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Research Article

Long-term central venous catheters: evidences on nursing care - A literature review

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Abstract

Purpose: To evaluate the evidence available in the literature on the nursing care related to long-term central venous catheters. Method: For the selection of items we used LILACS, CINAHL, PubMed and Cochrane databases, providing a sample of 27 articles. Results: The data showed four themes: dressings; blood collection; prevention and control of infection; and treating thrombotic obstruction and heparinization. With the healing, there was no contraindication on the type of material used. Intervals of dressing changes up to seven days were the most targeted. About collecting blood for testing is recommended to discard the first sample, but blood culture using the first sample optimizes results. The chlorhexidine was more effective in skin antisepsis, disinfection of the hub but alcohol was 70% more effective. The articles showed that drug treatment of obstruction is safe and effective. Conclusion: the articles analyzed brought relevant results on nursing care related to central venous catheters, highlighting the importance of evidence-based practice to a reasoned assistance.

Keywords: Catheterization Central Venous, Oncology Nursing, Evidence-Based Nursing, Nursing Care

INTRODUCTION

Long-term central venous catheters (LTCVC) are devices used in situations requiring long-term access to the vascular system (Júnior et al., 2010). The increasing advances in therapeutic modalities in oncology, especially in regard to chemotherapy, have emphasized the importance of the recommendation for the use of central venous catheters (Cunha and Leite, 2008).

The constant use of the venous network of patients leads to increasingly serious problems of visualization and puncture the vessel. Furthermore, administration of antineoplastic requires usually several venous punctures during treatment, which in addition to the irritating and / or vesicant characteristics of some drugs can exacerbate vascular fragility and hardening, favoring chemotherapy extravasation (Martins and Carvalho, 2008).

Although these devices are an important source of infection of primary blood stream are considered indispensable in the practice of modern medicine, especially in intensive care units (Mesiano and Merchán-Hamann, 2007). So, vascular access are increasingly required as an essential part of the treatment plan, since one of the objectives of the use of venous tunneled catheters to reduce or eliminate psychological and physical traumas related to venipuncture (Cunha and Leite, 2008). There are basically two types of venous tunneled catheters, called Semi-implantable and totally implantable (Albuquerque, 2005). The choice of the type of catheter is based on the therapeutic indication and limitations to the patient, as well as age and socioeconomic status, in order to reduce the risk of complications. Despite being widely used, these devices expose the patient to complications such as bloodstream infection, thrombosis, pneumothorax, among others. These complications worsen the clinical picture, with important cause of morbidity and mortality (Instituto Nacional de Câncer José Alencar Gomes da Silva, 2008).

It is known that such complications are often related to the handling of these catheters, generally required practice. This study is justified by the need to give special attention to the care in handling these devices, since the members of the nursing team must be trained in order to provide care to minimize the risks inherent in its use. The standardization of actions and constant training of nurses qualify the care provided and are of maximal importance so that there is uniformity and consensus of professionals (Instituto Nacional de Câncer José Alencar Gomes da Silva, 2008).

Based on these, this paper aims to assess the evidence available in the literature on the nursing care related to long-term central venous catheters. We seek in literature a theoretical framework that could substantiate this study, selecting evidence-based practice, as this will enable us to work by encouraging the use of research findings by the health care, reinforcing the importance of research for clinical practice based in scientific knowledge, with quality results and cost effective (Mendes et al., 2008).

METHOD

It is an integrative literature review, which mainly aims at gathering and synthesizing the studies on a given topic. It enables to generate a source of current knowledge about the problem and determine if knowledge is valid to be transferred to practice, thus offering, grants for the advancement of nursing (Pompeo et al., 2009).

The guiding question of this review consisted of: which knowledge published in the literature on the nursing care is related to long-term central venous catheters?

Searches were conducted from April to July 2013 in the electronic databases Latin American and Caribbean Literature on Health Sciences (LILACS), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medical Literature Analysis and Retrieval System Online (MEDLINE - PubMed) and The Cochrane Library (Cochrane) interface. To discuss the results the reference documents for the prevention of infection from the Centers for Disease Control and Prevention (CDC) and the National Health Surveillance Agency (ANVISA) were used. Was used as search terms and combinations of descriptors strategy: central venous catheters, nursing care, neoplas * * cancer, tumor and onco * *.

The inclusion criteria of articles in this review were: original papers dealing with the nursing care related to long-term central venous catheters, published in Portuguese, English or Spanish, and no time frame. Although the literature reviews were excluded, however, the articles referenced by these reviews and that met the inclusion criteria set out above were used. The entire process of search and selection of works is described in the flow chart shown in Figure 1.

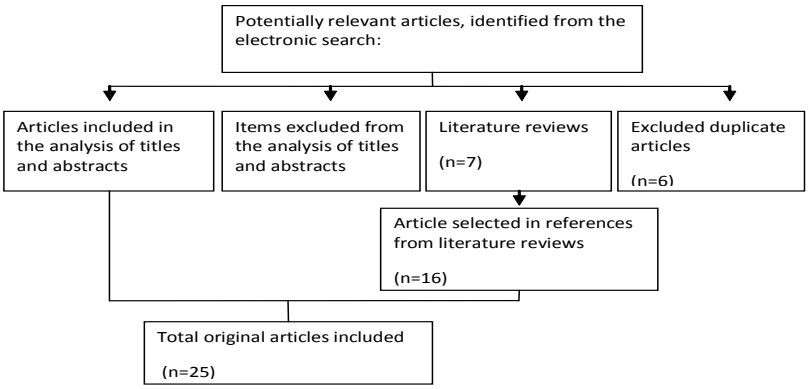

Figure 1. Flow of selection and identification studies

The level of evidence of the included articles was analyzed by three researchers independently, according to the evidence hierarchy system that provides seven levels: level I - review or meta-analysis of relevant randomized clinical trials; Level II - Evidence obtained from at least one well-designed randomized clinical trial; Level III - Well designed clinical trials without randomization; Level IV - case study with control and cohort studies; Level V - systematic reviews of descriptive studies and qualitative studies; VI level - single descriptive or qualitative level and VII- opinion of authorities and study or expert committee (Melnyk and Fineout-Overholt, 2005). The three cases in which there was disagreement were re-evaluated by researchers reached a consensus.

The collected data were organized into a table for ease of understanding regarding the results and their discussion. The data depicted four themes, namely: dressings; blood collection; prevention and control of infection; treatment of thrombotic obstruction and heparinization.

RESULTS

The twenty (25) selected articles were published from 1991 to 2013. In analyzing the search of researches of the included articles, it was found that they were thirteen (52%) randomized trials, seven (28%) non-randomized clinical trials, five (20 %) descriptive studies. Therefore, regarding the level of evidence, thirteen articles were classified as level II, seven as level III and five classified as level VI.

As for the themes portrayed, six articles (24%) referred to the dressing theme, two (8.0%) to blood collection, eight (32%) the prevention and control of infection and nine (36%) the treatment of thrombotic obstruction and heparin for locking.

Table 1 presents a summary of findings, including: identification of the article (author and year), assessment of methodological rigor (level of evidence), intervention studied and the recommendations found (conclusion).

Table 1. Summary of findings

Author	Evidence	Studied intervention	Conclusion
Wille et al. (1993)	II	Compare the performance of using two types of transparent film dressings with regard to permeability (medium/high).	Dressing with transparent film is an important resource for CVC care* Both dressings tested can be safely used.
Brandt et al. (1996)	II	To determine the effect of two kinds of dressings on IRC†.	The transparent dressing was the most profitable. However the choice of dressing depends on the preference and skin tolerance.
Ruschulte et al. (2008)	II	Evaluate the effectiveness of sponge impregnated with chlorhexidine gluconate in reducing IRC †.	Dressings impregnated with chlorhexidine reduced the incidence of CVC infections *.
Engervall et al. (1994)	II	Determine whether the reduction of dressings from two (2) to one (1) time per week can be safely performed in neutropenic patients.	Reducing the period of exchange of transparent dressings twice a week to once cannot be safely performed in neutropenic patients.
Rasero et al. (2000)	II	Comparing two time intervals protocols to exchange bandage CCV * in order to assess toxicity and local infections.	The increase in the interval between dressing changes do not increase the risk of local infections, while reducing patient discomfort and cost.
Timsit et al. (2009)	II	Compare dressings of sponge impregnated with chlorhexidine versus standard dressings on the CIT rate † and dressing changes.	Sponge dressings impregnated with chlorhexidine CVC * reduced risk of infection even when rates were low. Reduce the frequency of changing dressings every three to seven days reduces the number of changes and appears safe.
Mayo et al. (1996)	III	Determine the volume of blood discarded to obtain clinically useful samples taken from a heparinized * CVC.	As it is difficult to obtain heparin free samples, peripheral blood should be used for coagulation.
Winokur et al. (2013)	VI	Determine whether there are differences between the collection of blood cultures from the first and second blood sample obtained from a CVC *.	The first blood samples taken from CVC * have high sensitivity and specificity for a later one. For blood collection, the gold standard is peripheral blood.
Maki et al. (1991)	II	Evaluate the efficacy of skin antisepsis to prevent IRC †.	The use of chlorhexidine 2% instead of 10% povidone-iodine and 70% alcohol, can reduce the incidence of CRF †.
Mimoz et al. (2007)	II	Compare chlorhexidine with povidone-iodine for skin antisepsis in terms of catheter colonization and CRI †.	The solutions based on chlorhexidine are to be regarded as a substitute for the povidone-iodine in order to prevent catheter-related infection.
Rackoff et al. (1995)	II	Determine whether the addition of vancomycin * CVC reduces the incidence of bacteremia attributable to luminal colonization.	The addition of heparin to the solution of vancomycin did not reduce bacteremia with vancomycin sensitive organisms.
Daghistani et al. (1996)	II	Evaluate the benefit of adding flush of broad-spectrum antibiotic for catheters.	The effectiveness of antibiotic prophylaxis cannot be assessed. Prophylactic antibiotics lose their importance when IRC † are reduced through education.

Continuation of table 1

Maki et al. (1997)	II	To determine the efficacy of a new CVC * impregnated with an antiseptic for preventing CRI †, patient tolerance and sources from CRI † multiple lumens.	The catheter impregnated with chlorhexidine and silver sulfadiazine is well tolerated, reduces the incidence of CKD †, extends the time that CVC * can be left safely, and allows cost savings.
Salzman et al. (1993)	VI	To evaluate the efficacy of the disinfection agents in reducing the bioburden of CVC * hub.	Cleaning the hub of the CVC * with disinfectant can drastically reduce microbial contamination.
Kaler et al. (2003)	VI	To study the efficacy of disinfection needleless access connector.	Models of needleless connectors were effectively disinfected with both methods.
Sweet et al. (2012)	III	To evaluate the effect of optimizing the disinfection of hub.	The use of protective doors and connectors neutral pressure needleless demonstrate a beneficial effect on patient care.
Ponec et al. (2001)	II	To determine the efficacy of the CCV * alteplase occluded.	The infusion of alteplase appears safe and effective in restoring the flow of CCV * occluded without the need for radiographic assessment pre-treatment.
Deitcher et al. (2002)	III	Evaluate the efficacy and safety of alteplase for restoring function of the CVC *.	A regimen of two doses of up to 02mg alteplase is safe and effective for restoring the flow of occluded CVC *.
Shen et al. (2003)	III	Evaluate the safety and efficacy of alteplase for restoring function in occluded CVC * children.	A regimen of alteplase up to two doses of 02mg is safe and effective for the restoration of function of occluded CVC*.
Liu et al. (2004)	III	To evaluate the efficacy and safety of reteplase in CVC occlusions * in cancer patients.	Reteplase in dose 0,4UI per lumen CVC * is an effective and safe alternative, which quickly restores the CVC patency *.
Ng, R. et al. (2004)	III	To evaluate the efficacy and safety of treatment with alteplase.	Treatment with the maximum use of two doses of alteplase is safe and effective in the restoration of function of the catheter.
Blaney et al. (2006)	III	To evaluate the safety and efficacy of alteplase for treating occlusions CCV * in children.	The administration of alteplase is safe and effective for the recovery of CVC function * in pediatric patients.
Moll et al. (2006)	II	To test the activity of alfimeprase in patients with occluded CVC *.	Alfimeprase has the potential to restore function to occluded CVC * quickly and safely.
Kelly et al. (1992)	VI	Determine infection rates and permeability of CVC * who used the weekly flush.	This study indicates the safe and effective weekly flush. Incidents of dysfunction did not occur, and the acceptable rate of infection.
Mayo et al. (1996)	VI	Determine whether the addition of heparinized saline solution will decrease the formation of clots and suspension of persistent occlusion.	The addition of heparin solution weekly for catheter maintenance decreases intraluminal presence of clots and improves the functionality of the catheter.

*Central venous catheter
† Catheter-related infection

DISCUSSION

Six articles addressed the theme "curative". Three papers referred to the types of materials used - gauze, transparent film and sponge impregnated with chlorhexidine (Kelly et al., 1992; Liu et al., 2004; Maki et al., 1991), two articles the frequency of exchange (Maki et al.,1997; Martins and Carvalho, 2008) and an article addressed the two issues - equipment and frequency (Mayo et al., 1996).

A paper presented the effect of two dressings protocols of central venous catheters (gauze or transparent film) on catheter-related infection and showed no any statistically significant differences. The transparent dressing changes required beyond seven days due to the presence drainage catheter in the ostium, however was more profitable than with gauze bandage. Due to the absence of adverse effects in both groups, the article guides the choice of the type of dressing depends on patient preference and skin tolerance (Kelly et al., 1992).

A study compared the clinical performance of prolonged use of two types of dressings with transparent film that differed according to the moisture vapor permeability (moderate or high). The study showed no difference in the incidence of complications, or moisture accumulation lifting and durability of dressing.

Also in this article, the authors described the advantages found in the use of transparent film dressing, as the possibility of continuous visual inspection of the catheter site, requiring less frequent changes (preventing its excessive manipulation), reducing healthcare costs, greater satisfaction and patient comfort, and provide an impermeable barrier to water and bacteria (Liu et al., 2004).

Two randomized controlled trials reported a decrease in infection rates related to the catheter without bacterial resistance when used with dressings impregnated sponges with chlorhexidine (Maki et al., 1991; Mayo et al., 1996). However, the use of dressings impregnated with antiseptic is accepted only in Intensive Care Units, where the catheter related infection rates are above the reference rate (Mayo et al., 1996). In less complex services simple preventive measures can be as effective as the use of new devices. This consideration reiterates the guidelines present in the guidelines of the CDC (Mayo et al., 1996) and ANVISA (Melnyk BM, Fineout-Overholt, 2005).

As regards the frequency of dressing change with transparent film, two randomized clinical trials stiffened security at dressing changes at longer ranges (up to seven days) (Martins and Carvalho, 2008; Mayo et al., 1996). Patients who received dressing changes at longer intervals showed no significant increase in the rate local infection, while those in which the exchange was carried out every two days had an increase of the local cutaneous toxicity. In addition, a

reduction of costs in the longer intervals exchanges (Martins and Carvalho, 2008).

In contrast, another study with 32 neutropenic patients with central venous catheters, compared dressing change weekly with transparent film with held twice a week. I concluded that there was no difference in the incidence of complications that led to the removal of the catheter between the two groups. However, the group for which it is made weekly dressing change compared to the frequency of twice a week, had a higher incidence of infection from the catheter tip and the ostium, and a greater tendency to wound dressing extra, early occurrence of infection of the catheter ostium and a larger number of cases of sepsis Gram-positive bacteria (Maki et al., 1997).

Reinforcing the above results found on dressings, CDC guidelines and ANVISA for dressing semi-implanted catheters recommend that the dressing can be, both with sterile gauze, and with transparent film. The dressing with sterile gauze in patients with abundant perspiration, bleeding or oozing site is preferable. On the frequency, guide 48 hours to sterile gauze and up to seven days for an exchange of dressings with transparent film, and redo the dressing when wet, loose or dirty (Mayo et al., 1996; Melnyk and Fineout-Overholt, 2005).

All six articles found were studies of the type randomized clinical trial, which showed high level of evidence (level II), demonstrating greater reliability of data found. However, a present limitation referred to the year of publication of the articles, three of the 90 and three published between the years 2000 to 2009. Thus, it is important to compare these results with more current data.

As for the recommendations found, there was no contraindication related to the type of dressing material. Most studies suggested the transparent dressing as preferred and directs the use of sponge impregnated only in places where the infection rates have become high. On the exchange period, longer intervals (up to seven days) were oriented more, subject to neutropenic patients, according to one study found, benefit from frequent dressing change (twice a week).

Two studies found referred to the blood collection. While the first discussed the volume of blood to discard (Mendes et al., 2008), the second addressed the collection of blood for culture (Erab and Merchán-Hamman, 2007).

The catheter blood collection method most commonly encountered in clinical practice has been the discard. This practice is designed to remove potential contaminants, such as electrolytes, heparin or other elements of the previously infused solution and is present in the first blood sample. For this purpose, a study was performed to determine the volume of blood to be discarded prior to obtaining the sample for Prothrombin Time tests and partial thromboplastin time. Indicate that only after the 25-ml volume of disposal, the examination showed 95% reliability and can be used clinically (all samples were obtained from a closed vial with heparin solution). However, this research should be analyzed with caution because it was held for 18 years, requiring further studies (Mendes et al., 2008).

As for the blood collection for culture, in order to determine whether there were differences between blood cultures obtained from the first or second blood collection, a study concluded that the first blood samples taken from central venous catheters have high sensitivity and specificity for a subsequent taking bacterial growth an average of 20 hours before the second sample.

The two articles found regarding the collection of blood brought important issues related to the handling of catheters. It should be noted that for blood collection for laboratory tests is recommended to discard the first sample for blood culture using the first sample optimizes the results.

The discussion on ways to prevent and control infection was divided into three sub-themes: skin disinfection, impregnated catheters / antibiotic therapy and catheter connectors - hub (disinfection and new devices). Of the eight articles that treated of this, two studies have addressed skin disinfection (Mimoz et al., 2007; Moll et al., 2006), three discussed impregnated catheters / antibiotic therapy (Neves et al., 2010; Ng et al., 2004; O'Grady et al., 2011) and three referred catheter connectors - hub (disinfection and new devices) (Pompeo et al., 2009; Ponec et al., 2009; Rackoff et al., 1995).

In order to assess antiseptic solutions for the prevention of infection associated with central venous catheters, has demonstrated that the use of 2% chlorhexidine, replacing povidone-iodine 10% or 70% alcohol for skin disinfection reduces incidence of catheter-related infection (Mimoz et al., 2007).

Another study reinforces this data to conclude that chlorhexidine was associated with a 50% decrease in catheter colonization incidence compared with povidone iodine. The superiority of chlorhexidine-based solution can be explained by three reasons. Firstly, although a low face value of chlorhexidine, the concentration of 2,500 pg / ml is 50 times greater than the minimum inhibitory concentrations against almost all nosocomial bacteria and yeasts. Secondly, blood, serum and other protein-rich biomaterials can disable the microbicidal effect of povidone-iodine, but the chlorhexidine. Third, the residual effect of chlorhexidine, defined as the antimicrobial activity in suppressing long term is extended (six hours), while the povidone-iodine is minimal (Moll et al., 2006).

The two articles found, both randomized clinical trial (level II) presented favorable results to replace iodine-povidone for the chlorhexidine-based solutions in order to prevent catheter-related infection. The guidelines of ANVISA and the CDC confirm this guidance, however point out that if there is contraindication to the use of chlorhexidine, povidone iodine-or 70% alcohol can be used as alternatives (Mayo et al., 1996; Melnyk and Fineout-Overholt, 2005).

Two randomized clinical trials referred to the assessment of the effect of the addition of antibiotic flush in preventing infection in central venous catheters. The authors concluded that the use of antibiotics added to heparin flush have no significant impact in reducing catheter-related infections (Moll et al., 2006; Neves et al., 2010). Prophylactic antibiotics have a reduced importance when it gets reducing catheter-related infection only through proper guidance for aseptic handling of the catheter (Ng et al., 2004).

Another randomized study evaluated the impact of catheters impregnated with chlorhexidine and silver sulfadiazine in the prevention of catheter-related infection. There was a reduction in the incidence of this complication and extension of secure catheter dwell time in the patient. The authors, however, concluded that, for maximum benefit in reducing infection rates, preventive strategies should be adopted to block microbial invasion from all possible sources of contamination - infusion solution, connections, insertion site and colonization endogenous catheter (O'Grady et al., 2002).

ANVISA and the CDC, although not condemn the antibiotic therapy flush and the use of impregnated catheters, guides to the use with caution and only when comprehensive strategies are being carried out - educate people who insert and maintain catheters, use of maximal sterile barrier precautions and preparation for skin antisepsis during catheter insertion with chlorhexidine (Mayo et al., 1996; Melnyk and Fineout-Overholt, 2005).

Thus, the selected study did not advise the antibiotic flush because there was no reduction in rates of bacteremia and its effectiveness cannot be evaluated. On the other hand recommend the catheters impregnated with chlorhexidine and silver sulfadiazine, associated with other preventative measures.

Of the three articles that discuss the theme catheter connectors - hub (disinfection and new devices), an analyzed impregnated hub protectors with alcohol and neutral pressure needleless connectors (Rackoff et al., 1995), and two discussed antisepsis of the hub (Pompeo et al., 2009; Ponec et al., 2001) .

A clinical trial significantly reduced infection rates of catheter-related bloodstream using impregnated hub protectors with alcohol and neutral pressure needleless connectors (Rackoff et al., 1995).

In relation to the hub antisepsis, one study found that disinfection through friction connector maneuvers for 15 seconds with 70% alcohol or chlorhexidine is effective against infection. However, observed that the membranous septum becomes "sticky" when chlorhexidine is used continuously. The limitation of this study was its applicability only in vitro, as it shall be transferred to clinical settings (Pompeo et al., 2009). As to the antiseptic saline to the hub, the authors advised against its use and cleaning systems which reinforce containing ethanol and were more effective than the 70% alcohol was more effective than chlorhexidine (Pompeo et al., 2009; Ponec et al., 2001).

As for the recommendations found, bloodstream infection rates were reduced using impregnated hub protectors with alcohol and neutral pressure needleless connectors (Rackoff et al., 1995). However, the use of impregnated hub with alcohol could not be recommended by ANVISA and CDC which, probably because of a recent device, was not covered by these guidelines (Mayo et al., 1996; Melnyk and Fineout-Overholt, 2005; O´Grady et al., 2011, Ministry of Health, 2010). However, on employment connector coated with silver, ANVISA does not indicate its use routinely, because there is no evidence of reduction in the incidence of primary bloodstream infection (Melnyk and Fineout-Overholt, Ministry of Health, 2010).

For the disinfection connectors ANVISA and the CDC reinforce the results, guiding for disinfection with alcoholic solution by vigorous rubbing with at least three rotational movements using clean gauze or sachet, always before accessing this device. On the frequency of exchange of the connectors, guide to be performed every 72-96 hours or according to manufacturer's recommendations (Mayo et al., 1996; Melnyk and Fineout-Overholt, 2005; O´Grady et al., 2011, Ministry of Health, 2010).

Nine articles deal on treatment of thrombotic obstruction and heparin. Seven approached the pharmacological treatment of obstruction (Rasero et al., 2000; Ruschulte et al., 2009; Salzman et al., 1993; Shen et al., 2003; Sweet et al., 2012; Timsit et al., 2009; Wille et al., 1993; Winokur et al., 2013) and two analyzed heparinization (Wille et al., 1993). Regarding the type of design, two were randomized clinical trial (level II), six non-randomized clinical trial (level III) and only a descriptive study (level IV). Demonstrating strong level of evidence for the results.

Five selected articles referred to the efficacy and safety of alteplase in the treatment of occlusions of CVC. They concluded that treatment with the use of two doses of alteplase is safe and effective in the restoration of function of the catheter (Rasero et al., 2000; Ruschulte et al., 2009; Salzman et al., 1993; Shen et al., 2003; Sweet et al., 2012). The most common complication of thrombolytic therapy is bleeding. In this study, there were no cases of intracranial hemorrhage and bleeding associated with the drug, since the treatment of catheter dysfunction, little or no drug enters the systemic circulation. In addition, with a plasma half-life of about five minutes, it is unlikely that systemic fibrinolysis could be achieved with the reported dose regimen (Sweet et al., 2012).

Two studies used different drugs in the treatment of CVC obstruction and lead to a successful resolution of this complication: reteplase (Shen et al., 2003) and alfimeprase (Sweet et al., 2012).

An article found that three doses of alfimeprase alteplase were more successful than the first 15 to 30 minutes. According to the authors alfimeprase proteolytically cleaves fibrin and dissolves the thrombus directly contrary to that

need alteplase plasminogen activation (Wille et al., 1993).
Two studies evaluated permeability changes in central venous catheters used to flush weekly heparin. They concluded that the addition of heparin solution weekly to maintain the catheter decreases intraluminal presence of clots and improve the functionality of the catheter (Winokur et al., 2013). In accordance with the authors, the catheters that used saline only developed an adherent clot in one or both of the lumens.
According to studies included in this review, drug treatment of obstruction (alteplase, reteplase and alfimeprase) is safe. However, although there was consistency in the results as to the frequency of weekly catheter heparin, the two articles that addressed the heparin have an average of 20 years since its publication, requiring a more detailed analysis and further studies.

CONCLUSION

The theme "central venous catheter indwelling: evidence on nursing care" has been well addressed in the literature, with studies found a high level of evidence. However, eighteen articles have been published for over ten years and these eleven still in the 90. Thus, it is noteworthy that despite the consistency of the results, a more careful analysis and new research on the subject is needed.

As for recommendations for dressings, there was no contraindication to the type of material used. Most studies preferred the transparent dressing and guides for using the sponge impregnated only in places where infection rates are presented high. Regarding the exchange period, the longer intervals were the most targeted, with the exception for neutropenic patients who benefit from the dressing change more frequently.

About collecting blood for laboratory tests is recommended to discard the first sample. However, to collect blood cultures, the use of the first sample optimizes the results, enabling the early initiation of a therapeutic intervention.

Regarding the skin disinfection, the results were favorable to the replacement of iodine-povidone for solutions to chlorhexidine base. However, for the antisepsis of the hub, more effective results were obtained with friction maneuvers with 70% alcohol.

Alcohol impregnated port protectors and needleless connectors use were important in reducing infection rates of catheter-related bloodstream. However antibiotics to flush was not shown significant results in reducing this complication, and discouraged its use.

In the drug therapy of the obstruction, the use of alteplase drugs, reteplase and alfimeprase seem to be safe. However, the articles that addressed the frequency of heparin by having an average of 20 years since its publication, need to be confronted with current studies.

The articles analyzed brought significant results on nursing care related to central venous catheters, emphasizing the importance of evidence-based practice for a grounded assistance in scientific knowledge.

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