



PREVALENCE OF INFECTION IN DOUBLE LUMEN CATHETER IN A NEPHROLOGY SERVICE

PREVALÊNCIA DE INFECÇÕES EM CATETER DE DUPLO LÚMEN EM UM SERVIÇO DE NEFROLOGIA

PREVALENCIA DE INFECCIONES EN CATÉTER DE DOBLE LUMEN EN UN SERVICIO DE NEFROLOGÍA

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ABSTRACT

Objective: identifying the prevalence of infections in the insertion of double lumen catheter in patients under hemodialysis. **Method:** a quantitative, descriptive and documentary study performed in a hospital in northern Minas Gerais (MG) with records of 18 clients using double lumen catheter in the nephrology service. It was used a semi-structured form as a tool for data collection, analyzed by descriptive epidemiology. The research project was approved by the Research Ethics Committee, CAAE 05719012.3.0000.5141. **Results:** of the 18 patients who had the double lumen catheter, 10 (55,5%) were male and 08 patients (45,5%) were female; 50% of patients were aged between 25-59 years old and the remaining patients were elderly; most of the sample (55,5%) was married. The dressings were changed three times per week and most frequently (94,5 %) performed by the nurse; in 27,8% of patients there was required exchange of the catheter due to infection. **Conclusion:** the number of infections in double lumen catheters showed a significant increase comparing to the period of occurrence. **Descriptors:** Indwelling Catheters; Infection; Renal Dialysis.

RESUMO

Objetivo: identificar a prevalência de infecções em inserção de cateter de duplo lúmen nos pacientes em tratamento de hemodiálise. **Método:** estudo quantitativo, descritivo e documental realizado em uma instituição hospitalar do norte de Minas Gerais (MG) com prontuários de 18 clientes que utilizavam cateter duplo lúmen no serviço de nefrologia. Utilizou-se um formulário semiestruturado como instrumento de coleta de dados, analisados pela epidemiologia descritiva. O projeto de pesquisa foi aprovado pelo Comitê de Ética em Pesquisa, CAAE 05719012.3.0000.5141. **Resultados:** dos 18 pacientes que possuíam o cateter duplo lúmen, 10 (55,5%) eram do sexo masculino e 08 (45,5%) do sexo feminino; 50% dos pacientes apresentavam faixa etária entre 25-59 anos e os demais eram pacientes idosos; a maior parte da amostra (55,5%) era casada. Os curativos eram trocados três vezes por semana e na maior parte das vezes (94,5%) realizado pelo enfermeiro; em 27,8% dos pacientes houve necessidade da troca do cateter em função de infecção. **Conclusão:** o número de infecções em cateteres duplo lúmen apresentou um aumento significativo quando comparado ao período de ocorrência. **Descritores:** Cateteres de Demora; Infecção; Diálise Renal.

RESUMEN

Objetivo: identificar la prevalencia de infecciones en la inserción del catéter de doble lumen en los pacientes en hemodiálisis. **Método:** un estudio cuantitativo, descriptivo y documental efectuado en un hospital en el norte de Minas Gerais (MG) con registros de 18 pacientes que utilizaban catéter de doble lumen en el servicio de nefrología. Se utilizó un formulario semi-estructurado como una herramienta para la recopilación de datos, analizados por la epidemiología descriptiva. El proyecto de investigación fue aprobado por el Comité de Ética de Investigación, CAAE 05719012.3.0000.5141. **Resultados:** de los 18 pacientes que tuvieron el catéter de doble lumen, 10 (55,5%) eran hombres y 08 pacientes (45,5%) eran mujeres; 50% de los pacientes tenían entre 25 a 59 años y los pacientes restantes eran de edad avanzada; la mayoría de la muestra (55,5%) era casada. Los apósitos eran cambiados tres veces por semana y con más frecuencia (94,5%) realizado por la enfermera; en el 27,8% de los pacientes requiere el cambio del catéter debido a la infección. **Conclusión:** El número de infecciones en los catéteres de doble lumen mostró un aumento significativo en comparación con el período de ocurrencia. **Descriptores:** Catéteres Internos; La Infección; Diálisis Renal.

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INTRODUCTION

The Chronic Renal Failure (CRF) is characterized by continuous, progressive and often irreversible loss of glomerular filtration. Thus, when the kidneys are unable to remove liquids and degradation products in uremic body, dialysis is required. Methods of therapy are: hemodialysis, continuous renal replacement therapy and various forms of peritoneal dialysis.^{1,2}

The choice to start dialysis care worries nephrologists for decades. To delay this treatment or prepare the patient for starting the dialysis is indicated the conservative treatment, considered as palliative when the only alternative for patients with contraindications for dialysis or transplantation, which is non-dialysis therapy of uremia which includes: diet control, blood pressure control, improvement of glomerular hemodynamics, control of aggravating factors, treatment and prevention of chronic complications of uremia, monitoring of renal function, nutritional monitoring and preparing for the start of dialysis.¹

By hemodialysis, the dialysis method most commonly used, for it to occur, the blood should be taken through vascular access and led to capillary dialyzer, this method is called extracorporeal circulation. Arteriovenous fistula is the most appropriate vascular access, and can also be permanent or temporary catheter used.³

The temporary double lumen catheter (CDL) brought several benefits: convenience, speed of implant - which allows it to be used immediately and does not cause pain during hemodialysis session.⁴ Venous catheters have become a choice of vascular access as they were evolving, being used increasingly, but are prone to numerous complications, and most frequent the site of infection puncture with systemic manifestation.⁵

The annual rate of mortality in patients with CKD on dialysis is almost 16% in Brazil. Infections comprise the leading cause of hospitalization and the second leading cause of death, second only to cardiovascular reasons.^{1,6} Infection is the presence of microorganism in a given location of the body (intracellular, intratissueal, in the skin, etc.). Multiplying and obtaining host response - mobilization of microphages e macrophages, lymphocytes, antibody production, etc.⁷

It is defined as related to health care (IRAS) systemic or localized conditions resulting from infection caused by a microorganism that was not present or

incubating on admission in the healthcare environment.⁸ The IRAS infections constitute major public health problem and are among the leading causes of morbidity and mortality, and increase the time of hospitalization in approximately four days of infection, also increasing the cost to the patient's treatment.⁷

The occurrence of infections related to puncture and catheter placement constitutes the leading cause of hospitalization and the second most common cause of death of patients undergoing haemodialysis.⁴ The emergence of these complications depends on the type of the catheter, the frequency of manipulation, the length of stay and patient-related factors⁷

OBJECTIVE

- identifying the prevalence of infection in the insertion of double lumen catheter in patients on hemodialysis of a nephrology service.

METHOD

This is a descriptive study of documentary nature with a quantitative approach, conducted in the Department of Nephrology of the Hospital Dilson de Quadros Godinho, in the city of Montes Claros (MG), northern of the State of Minas Gerais, which serves patients with chronic kidney disease for performing renal replacement therapy.

There were 22 users who on hemodialysis by CDL, in the period of data collection, but the study population was composed of 18 of these patients, because four are acute patients who did not have medical records at the institution.

To participate in this research, we adopted the following inclusion criteria: patients with the double lumen catheter as vascular access for the therapy. With respect to the exclusion criteria for participation in it, it has that: patients who use other dialysis method, which is not on hemodialysis, as intermittent peritoneal dialysis, continuous ambulatory peritoneal dialysis, continuous cyclic peritoneal dialysis, continuous dialysis, and others; patients on hemodialysis via another type of vascular access, which is not the double lumen catheter, such as arteriovenous fistula, catheter of Tenckhoff, among others.

The instruments used for data collection were the monthly consolidated control of catheter-related infection, the contract record of dressings and medical records of registered customers, which are documents in the sector. A registration form was also used

in order to collecting the information necessary to fulfill the objective of this research. This form was completed by the researcher responsible with the information contained in the patient's record.

The research was conducted in November 2012. Observational analysis was also made of the types of dressings used in the inserts of CDL and which professionals who acted, as well as the existence of a protocol of action by signs of infection from use of the CDL. The documentary analysis period was the first half of 2011 versus the same period of 2012. Occurred in the data collection industry documents to verify the indication for the use of the CDL and contrast the rates of infection occurred between in a same period in different years.

To tabulate the data the computer program Microsoft Office Excel 2007 for data processing with presentation of mean percentage was used in which the results were tabulated. The analysis and discussion of the data were performed using descriptive epidemiology, to perform later the confrontation with the literature.

The field for the identification on the registration form was filled only with the initials of the names of the participants to ensure the anonymity of the same. Photocopies used in the research were discarded safely after the research, ensuring that the management of the forms was accessed only by the researchers.

When meeting the ethical principles of Resolution 196/96 of the National Health Council, which regulates research with humans before accepting participate, the institution signed the terms of agreement of the Institution for research authorization and included patients signed the of Informed Consent for participation in research by allowing data collection. The research project was approved by the Ethics Committee in Research of Faculdades Unidas of Northern Minas (Funorte CEP) embodied in the opinion paragraph No. 135.195/2012, CAAE: 05719012.3.0000.5141.

RESULTS

In the Service of Nephrology of the Hospital Dilson de Quadros Godinho, in Montes Claros (MG), twenty-two patients were on hemodialysis therapy for CDL at the time of conducting the research, which was conducted with 18 of these patients with open records within the service.

Table 1 describes the number of patients of male and female, most were male (55,5%). The age range of patients, arranged according to the World Health Organization (WHO), has 50% of patients aged 25-59 years old and the same percentage aged 60 or older. Regarding marital status, 55,5% are married patients, 33,3% singles and only 02, which corresponds to 11,2% widowed.

Table 1. Patients under hemodialysis treatment for CDL in the period of November 2012. Montes Claros (MG), 2013.

Variable	Description	(n=18)	%
Gender	Male	10	55,5
	Female	08	45,5
Age	25-59 years old	09	50
	60 or older	09	50
Marital Status	Married	10	55,5
	Single	06	33,3
	Widowed	02	11,2

Source: Hospital Dilson de Quadros Godinho, Nefrology sector. Montes Claros, MG.

During the study it was observed that in the service exists standardization of materials used for realization of dressings: 0.9% saline, sterile gauze, chlorhexidine 2% degermante, dressing pack, gloves and micropore procedure; of which curative in 94,5% of cases are exchanged three times a week, or every hemodialysis session. Also standard is the professional responsible for the return of the nurse is healing, although it was found in 5,5%

of patients in the registry change made by the nursing technician.

According to the protocol of the Nephrology Service of the Hospital Dilson de Quadros Godinho in Montes Claros (MG), it states the use of the CDL if waiting the making and maturation of arteriovenous fistula, or due to improper operation thereof, agreeing with the assertion of these authors.

Table 2. History of infection in CDL patients under hemodialysis treatment in the period of November 2012. Montes Claros (MG), 2013.

Variable	Description	N=18	%
Historic of infection	Yes	05	27,7
	No	13	72,3

Source: Hospital Dilson de Quadros Godinho, Nefrology sector. Montes Claros, MG.

Table 2 depicts the amount and percentage of patients who have had infection in the CDL. It was announced that five patients had

required, at some moment of the therapy in changing the catheter due to infection, which equates to 27,7%.

Table 3. Prevalence of infection in CDL patients under hemodialysis treatment in the period from January to June 2011 and 2012. Montes Claros (MG), 2013.

Months of occurrence of infection in CDL	Years of infection occurrence			
	2011		2012	
	n	%	n	%
January	00	00	00	00
February	00	00	03	16,6
March	00	00	04	22,2
April	00	00	02	11,1
May	01	5,5	02	11,1
June	00	00	02	11,1

Source: Hospital Dilson de Quadros Godinho, Nefrology sector. Montes Claros, MG.

Table 3 contrasts the exchange of CDL infections in the first half of 2011 and the first half of 2012. One can see that in 2011 there was infection in the month of May, the year in which the calculation of rates was made by the hemodialysis team. In 2012, when the Service Infection Control - SCIH blamed himself for calculating the fees, infections were detected in the months from February to June, with questionable zero rates of 2011.

In Hemodialysis Service of the Hospital Dilson de Quadros Godinho, in Montes Claros/MG. There is a plan of action for pyrogenic related to infection CDL prepared by management nurse and recorded in the minutes of management. The routine that describes when the patient shows signs of pyrogenic (tremors, chills and fever) should be given an ampoule of intravenous dipyrone; routing culture of the catheter tip to the lab and submit three samples of blood culture from patient to laboratory also requesting the antibiogram; meet with the HICS to verify the predominant germ and check the specific antibiotic for treatment.

The action plan also describes the intervention of the maintenance team to evaluate the machines as disinfection. The treatment of infections depends on the kind of the microorganism found, the type of catheter of signs / symptoms and the kind of infection¹², confirming what is done in hemodialysis at the Hospital Dilson de Quadros Godinho, since the expected result of the culture to adjust the medication according to the antibiogram.

DISCUSSION

In Brazil there are about 50 thousand patients with renal failure undergoing hemodialysis therapy, 13% of them make use of temporary or permanent catheter for the treatment.⁴

A study with 232 patients with renal disease on hemodialysis in the ARDS Clinical Hemodialysis located in Fortaleza/CE shows that 60,3% of surveyed patients with renal failure on hemodialysis are male, of these, about 40% with prevalent age between 21 and 60 years old , another 37% aged between 61 and 80 attended, mostly, in intensive care units (66,4%).⁹

The dressings used in the CDL hemodialysis should be made with sterile gauze or transparent film, and further describe that in a clinical trial conducted in the Dialysis Unit, Hospital São Paulo has been shown that the type of dressing (sterile gauze or transparent film) did not contribute to reducing the incidence of skin infection or bacteremia.¹⁰

The Law 7,498 of June 25th, 1986, which regulates the practice of nursing in its Article 11 provides as private nurses: direct assistance to clients with severe life-threatening; nursing care of high degree of technical complexity and that require further scientific knowledge and skill in immediate decision-making.¹¹

The professionals who handle the CDL should be aware of risk factors and prevention of infection at the catheter insertion, and should involve patients in the process. Care to prevent infection of venous tunneled

catheters begin at the time of implantation, and every manipulation must be preceded by adequate antisepsis and semi-implantable devices require bandages on his exposed segment after each use.^{4,12}

The CDL is indicated due to the delay in the diagnosis of disease and the centers of late renal replacement therapy reference. Most of the time the catheter is used instead of the lack of other venous access.³ The catheters are removed when no longer needed if the patient's condition has improved or has established another kind of access.² The residence time of the catheter varies from a few days to several weeks, and the origin of catheter-related infection is often contamination of the lumen as well as the migration of microorganism flora of the skin of the patient at the insertion site along the outer surface of the catheter colonizing and causing the tip infection.¹

Catheter -related infections are treated in different ways depending on the type of catheter and the type of infection being the main etiological agent *Staphylococcus aureus*.¹³ Although recommended, Brazil has not yet established a standardized system of surveillance and monitoring related infections hemodialysis, which contributes to the existence of differences in the mode of investigation of cases in settings of infection and calculating the rates of occurrence. Thus, in the absence of national models, indicators may have little practical usefulness, since it does not offer the possibility of compatibility, hampering the interpretation of rates found.³

In studies conducted in Natal/RN, the total number of patients participating in the research, 71,0 % were female and 29,0 % male, age ranged from 18 to 85 years ($52,6 \pm 22,5$). The length of stay in the ICU, during the study, ranged from 3 to 24 days ($9,7 \pm 5,8$). Regarding the risk of infection at the insertion procedure associated with aseptic technique in all patients studied, there was a change from zero to five errors ($1,2 \pm 1,4$). Regarding the risk related to the maintenance of insertion site infection, the mean was $2,3 \pm 0,9$ errors, ranging from 0 to 4.¹⁴

The Ministry of Health published in June 2004, the Collegiate Board Resolution - RDC No. 154 (Technical Regulations for the Operation of Dialysis Services), which establishes rules for this operation. This ordinance requires that all Dialysis Service should implement a program of Infection Prevention and Control and Adverse Events - PCPIEA.¹⁵ Still, the same author adds that PCPIEA should be done with the participation of professionals in the dialysis service under

the responsibility of the physician or nurse service. It is up to PCPIEA responsible for ensuring systematic programming of epidemiological surveillance of infectious episodes and pyrogenic reaction, as well as evaluating the written routines related to the control of infectious diseases intervention measures aimed at prevention and control.

Bacteremia can be confirmed when the patient has a microorganism in one or more blood cultures microorganism and this is not related to infection at another site, or when the patient has fever ($> 38^{\circ} \text{C}$), chills, or hypotension with positive laboratory results for infection - without another apparent focus; it should also be investigated to the catheter tip, which is positive when more than fifteen colonies forming units - CFU.⁸ Thus, we can see a line with the performance of Hemodialysis Service of the hospital.

CONCLUSION

Most patients on hemodialysis were male, with quantitative homogeneity related to age, married, more than a quarter of the sample had a historic of infection to the double-lumen catheter infection a significant increase when compared to the period of occurrence.

It must be considered that the nurse is a qualified professional to perform the exchanges of dressings of CDL, since he has the technical / theoretical capacity for this procedure. Necessary to make both the knowledge of the action protocol by the nursing staff so they know how to deal with the cases conducting continuing education for early identification of infection and patient management.

The notification of the occurrence of infection is critical to establish preventive measures, concomitant with this work with the Office of Hospital Infection Control enables a decrease of underreporting and agility in the care provided to patients with infection in the insertion of double-lumen catheter.

The study may contribute to the evaluation of occurrences of infections in CDL, amplifying the perception of the nursing staff on the prevention and control of them in order to provide greater support for reducing the risk of the patient's death. A new semester evaluation will contrast the rates of infections carried by HICS validating or not its effectiveness.

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Submission: 2013/09/14

Accepted: 2014/04/15

Publishing: 2014/07/01

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