal of the devices. There is an extensive use of the professional nurse qualified by the insertion and removal of PICC, ensuring significant professional autonomy.

Table 3 - Professionals responsible for the insertion, maintenance, and removal of the PICC catheter interviewed in health institutions using PICC. Taubaté-SP 2011.

Professional responsible	Insertion of PICC		Maintenance of PICC		Removal of PICC	
	n	%	n	%	n	%
Nurses	6	86	3	43	7	100
Nusing technicians and nurses	—	—	4	57	—	—
Nurses and doctors	1	14	—	—	—	—
Doctors	—	—	—	—	—	—

The use of central venous catheters in the hospital environment is extremely important^{8,9} because of low rates of infection and complications. The use of Peripheral Insertion Central Catheter (PICC) is an effective treatment option when there is absolute or relative contraindication to the use of central lines of thoracic puncture.¹⁰

The PICC has been widely used in American institutions in several medical fields, ensuring reliable access, long stay and the possibility of ambulatory use for patients.^{11,12} In Brazil, it has been widely used in neonatology, in intensive care and oncology services.¹⁰

When analyzing the results of this study, it was found that most of the interviewed institutions (70%) use the PICC catheter, now representing one of the technological and therapeutic advances available to patients for the care of intensive care. This type of catheter is in expansion for its numerous benefits such as the possibility of maintaining a long-term therapy reducing the number of punctures, as well as their ability to insert it in the bedside by nurses, giving them autonomy, as regards the choice of best treatment for the hospitalized patient. Proper qualifications and professional training nurses provide skills and knowledge necessary for the indication, insertion, and maintenance of PICC, generating a proper ensuring care to professional autonomy.^{13,14}

Moreover, a study in England demonstrated that this type of catheter has several limitations as the difficult manipulation of the catheter tip, increasing the difficulty in achieving an ideal center position, thereby causing adverse effects such as increased stroke rates occurring arrhythmia and even cardiac puncture. It also demonstrated that the small catheter diameter limits the infusion and hinder the vacuum, as well as a large number of such catheters, is removed prematurely due to occlusions or phlebitis. However, it showed that the PICC catheter failure rates are higher than the tunneled catheters.¹⁵

Concerning the broad use of the PICC, studies evaluating the utilization of this catheter in groups of critically ill patients and intensive care show lower infection rates with its use and lower cost when compared to a short-term central catheter inserted through a puncture in the jugular or subclavian.¹⁶ The cost of the catheter is an aspect still being studied, but some studies have demonstrated its reduction with its use. A prospective study demonstrated cost savings when the PICC is inserted by nurses.¹⁷

Regarding the using time, it is known that, in Brazil, the PICC has become used since 1990, first in neonatology, due to its small diameter and its flexibility and its use in adults only began in 1995.^{18,19} The study showed that the first institution interviewed to start using the PICC did it in 2005, that is 15 years after the begin of using this catheter in Brazil.

Studies have shown that the development of care protocols based on scientific evidence have been motivated, aiming to standardize procedures and improve the quality of care.²⁰ In this study, the existence of protocols for the insertion, maintenance and removal of the PICC shown to be prevalent. The standardization using protocols allows to minimize variations conduit and facilitates the monitoring results. For that, it is recommended to use specific documentation for each catheter inserted, allowing the evaluation of the practice and the development of quality indicators.^{20,21}

As regards the use of image guided puncturing, only 29% of the sample uses this feature to insertion of the PICC. Studies have shown that the use of US interventional procedures for guiding may provide increasing success in the venous or arterial puncture, and central venous

catheter deployment peripherally inserted venous network in patients with difficult to access. In this way, it contributes to the improvement of nursing practice, professional development, and promotion of patient safety. However, for this, there must be training programs for health professionals.^{22,23}

The use of US in the care of the patient undergoing intravenous therapy has been recommended for the promotion of patient safety. Using the image is possible to improve the results of the assertiveness of intravenous puncture of peripheral and central vessels, reducing the number of attempts and complications, promoting greater patient and family satisfaction.^{24,25} Thus, it is clear that the use of US can contribute to the achievement of more efficient intravenous punctures. Nurses, improving their performance during the procedure, can use new portable equipment at the bedside and, consequently, the care provided to patients.²⁶

As for the training of the teams involved with the use of the device, most institutions (86%) offer this training to their employees. According to the literature, it must have a continuing education strategy that allows training professionals for their handling and maintenance to avoid complications related to the use of this catheter.²⁷

The use of this device requires knowledge, skill and ability to handling by nursing staff and other health professionals, may reducing occurrences that compromise their stay. This requires paying attention to the routines and better training of nursing care teams, seeking a better performance in maintaining the catheter. There are strategies necessary to qualify for assistance, consequently minimizing early catheter removal and ensuring patient safety.²⁸

This study showed that PICC insertion is widely used in intensive care units. These data corroborate with studies showing that as a result of the advantages presented by this catheter, there are hemocompatible and less thrombogenic material, use for a long time, among other things. This device has been widely used in neonatal care units and patients of different age groups.^{28;2} As for its implementation, the PICC insertion could be done at the bedside by nurses¹³ avoiding the need to implement it in Surgical Centers.

It was observed that 43% of institutions interviewed only use the nursing staff for daily maintenance of the catheter. In this regard, studies show that qualified and trained nurses for such a procedure have more skills and knowledge necessary to maintain the PICC, and generate a proper care ensuring professional autonomy.^{13;14} Studies have shown that the use of this device by experts who have knowledge, skill and ability reduce handling occurrences that compromise their stay.²⁸

As for the control of catheter-related complications, all respondents reported having these controls. However, as the cost-effective control, only 57% of respondents do it. It is known that the cost of the catheter is an aspect still being studied, but some studies have demonstrated its reduction using the catheter inserted by nurses.¹⁷

The intensive care nurse takes on a new role by introducing this practice, which has become another treatment option for the patient. This new activity also brings with it new responsibilities that range from the technical training professional, their ability to evaluation and decision-making, patient, his family approach, and the relationship of nurses within the institution. It is a necessary to increase in institutional training regarding the handling and maintenance of the catheter. Nurses need to assess intravenous and indication of therapy in

this way and also the catheter usage time. Nurses need to be able to indicate early the catheter before several peripheral punctures occur, preventing the passage of PICC.²⁹

CONCLUSION

There was a wide use of Peripheral Insertion Central Catheter by HCI interviewed for this research in the Vale do Paraíba Paulista since 2005 because of its numerous benefits. It became apparent that the institutions use this catheter using properly protocols throughout the process, investing in training for staff involved in the utilization of the PICC as this is necessary for the success of this type of therapy.

As for the sectors that use the PICC, neonatal and adult ICUs predominated. They are also the catheter insertion environments chosen by the institutions since this catheter allows the insert by the bedside.

All respondents use the qualified professional nurse for insertion and removal of PICC, but nursing technicians along to nurses are responsible for catheter maintenance.

When asked about the use of image-guided puncture, it was found that a minority uses this feature to catheter insertion.

REFERENCES

1. Hospital de Doenças Tropicais Anuar Auad (HDT). Protocolo para passagem do Cateter Venoso Central de Inserção Periférica (PICC) pelos enfermeiros devidamente capacitados e habilitados do Hospital de Doenças Tropicais - Goiânia, GO. 2007.
2. Philips LD. Cateteres de Acesso Venoso Central. em: Philips LD - Manual de Terapia Intravenosa. 2ª Ed. Porto Alegre: Artmed; 2001. p: 334-372.
3. Abreu R. O enfermeiro e sua responsabilidade na criação e manutenção de um acesso venoso: um desafio com novas perspectivas. 2006.
4. Peterlini M, Chaud M. Órfãos de terapia medicamentosa: a administração de medicamentos por via intravenosa em crianças hospitalizadas. Rev latino-am enferm. 2003; 11(1):88-95.
5. Machado AF, Pedreira MLG, Chaud MN. Estudo prospectivo, randomizado e controlado sobre o tempo de permanência de cateteres venosos periféricos em crianças, segundo três tipos de curativos. Rev latino-am enferm. 2005;13 (3):291-8.

6. Pedreira MLG. Uso de bombas de infusão na terapia intravenosa em crianças assistidas em unidades de cuidados intensivos pediátricos: contribuições para estudos clínicos e técnicos. [tese]. São Paulo (SP): Universidade Federal de São Paulo; 1999.
7. O'Grady NP, Alexander M, Burns LA, Dellinger EP, Garland J, Heard SO, et al. Guidelines for the Prevention of Intravascular Catheter-related Infections. The Healthcare Infection Control Practices Advisory Committee (HICPAC). *Clin Infect Dis*. 2011; 52(9):162-93.
8. Aguiar RW - Intervenções em Crise, em: Cordioli AV - Psicoterapias: Abordagens Atuais. 2ªEd, Porto Alegre, Artes Médicas, 1998;153-158.
9. Harbert KR - Elaboração do Estresse de Incidente Crítico, em: Dattilio FM, Freeman A - Estratégias Cognitivo-Comportamentais de Intervenção em Situações de Crise. 2ª Ed, Porto Alegre, Artes Médicas, 2004;317-334.
10. Oliveira ECN - O Psicólogo na UTI. Reflexões sobre a saúde, vida e morte nossa de cada dia. *Psicol., Ciênc. Prof.*, 2002;2:30-41.
11. Cordioli AV - As Psicoterapias mais Comuns e suas Indicações, em: Cordioli AV - Psicoterapias: Abordagens Atuais. 2ª Ed, Porto Alegre, Artes Médicas, 1998;19-34.
12. Botega NJ - Reações à Doença e à Hospitalização, em: Botega NJ - Prática Psiquiátrica no Hospital Geral: Interconsulta e Emergência. Porto Alegre, Artes Médicas, 2002;43-59.
13. Paes GO, Leite JL, Melo ECP. Caring for the client with acute respiratory disorders: a proposed protocol for assistance to make decisions in nursing. *Online Braz J Nurs*. 2011; 10(1).
14. Paes GO. Gerenciando o cuidado de enfermagem com protocolos assistenciais: a práxis em enfermagem e sua interface com a tecnologia em saúde [tese]. Rio de Janeiro: Escola de Enfermagem Anna Nery, Universidade Federal do Rio de Janeiro; 2011.
15. Galloway S, Bodenham A. Long-term central venous access. *UK. Br. J. Anaesth.*, 2004 92 (5): 722-734.
16. Ng PK, Ault MJ, Ellrodt AG, Maldonado L. - Peripherally inserted central catheters in general medicine. *Mayo Clin Proc*. 1997;72:225-33.
17. Cardella JF, Cardella K, Bacci N. Cumulative experience with 1,273 periph periph-erally inserted central catheters at a single institution. *J Vasc Interv Radiol*, 1996;7:5-13.
18. Jesus VC, Secoli SR. Complicações acerca do Cateter Venoso Central de Inserção Periférica-PICC. *Cienc Cuid Saude*. 2007 abr/jun; 6(2): 252-60. Disponível em: [Http://www.periodicos.uem.br/ojs/index.php/CiencCuidSaude/article/view/4174/2762](http://www.periodicos.uem.br/ojs/index.php/CiencCuidSaude/article/view/4174/2762)
19. Pezzi MO, et al. Manual de Cateterização Central de Inserção Periférica CCIP/PICC. Grupo de estudos do CCIP. Porto Alegre: Associação Hospitalar Moinhos de Vento; 2004.
20. Alexander M. Infusion nursing: standards of practice. *J Infus Nurs* 2000; 23(6S):S188.
21. Galloway M. Using benchmarking data to determine vascular access device selection. *J Infus Nurs* 2002;25(5):320-5.
22. Weinstein SM. Plumer's principles and practice of intravenous therapy. 5th ed. Philadelphia: J.B. Lippincott; 1993. 663p.
23. Blaivas M. Ultrasound-guided peripheral i.v. insertion in the ED. *Am J Nurs*. 2005;105(10):54-7.
24. Tibbles CD, Porcaro W. Procedural applications of ultrasound. *Emerg Med Clin North Am*. 2004;22(3):797-815.
25. Calvert N, Hind D, McWilliams R, Davidson A, Beverley CA, Thomas SM. Ultrasound for central venous cannulation: economic evaluation of cost-effectiveness. *Anaesthesia*. 2004;59(11):1116-20.

26. Pedreira MLG, Peterlini MAS, Pettengill MAM. Ultra sonografia na punção intravenosa periférica: inovando a prática de enfermagem para promover a segurança do paciente. *Acta Paul Enferm.* 2008;21(4):667-9.
27. Beghetto M, Victorino J, Teixeira L et al - Fatores de risco para infecção relacionada a cateter venoso central. *Rev Bras Ter Intensiva.* 2002;14:107-13.
28. Baggio MA, Bazzi FCS, Bilibio CAC. Cateter central de inserção periférica: descrição da utilização em UTI Neonatal e Pediátrica. *Rev Gaúcha Enferm.* 2010;31(1):70-6.
29. Lamblet LCR, Guastelli LR, Moura Júnior DF, Alves MAY, Bittencourt AC, Teixeira APP, et al. Cateter Central de Inserção Periférica em Terapia Intensiva de Adultos. *Rev bras ter intensiva.* 2005;17 (1): 23-7.



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