



DIAGNOSIS, RESULT AND INTERVENTION OF NURSING IN PATIENTS WITH CATHETER FOR HEMODIALYSIS

DIAGNÓSTICO, RESULTADO E INTERVENÇÃO DE ENFERMAGEM NO PACIENTE COM CATETER PARA HEMODIÁLISE

DIAGNÓSTICO, RESULTADO E INTERVENCIÓN DE ENFERMERÍA EN EL PACIENTE CON CATÉTER PARA HEMODIÁLISIS

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ABSTRACT

Objective: to identify the NANDA-I/Outcome (NOC)/Nursing Intervention (NIC) in the chronic renal patient using a central venous catheter for hemodialysis implemented by the nurse. **Method:** this is a quantitative, descriptive, exploratory study with 57 patients undergoing hemodialysis. The data collection had an instrument containing sociodemographic information, technical aspects of CVC, NANDA-I diagnostic title, NOC title, NIC title. The data were stored in the Microsoft Word program, analyzed by descriptive statistics and based on scientific literature. **Results:** the following connections were implemented by the nurses: (1) Risk of infection/Risk control: Infectious process/Care with the vascular device; and (2) Risk of vascular trauma/Access to hemodialysis/Maintenance of vascular access. **Conclusion:** the nurse identified two connections in the patient using CVC and it was anchored on a robust scientific basis. Its professional action is of paramount importance so it can mitigate the potential risks that the use of the device brings about the patient in this treatment. The use of this methodological instrument may subsidize the care practice with the chronic renal patient undergoing hemodialysis. **Descriptors:** Renal Dialysis; Renal Insufficiency; Catheters; Nursing; Diagnosis of Nursing; Maintenance.

RESUMO

Objetivo: identificar a ligação NANDA-I/Resultado (NOC)/Intervenção de Enfermagem (NIC) no paciente renal crônico em uso de cateter venoso central para hemodiálise estabelecido pelo enfermeiro. **Método:** estudo quantitativo, descritivo, exploratório, com 57 pacientes em tratamento hemodialítico. Instrumento de coleta de dados contendo informações sociodemográficas, aspectos técnicos do CVC, título diagnóstico NANDA-I, título NOC, título NIC. Dados armazenados no programa Microsoft Word, analisados por estatística descritiva e à luz da literatura científica. **Resultados:** foram estabelecidos pelos enfermeiros as seguintes ligações, a saber: (1) Risco de infecção /Controle de Risco: processo infeccioso/Cuidados com dispositivo vascular; e (2) Risco de trauma vascular /Acesso para hemodiálise/Manutenção do acesso vascular. **Conclusão:** o enfermeiro identificou duas ligações no paciente em uso de CVC e o fez ancorado em base científica robusta. Sua ação profissional é de suma importância para que possa mitigar os riscos potenciais que o uso do dispositivo traz sobre o paciente nesse tratamento. O emprego desse instrumental metodológico poderá subsidiar a prática assistencial com o paciente renal crônico submetido à hemodiálise. **Descritores:** Diálise Renal; Insuficiência Renal; Cateteres; Enfermagem; Diagnóstico de Enfermagem; Manutenção.

RESUMEN

Objetivo: identificar la ligación NANDA-I/Resultado (NOC)/Intervención de Enfermería (NIC) en el paciente renal crónico en uso de catéter venoso central para hemodiálisis establecido por el enfermero. **Método:** estudio cuantitativo, descriptivo, exploratorio, con 57 pacientes en tratamiento de hemodiálisis. El instrumento de recolección de datos contenía informaciones sociodemográficas, aspectos técnicos del CVC, título diagnóstico NANDA-I, título NOC, título NIC. Datos almacenados en el programa Microsoft Word, analizados por estadística descriptiva y baseadas de la literatura científica. **Resultados:** fueron establecidos por los enfermeros las siguientes ligaciones: (1) Riesgo de infección/Control de Riesgo: proceso infeccioso/Cuidados con dispositivo vascular; y (2) Riesgo de trauma vascular/Acesso para hemodiálisis/Mantenimiento del acceso vascular. **Conclusión:** el enfermero identificó dos ligaciones en el paciente en uso de CVC y lo hizo basado en científica robusta. Su acción profesional es de suma importancia para que pueda mitigar los riesgos potenciales que el uso del dispositivo trae sobre el paciente en ese tratamiento. El empleo dese instrumental metodológico podrá subsidiar la práctica asistencial junto al paciente renal crónico sometido a hemodiálisis. **Descriptor:** Diálisis Renal; Insuficiencia Renal; Catéteres; Atención de Enfermería; Diagnóstico de Enfermería; Mantenimiento.

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INTRODUCTION

There are just over 100,000 people in dialysis treatment in Brazil and hemodialysis stands out among the modalities available. It is the most commonly used method for life support in patients with renal failure since this therapy partially replaces one of the functions of the kidney. It represents a hope for life since chronic renal disease (CKD) is irreversible and all efforts must be undertaken to avoid complications.¹⁻⁶

This modality requires technological apparatus involving (a) hemodialysis machines, reprocessing of dialyzers, water treatment system, digital scales, various specific inputs, among others; (b) trained professionals and the creation of a vascular access (VA) in the patient. On access, there are two main types: arteriovenous fistula (AVF) and double-lumen central venous catheter implant.⁶⁻⁷

The central venous catheter of double lumen without cuff (CVC), routinely implanted by the nephrologist physician by percutaneous puncture technique, stands out Among the different types of catheters. It is one of the main alternatives used to obtain VA in the national clinical practice and its prevalence is 9.4%.⁶⁻⁸

The maintenance of CVC is a fundamental element for the performance of hemodialysis therapy. Therefore, it is required a systematic nursing action in the care offered to the patient in use of this device, in spite of its maintenance and prevention of complication, whether infectious, thrombotic or traumatic. It is a fast and safe vascular access option for hemodialysis for short periods of time. However, its use is related to bacteremia and candidemia, with significant morbidity and mortality rates and high hospital costs.⁶⁻⁸

In the United States of America, the main complication associated with the use of the central venous device for hemodialysis concerns bloodstream infection (BI). In Brazil, the overall rate of catheter-related BI is 17.05/1000 invasive devices per day, considering 95%.⁶⁻⁸

Therefore, the safe handling of the CVC should be a priority of all the nursing team that assists the patient, so there are technical rigor and vigilance, aiming to prevent and control possible adverse events. Considering the complexity of the implantation and use of this type of vascular access, it is essential to technical standardization.⁷⁻¹⁰

Thus, the nurse who works in the renal replacement therapy unit, who is able to

coordinate the assistance provided from the identification of the needs manifested by the person undergoing hemodialysis is required to providing means of care that aim at better treatment adequacy, ensuring quality of life and taking advantage of every moment to create conditions for change.⁷⁻¹⁰

In the process of coordination of nursing care in nephrology, a strategy emerges that, when incorporated into professional practice, it enables nurses to offer nursing care to patients with CKD undergoing hemodialysis with a high scientific, human and safety base. In this context, the value and singularity of Nursing Care Systematization (SAE) are contemplated. It organizes work on method, personnel, and instruments, enabling the operationalization of the Nursing Process (NP).⁹

The NP is a methodological instrument with a set of actions performed by a certain way of doing and reasoning, in the face of the needs of the person, family or human collectivity at a given moment in the health and illness process, which demands the professional care of nursing. It constitutes the element capable of providing the means to ensure the adequacy of treatment, research, and teaching, delimiting the independent functions of nursing, stimulating the patient's participation in the process of their treatment and contributing to the expansion of their own knowledge for the career.⁹⁻¹²

The basis of the NP is the Nursing Diagnosis (ND). This should be formulated based on a clinical evaluation that uses objective and subjective criteria that can guide the establishment of expected results and interventions that are objectified by prescriptions, aiming at the achievement of results (indicators) of nursing care. From the ND, it is possible to identify its connection with the Nursing Outcomes Classification (NOC) and the Nursing Interventions Classification (NIC).⁹⁻¹²

The justification and relevance of the study are centered on the fact that CVC is widely used in patients requiring hemodialysis. Its use requires the nurse to engage in care from the establishment of the NP, so it can contribute to minimizing the health risks inherent to the use of the device, reducing morbidity and mortality in the assisted patients.

As an instrument available for the development of NP, the NANDA-subsidized ND in association with NOC and NIC can grant to nurses who work in the care of patients using CVC for hemodialysis, adequate means to measure and develop assistance with a high safety standard. Therefore, it is necessary to

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know the possibilities of connections by the nurse, involving the human being, the patient's safety, and the nursing interest. ND is related to safety in NANDA-I, and it is possible to establish their relationship with NOC and NIC to assess their relevance for reducing the risk to the health of patients using CVC.⁹⁻¹²

OBJECTIVE

- To identify the NANDA-I/Outcome (NOC)/Nursing Intervention (NIC) link in the chronic renal patient using a central venous catheter for hemodialysis implanted by the nurse.

METHOD

This is a quantitative, descriptive, exploratory study developed in a privately-linked renal replacement therapy (RRT) unit, located in a city of the State of Minas Gerais/Brazil, together with patients undergoing hemodialysis. The population was 175 patients doing hemodialysis. The inclusion criteria were adults of both genders; age > 18 years old and <60 years old, in treatment for at least 90 days. The sample consisted of 57 patients.

A data collection instrument was developed for the registration of sociodemographic information, aspects related to CVC implantation, dialysis parameters, laboratory tests, identification of NANDA-I Nursing Diagnostics, the title of Expected Nursing Outcomes (NOC); the title of Nursing Interventions - NIC. The data collected were stored in the Microsoft Word program and analyzed by descriptive statistics and based on the scientific literature.^{9,12}

Data collection was carried out from October 2014 to October 2015, totaling 12 months, by consulting the medical records of patients on a hemodialysis program that used the CVC.

The research project was approved by the Research Ethics Committee of the Federal University of Minas Gerais/UFMG, under CAAE n 11813512.1.0000.5149.

RESULTS

In the sample of 57 patients submitted to hemodialysis via CVC, there were 75% of male; the age range ranged from 20 to 59 years old; 64% were married; regarding the education level, 46% had primary education.

Regarding CVC implants, it was found that 70% were inserted in the right internal jugular vein and 12% in the right femoral vein. Regarding the causes of removal, it was identified that 70% were produced by the maturation of permanent access (AVF) and 20% by infection. The main causes of CKD were Hypertensive nephropathy (50%), followed by diabetic nephropathy (35%) and chronic glomerulonephritis (10%).

Two consecutive NANDA-I diagnoses regarding patient safety evidenced by the vascular access in the hemodialysis patient by CVC were established by the nurses in a consensual way: (a) Risk of vascular trauma and (b) Risk of infection.

Thus, from these two NDs, the nurses (100%) established the Outcomes (NOC): (1) Risk Control: infectious processes; and (2) Access for hemodialysis. They directed the establishment of care in the care of patients with CKD using CVC for hemodialysis.

From the ND, the professionals (100%) also chose two titles of Nursing Interventions - NIC: Care with vascular device and maintenance of access for dialysis.

Through the association of the activities present in the interventions (NIC), the nurses listed actions for the formulation of nursing prescriptions to the hemodialysis patient to reach the proposed goal, from the results (NOC), such as pre/post-treatment axillary temperature gauging; (2) maintain occlusive dressing; (3) monitor the signs and symptoms associated with local and systemic infection; among others.

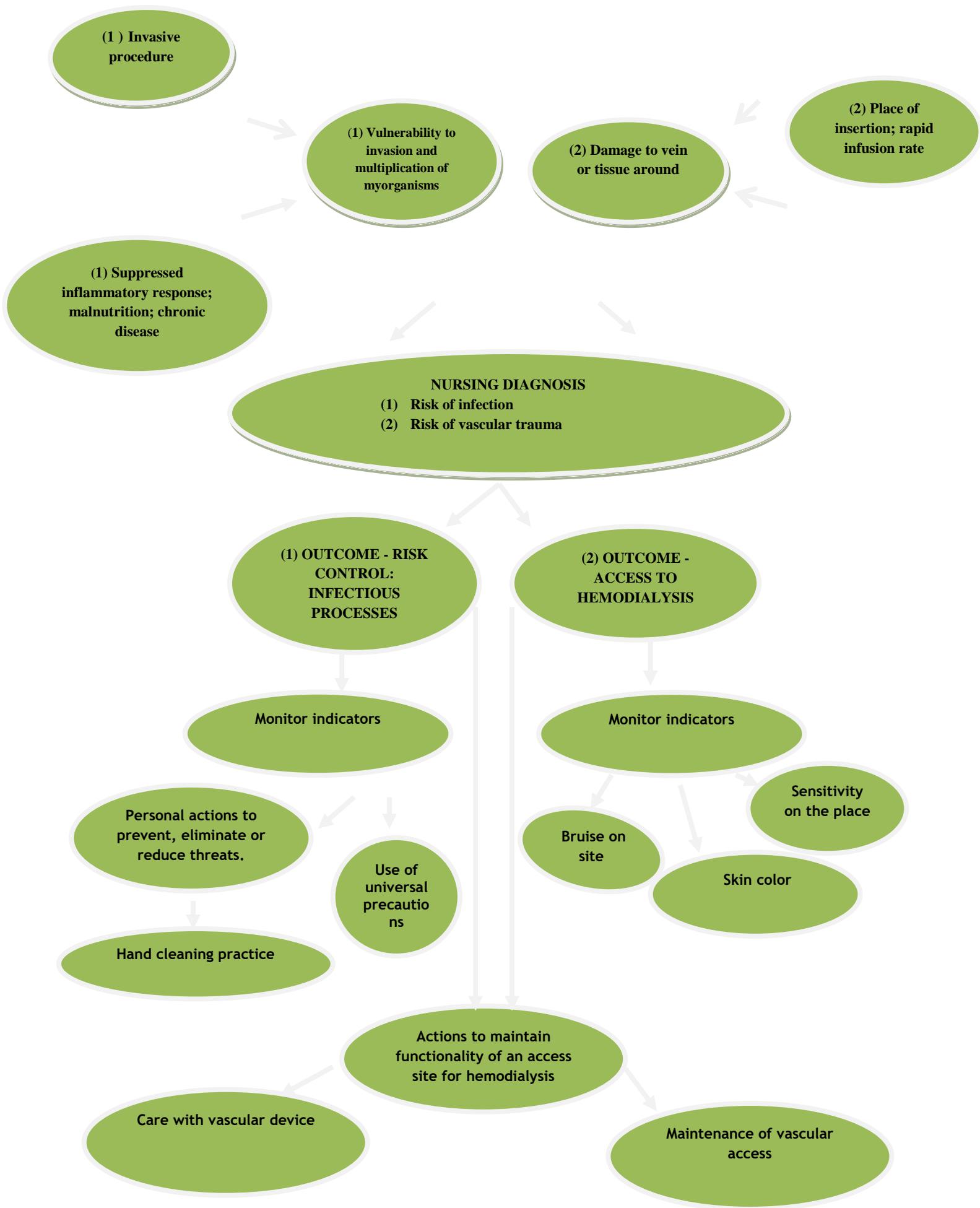


Figure 1. Titles of Nursing Diagnostics and Expected Nursing Outcomes. Belo Horizonte (MG), Brazil, 2015.

DISCUSSION

The NANDA-I Nursing Diagnosis link (NOC)/Nursing Intervention (NIC) link was established by nurses, forming two categories: (1) Risk of infection/Control of risk: Infectious process/Care with the vascular device; and (2) Risk of vascular trauma/Access to hemodialysis/Maintenance of vascular access. The scientific basis for this link is discussed.

◆ Risk of infection/Risk control: Infectious process/Care with vascular device

Data from the literature indicate that vascular access for hemodialysis is responsible for 80% of the cases of infection related to therapy and may lead the patient to the development of bacteremia and in the most severe cases they have endocarditis, meningitis, osteomyelitis, paraspinal abscess and septic plague. All these situations are serious in clinical practice and increase patient morbidity and mortality.^{5-6,12}

Infection is the second cause of mortality in the hemodialysis patient, being overcome only by cardiovascular complications. Therefore, it is extremely important that the nurse has a critical attitude towards the care provided to these patients, assuming a position guided by the search for the best scientific evidence available for the management of vascular access, recognizing the value of the monitoring of the signs and symptoms associated with local and systemic CVC infection. It is necessary to recognize that the patient with hemodialysis CVC has compromised cellular and humoral immunity, comorbidities, inadequate feeding and the need to maintain CVC for long periods. These factors, when fully glimpsed, attest to the clinical complexity in which the patient is inserted.^{3,4,11-6}

It should also be pointed out that the pathogenesis of infection associated with CVC can be varied, from infection of the exit point, followed by migration of the microorganism on the external surface of the catheter, contamination, and colonization of the lumen and hematogenous infection. The clinical data that the patient presents is nonspecific and has low sensitivity. Thus, the presence of signs and symptoms of infection (fever, malaise, chills, pain or exudate at the exit site), with no other apparent focus, should be considered the presence of CVC in the patient. It is known that the CVC hemodialysis patient's risk of developing bacteremia is seven times greater than those with arteriovenous fistula.^{6-8,13,17}

The most frequent clinical finding highlighted in the literature is a fever. However, it has a low specificity. On the other hand, the presence of inflammation, purulent exudate around the implant site, presents greater specificity. Also, for the suspicion of infection related to CVC, blood culture should be performed to accurately assess whether or not there is associated bacteremia.⁶⁻⁸

It is also emphasized that central venous catheters are indicated in cases of urgent hemodialysis or in cases in which it is not possible to perform AVF. Therefore, they are related to higher rates of infection, hospitalization, and morbimortality of dialysis patients.¹

Currently, alternative places for the implant have been employed due to thrombosis of the most common sites. This fact creates a great challenge for the nursing team and the attending physician, whether this surgeon or nephrologist. Among the alternatives, there is the implantation of the CVC in the inferior vena cava through a transluminal puncture with a 20 cm needle. This puncture is made in the right paravertebral space, with the placement of the catheter tip at the junction of the inferior vena cava. Another alternative is the implantation of the catheter through a transparent-hepatic puncture with a guide through the inside to guide the CVC through the suprahepatic vein to the right atrium.¹

These data point to the urgency of mobilizing efforts so the patient undergoing CVC hemodialysis receives a nursing care based on the incorporation of actions that allow him total security in the treatment. It cannot be ignored that without a patent vascular access and infection-free, there is no guarantee of success in hemodialysis therapy. Therefore, the major challenge with respect to catheters is their maintenance. The need to keep them free of infection means that new filling solutions are constantly being studied, as well as the technical forms for better handling by the nursing team is discussed.⁶⁻¹³

Routinely, after their use, the catheters are filled with heparin, preventing the formation of thrombi within it and, consequently, minimizing rates of infection and occlusion. The dose of heparin used has been controversial in the literature. The use of appropriate germicide solution for catheter handling, use of goggles, face mask, gloves and sterile fields is of paramount importance.^{1,6}

Another important technical and scientific aspect to understand the relationship between the diagnosis of infection risk - NOC/Risk Control: Infectious process - NIC/Care with the vascular device, is the preparation of the skin of the patient and the hands of the nursing professional.

The preparation of the skin is fundamental in the prevention of infection, either in the hand hygiene (HH) or in the preparation of the place that will be subjected to percutaneous puncture by the medical professional. On the importance of HH, studies developed in control of infection outbreaks associated with staphylococcus sp, evidenced that hand hygiene, whether with soap and water or friction with an alcoholic solution, are efficient for the control of infectious outbreaks by multiresistant bacteria. Therefore, in a renal replacement therapy unit, every effort should be made to facilitate access to alcohol dispensers to increase the adherence of professionals to their use. It is important to emphasize that for the installation of the catheters, the preparation of the professional should be done by hand implantation with antiseptic detergent based on iodine or chlorhexidine.⁶⁻⁷⁻¹²

Regarding the preparation of the skin at the implant place, it is known that the use of chlorhexidine reduces the incidence of microbial colonization and infection compared to PVP-I (iodine-povidone) and 70% alcohol. For skin antisepsis, the use of chlorhexidine degermant (exposure time of one minute), cleaning with sterile gauze, followed by antisepsis with alcoholic chlorhexidine should be considered.^{6,7}

Other factors that help in preventing infections are the use of maximum barrier protection for catheter installation. Thus, the use of sterile gloves, sterile long-sleeved apron, surgical (surgical) mask, surgical fields (sterile and long) and bonnet, reduce the risk of infection. The use of protective goggles is indicated for the protection of the health professional. All professionals around the procedure (up to 1 meter) should also use procedure mask. It is essential that the installation of the catheter is performed with strict aseptic technique; contamination of the material, it should be disregarded. This ideal technical condition should move nurses to encourage the nursing team and the attending physician to make the necessary effort to incorporate these recommendations into the CVC implant.⁶⁻⁷

Thus, when identifying the risk of infection and its connection with the NOC/Risk Control: Infectious process - and the NIC/Care with the

vascular device, the nurse had his conscience raised on the seriousness of the problem and, as a lawyer of the patient, can strive to create the safe therapeutic environment.

◆ Risk of vascular trauma/Access to hemodialysis/Maintenance of vascular access

Articles 17 and 18 of the Code of Ethics of Nursing Professionals establish that the private nursing care of the nurse is those of greater technical complexity, requiring adequate scientific knowledge and the ability to make immediate decisions. In this way, it can be inferred that the responsibility for the manipulation of the CVC should be restricted to the nurse since its handling requires adequate and substantive scientific knowledge.^{6,9}

Regarding the Nursing Diagnosis - Risk of vascular trauma - it must be emphasized that it has two important aspects when it comes to the patient with CKD and a device for hemodialysis: the first, related to the structure of the device; the second, of an operational nature, from fibrin or clot lumen obstruction and implant site infection. In this case, in synergistic action, both aspects can acutely injure the vascular wall, causing inflammatory complications and in an extreme situation the rupture of the vascular bed.⁷⁻¹²

On the first one, it is emphasized that the CVC is semirigid, of polyurethane, and has a size of 15 to 25 cm. Femoral vein workers should be 20 to 24 cm - such a measure is to avoid recirculation and inadequate flow problems; the CVC inserted into the right internal jugular vein should be 15cm; the ones used in left internal jugular vein and subclavian vein should be 20cm; the diameter of the catheter ranges from 11 to 14 French. These characteristics are imposing and pose a high risk for vascular endothelial rupture.⁶⁻⁷

Regarding the location of the implant, the literature recommends the following veins in order of priority, internal jugular vein, subclavian vein, femoral vein, on both sides of the body. The internal jugular vein is the most chosen site because it has a lower risk of mechanical complications at the time of percutaneous puncture and is easily accessible. The second place of election is subject to controversy and must be instituted according to the anatomy of the patient.⁷

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Based on this technical information, it becomes evident that the role of the nurse is of paramount importance, from the nursing care, so they can mitigate the potential risks that the use of the device brings about the hemodialysis patient by CVC. Such a situation is possible, through the introduction in the praxis of health promotion measures for the patient's health, as well as through educational actions with the nursing team to move them to a transformation and reflection of care pragmatics.⁶⁻¹²

The second pillar indicated in the text, referred to as operational in nature, on which the risk of vascular trauma/Access to hemodialysis/Maintenance of vascular access is maintained - lumen obstruction and infection are highlighted.

It is known that CVC lumen obstruction results from the formation of thrombi, fibrin or drug precipitation. The principal conduct to prevent cases of catheter obstruction reported in the scientific literature was lavage of the lumen with 20 ml of the saline solution after the hemodialysis session, followed by filling the lumen with heparin at 5000 IU/ml. In this research, due to the multiple implications for the health of patients undergoing CVC for hemodialysis, it is advocated that this technical activity should be done by the nurse.⁶⁻¹²

For the correction of lumen obstruction, the literature indicates a good response to fibrinolytic therapy. Stressing the use of streptokinase or urokinase solution as a possible treatment, it is the responsibility of each institution to determine the most appropriate fibrinolytic; as well as the therapeutic dose and the clearing technique. Regarding the cause of catheter removal due to obstruction, a result in the literature showed a rate of 28%. It should also be noted that catheter replacement is not recommended in the presence of thrombus obstruction or suspicion of guidewire infection.⁷

Regarding the second aspect of operational nature pointed out in the study, we highlight the infection related to the care with the insertion site, especially with regard to the dressing technique employed in the patient using CVC. Maintenance of the CVC occlusive dressing is one way of protecting the insertion site of microbial colonization. In the practice of nursing care in Nephrology, there are different dressings. The most used are (a) gauze and tape; (b) the transparent polyurethane film. Among them, there is variation regarding durability, ease of application, ability to produce cutaneous

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reaction and effectiveness for infection prevention.^{6,16}

For diaphoretic patients, gauze dressing and tape are recommended. There is scientific evidence that transparent dressing does not possess the ability to absorb exudate and predispose the patient to bloodstream infection (BI). Another important aspect is regarding the fixation of the dressing. The dressing with gauze and tape allows occlusion until the next exchange, preventing colonization of the CVC implant place. As for the transparent film, it is observed that the edges of the dressing detach easily from the skin. It is necessary to consider the characteristics of the skin of each person that can interfere with the quality of the fixation since the patient diaphoretic or with greater oiliness in the epidermis presents difficulty in fixing the dressing in general, independent of the material used.^{6,7}

Another important aspect about occlusive dressing for CVC is the ability of the material employed to be able to produce a local inflammatory reaction. Studies have shown that dressing gauze and tape is associated with an increased risk of local inflammatory reaction. On the other hand, it is observed that in the dressing with a transparent film, the local reaction is observed in the contact region. However, it has less intensity. Regarding the interval of the exchange of the occlusive dressing, if occlusive dressing with sterile gauze and tape is used, its exchange should be processed at each session and in the case of transparent film every seven days or before, if necessary.⁷⁻¹²

It is known that the presence of cutaneous lesion increases the risk of infectious complication in patients using a catheter. Thus, the procedure of maintaining the occlusive dressing can contribute to reducing the cutaneous reaction, without increasing the risk of infection. Given these considerations, it is up to the nurse to establish strategies for the prevention, combat, and control of adverse events surrounding the use of CVC.⁶

If the CVC-associated infection is suspected, blood should be collected for a blood culture to evaluate whether or not there is associated bacteremia. Because complications such as endocarditis and the formation of an intracavitary septic ram are not uncommon. Therefore, every suspicious case must be approached with propaedeutic rigor. This evaluation is made by quantitative analysis (number of colonies 5 times higher) and qualitative analysis (differential time of growth greater than 120 minutes). The

qualitative and quantitative difference indicates the presence of infection. Quantitative methods have specificity of 100% and sensitivity greater than 90%.⁶

It is also worth noting that, in the presence of suspected cases of CVC infection, the peculiarities of the patient undergoing hemodialysis should be considered against the axillary temperature gauging technique. The first is that, for unknown reasons, 50% of patients have subnormal body basal temperature that is below 35°C. Thus, a small temperature change constitutes an increased risk for infection.⁶

Therefore, the vigilance attitude should be permanent, since the adverse events resulting from the use of CVC are serious and can cause significant loss of the quality of life of the patient and death in more serious cases. Given the scientific information available and the existing technological resources, there is no primary alternative other than the strict monitoring of the clinical aspects by the nurse next to the patient using CVC for hemodialysis.^{6,7,17}

CONCLUSION

The nurses identified two possibilities of NANDA-I/NOC/NIC liked for the patient using a central venous catheter for hemodialysis. It was found that there is a robust basis in the scientific literature to justify and legitimize the professional's connection. In establishing this connection, they recognized the risk of mechanical and infectious nature that the use of the device brings about the patient undergoing hemodialysis and the clinical severity of its complications.

Therefore, the nurse assumes a role of paramount importance so, through nursing care, he can mitigate the potential risks that the use of the device brings about the patient in this treatment. This situation is possible, through the introduction in the praxis of care based on the best scientific evidence available regarding the handling and maintenance of the device, as well as the adoption of educational actions to promote health with the patient and the permanent training of the nursing team.

At the same time, it is inferred that the use of taxonomic instruments, NANDA-I, NOC, and NIC can be useful for the development of the Nursing Process, allowing, among other possibilities (a) to unify terminologies and concepts; (b) to establish guidelines and bases for nursing care and (c) to allow for systematic research and teaching.

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