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INTEGRATIVE REVIEW ARTICLE

INTRADIALYTIC COMPLICATIONS IN PATIENTS WITH CHRONIC RENAL FAILURE SUBMITTED TO HEMODIALYSIS: INTEGRATIVE REVIEW

COMPLICAÇÕES INTRADIALÍTICAS EM PACIENTES COM INSUFICIÊNCIA RENAL CRÔNICA SUBMETIDOS À HEMODIÁLISE: REVISÃO INTEGRATIVA

COMPLICACIONES INTRADIALÍTICAS EN PACIENTES CON INSUFICIENCIA RENAL CRÓNICA HACIENDO HEMODIÁLISIS: REVISIÓN INTEGRADORA

Ana Paula Cavalcanti de Oliveira¹, Allana Santos de Sousa², Ana Elza Oliveira de Mendonça³, Richardson
Augusto Rosendo da Silva⁴

ABSTRACT

Objective: to identify the production about the intradialytic complications in patients with Chronic Renal Failure (CRF) submitted to hemodialysis. **Method:** it is an integrative review from three research questions, held in the databases Latin American and Caribbean Health Sciences (LILACS), Medical Literature Analysis and Retrieval System Online (MEDLINE), *Base de Dados de Enfermagem* (BDENF) and virtual library Scientific Electronic Library Online (SciELO). **Results:** the LILACS database has provided the largest number of research papers; 38,46% of selected scientific researches made use of the descriptive study type; during the period from 2006 to 2010, there was a higher number of publications addressing the issue at stake (69,23%); the main unveiled intradialytic complications were infection with double-lumen catheters (30,77%) and arterial hypotension (30,77%). **Conclusion:** it was observed that the nurse's role is essential to early detection and to prevent major complications during the dialytic session and that its intervention must be effective and with quality. **Descriptors:** Chronic Renal Failure; Renal Dialysis; Nursing.

RESUMO

Objetivo: identificar a produção acerca das complicações intradialíticas em pacientes com Insuficiência Renal Crônica (IRC) submetidos à hemodiálise. **Método:** revisão integrativa a partir de três questões de pesquisa, realizada nas bases de dados Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS), *Medical Literature Analysis and Retrieval System Online* (MEDLINE), Base de Dados de Enfermagem (BDENF) e biblioteca virtual *Scientific Electronic Library Online* (SciELO). **Resultados:** a base de dados LILACS forneceu o maior número de artigos da pesquisa; 38,46% das pesquisas científicas selecionadas faziam uso do estudo do tipo descritivo; no período de 2006 a 2010, houve maior número de publicações abordando a temática (69,23%); as principais complicações intradialíticas presentes são a infecção com cateter duplo lúmen (30,77%) e hipotensão arterial (30,77%). **Conclusão:** observou-se que o papel do enfermeiro é fundamental na prevenção e detecção precoce das principais intercorrências durante a sessão dialítica e que sua intervenção deve ser eficaz e de qualidade. **Descritores:** Insuficiência Renal Crônica; Diálise Renal; Enfermagem.

RESUMEN

Objetivo: Identificar los intradialíticas producción sobre las complicaciones en pacientes con insuficiencia renal crónica (IRC) sometidos a hemodiálisis. **Método:** revisión integradora a partir de tres preguntas de investigación realizadas en bases de datos de América Latina y del Caribe (LILACS), análisis de la literatura médica y recuperación del sistema en línea (MEDLINE), Base de Datos de Enfermería (BDENF), y biblioteca virtual *Scientific Electronic Library Online* (SciELO). **Resultados:** Base de datos LILACS proporciona el mayor número de artículos de investigación, 38,46% de la investigación científica seleccionada hizo uso de un estudio descriptivo, en el período 2006-2010, se produjo un mayor número de publicaciones sobre el tema (69,23%), las principales complicaciones están presentes infección intradialíticas con catéter de doble lumen (30,77%) e hipotensión (30,77%). **Conclusión:** Se observó que el papel del enfermero es fundamental en la prevención y la detección precoz de complicaciones mayores durante la sesión de diálisis y que su intervención debe ser eficaz y de calidad. **Descritores:** Insuficiencia renal crónica, diálisis renal, Enfermería.

¹Nurse, Federal University of Rio Grande do Norte/UFRN. Natal (RN), Brazil. E-mail: paula_anacavalcanti@yahoo.com.br; ²Nurse, Federal University of Rio Grande do Norte/UFRN. Natal (RN), Brazil. E-mail: allanasantos@hotmail.com; ³Nurse, Professor and Master in Nursing, Graduation Nursing Course, Federal University of Rio Grande do Norte/UFRN. PHD Student in Health Sciences/CCS/UFRN. Natal (RN), Brazil. E-mail: a.elza@uol.com.br; ⁴Nurse, PhD in Health Sciences, Professor of Graduation and Postgraduate in Nursing - Masters and PhD, Federal University of Rio Grande do Norte/UFRN. Natal (RN), Brazil. E-mail: rirosendo@yahoo.com.br

INTRODUCTION

Changes in the profile of morbidity and mortality of the population and declining fertility rates in Brazil have significantly contributed to the increase in life expectancy and aging population. Simultaneously, advances in development, urbanization and changes in lifestyle have led the Chronic Non-communicable Diseases (NCDs) to occupy a prominent place in population health.¹

The NCDs are characterized by a prolonged evolution, extensive latency period and asymptomatic course. Moreover, they encompass several risk factors involving the environment, among which, we could highlight kidney diseases, which in many countries of the world are among the most important causes of death and disability.¹

In Brazil, approximately 21 thousand patients a year need to start a replacement therapy of the renal function, which might be through hemodialysis or peritoneal dialysis.² Even Brazil having one of the largest public program of transplantation of organs and tissues in the world, with 555 health establishments and 1.376 medical teams registered by the National Transplantation System (STN), it is not possible to guarantee the performance of the procedure to all patients registered in waiting lists.³

The NCDs were responsible for an average of expenses corresponding to 2% of the Brazilian GDP between 2000 and 2004, and the expenditures with regard to high-cost drugs in the same period have averaged 2% of the federal funds.^{3,4}

Arterial hypertension, cardiovascular diseases, Diabetes Mellitus (DM), arthritis and Chronic Renal Failure (CRF) are the major NCDs that affect the population. Kidney diseases might be classified into two main categories: Acute Renal Injury (ARI), in which the kidneys suddenly stop to work almost completely or completely, and Chronic Renal Failure (CRF), where there is a gradual and irreversible loss of the renal function. In both cases, the lack of a suitable treatment might result in death of the patient.⁵

When a patient is diagnosed with renal failure in early stages, the traditional treatment, which consists in controlling diet, blood pressure and medication usage, is the most suitable. In later stages, subsequent to disease progression, with increased levels of toxins in the blood, it becomes necessary to establish a Renal Replacement Therapy (RRT).^{6,7}

RRT are Hemodialysis (HD), a procedure that depends on a capillary filter (dialyzer) for

blood filtering; Peritoneal Dialysis (PD), which uses the peritoneum itself as a filter, and Renal Transplant (RT), which is the replacement of diseased kidneys for a healthy kidney from a donor.^{6,7}

Hemodialysis requires an access port that might be obtained by an arteriovenous fistula, which is a venous catheter or prosthesis.^{8,9} Through an arteriovenous fistula, the patient is connected to the dialyzing machine, which drives the blood by means of a circuit and a balanced solution by another one, providing the removal of metabolic waste products, electrolytes and excessive fluids in the blood that returns purified to the patient.^{6,7}

Hemodialysis is the most used RRT worldwide for the maintenance of patients with CRF, and RT is the most suitable therapy, besides having less costs, however, it is not indicative for patients with neoplasm, active systemic infections, incompatibility related to the ABO system and presence of pre-formed antibodies against the donor.^{6,7}

Initially, the dialytic treatment, because of its complexity, was considered a procedure restricted to the medical class. Nonetheless, over the years, Nursing started to work with this therapy and be responsible for all scientific and technical aspects necessary and related to its accomplishment.¹⁰

In Brazil, there are 77.589 patients undergoing dialytic treatment, who are distributed in more than 600 dialysis centers, being that the distribution of patients on dialysis, according to the paying source, is of 86,7% to SUS and 13,3% to other agreements.²

Interventions through hemodialysis involve direct and indirect care guided by clinical assessments developed by nurses, and it is extremely relevant having continuous observation of patients during sessions. It is a task of the nursing team to hold this skilled care and of utmost importance in face of the complications that might occur during HD sessions.¹⁰

Despite the HD in recent years has become a safe procedure and able to keep lives of patients with CRF for extended periods, in 30% of sessions it might arise some complications. Among these, we could cite infections in double-lumen catheters, arterial hypotension, arterial hypertension, hypothermia, muscle cramps, cardiac arrhythmias, headache, hypoxemia, itching, allergic reactions, chest and back pains, nausea and vomiting, gas embolism, fever and chills.¹¹

In light of the foregoing, it is justified to conduct this study before the need for technical and scientific knowledge on the part

of nursing professionals to monitor the patient during hemodialysis sessions, seeking strategies aimed at preventing, monitoring and treating complications during this procedure, thereby contributing to the patient satisfaction and adherence towards the hemodialysis therapy.

The study is relevant, since, before the increasing number of patients diagnosed with CRF, it might envision scientific contributions to nurses working in the field of Nephrology in their care processes.

OBJECTIVE

- To identify the scientific production about intradialytic complications in patients with Chronic Renal Failure (CRF) submitted to hemodialysis.

METHOD

It is an integrative review, taking into account the stuffs available according to the classification of the Medical Subject Headings (MESH) in the following databases: Latin American and Caribbean Health Sciences (LILACS), Medical Literature Analysis and Retrieval System Online (MEDLINE), *Base de Dados de Enfermagem* (BDENF) and on the Website of the Virtual Health Library (VHL) Scientific Electronic Library Online (SciELO).

The search of the studies took place in the period between January and August 2012. We have used the following Medical Subject Headings: Chronic Renal Failure, Renal dialysis and Nursing.

In order to guide the accomplishment of this study, we have formulated the following research questions: What are the databases that published more papers about this issue? What are the most used study types in these researches? What was year that showed greater publication of these researches? What are the main complications found in these

researches? What is the role of the nursing professional before the complications of patients during the hemodialysis process?

The inclusion criteria were: papers available in full text, in English, Spanish and Portuguese, published in the last ten years and in line with the proposed theme of this research. In order to perform data collection, all papers were analyzed and their contribution to answering the research questions and proposed objective were verified.

In order to conduct the analysis of the sample, we have used an adapted research tool¹², which included the following aspects: paper title, author names, studied intervention, results and final considerations/conclusions.

With the purpose of maintaining good studies in this investigation, the pre-selected papers were assessed as relevant and methodologically appropriate, by using a form for assessing these studies, which was prepared by the Critical Appraisal Skills Programme (CASP).¹³The studies that reached a score of seven, given that the maximum possible was ten points, were included in the sample.

The data relating to this research are presented in summary tables for allowing a better description of the methodological aspects regarding the publication place, study type, publication year and main complications resulting from the dialytic treatment. The analysis was held by means of descriptive statistics and, subsequently, the outcomes were organized in form of figures.

RESULTS AND DISCUSSION

We will present the results from Table 1, which highlights the origins of the papers according to the databases BDENF, LILACS, MEDLINE, SciELO, with subsequent discussion.

Table 1. Distribution of papers published from 2002 to 2010 by database.

Researched Database	Nº of papers found	Nº of papers discarded	Nº of papers selected
LILACS	180	172	8
MEDLINE	142	133	9
BDENF	134	132	2
SciELO	92	89	3
Total	548	526	22

We have found 548 papers, of which only 22 met the inclusion criteria, and 526 were discarded. The LILACS database has provided the largest number of papers, followed by MEDLINE and SciELO. We emphasize that the papers found in more than one database were counted only once.

These findings make clear that the issue of intradialytic reactions is still little investigated, bearing in mind the relevance of this theme for patients and nursing professionals.

Table 2. Distribution of papers published from 2002 to 2010 by study type.

Study type	n°	%
Cross-sectional	10	45,46
Descriptive	5	22,73
Literature Review	4	18,18
Retrospective	3	13,63
Total	22	100,00

The most used study type in the selected scientific researches was the cross-sectional, with 45,46% of the sample, followed by the descriptive type, which covered 22,73%.

Table 3. Distribution of papers published from 2002 to 2010 by period (in years).

Publication year	n°	%
2001 to 2005	6	27,27
2006 to 2010	16	72,73
Total	22	100%

It appears that, between the years 2006 to 2010, there was a greater amount of publications about the theme at stake. The largest number of publications in the aforementioned period occurred in 2007, with five papers published, followed by the years 2006, 2008 and 2009, with three publications per each year, respectively, and by the year 2010, with two publications.

Table 4. Distribution of papers published according to the main intradialytic complications.

Main intradialytic complications	n°	%
Infection of double-lumen catheters	13	59,10
Arterial Hypotension	4	18,18
Arterial Hypertension	2	9,10
Headache	1	4,54
Itching	1	4,54
Arthralgia	1	4,54
Total	22	100,00

The main intradialytic complications, according to the selected papers, were infection of double-lumen catheters and hypotension, both with a percentage of 59,10% of the most common complications.

It is noteworthy to emphasize that, in the selected papers, complications like nausea and vomiting, fever and chills, dizziness, hypoglycemia, fainting, weakness, sweating, infarction, dyspnea, tremors, convulsions, coma and delirium were cited as complications that arise less frequently during the intradialytic procedures.

The highest number of infections in patients submitted to hemodialysis is related to Double-Lumen Temporary Catheter (DLTC). The bacteremia in patients who have catheters during hemodialysis varies from 4% to 18% and in most cases is associated with hyperthermia. The infectious complications are causative agents of increasing morbidity and mortality in patients on hemodialysis treatment.¹⁴⁻²⁶

The purpose of decreasing the incidence of infections associated with DLTCs requires the adoption of measures and strategies that begin in deployment, maintenance and removal of the catheter as soon as possible. The control of infections related to the access to hemodialysis requires monitoring of inflammatory signs and clinical assessment of

patients, becoming an important indicator of care quality.¹⁴⁻²⁶

The data found with regard to the complication of arterial hypotension come to corroborate scholars, who found through their surveys the predominance rates of, respectively, 35%, 30%, 62,07% and 54,8% during hemodialysis procedures.^{10,5,23,7} The hemodynamic vulnerability in sick patients, during hemodialysis therapy, takes place due to the process of cardiopulmonary bypass that removes a considerable amount of fluids during a small time interval.¹⁰

Arterial hypertension is directly linked to renal diseases, and it is the major cause for their evolution, as well as for worsening of the clinical picture of Chronic Renal Failure. The complications occurred during hemodialysis might be stimulated if the increase of the inter-dialysis weight is greater than two kilos. Consequently, this weight gain might become the main factor of the intradialytic complication related to arterial hypertension.²⁷⁻⁸

Based on the obtained data, the complications that presented less proportion in researched studies were headache, itching, arthralgia and cardiac arrhythmias. While arthralgia is a symptom that increases its prevalence according to the length of hemodialysis, headache reaches about 70% of

patients on dialysis and might take place during the first hour of hemodialysis. The main factors that trigger headache are arterial hypertension, arterial hypotension and rapid changes in body weight.²⁹⁻³⁰

Itching has not a completely understood etiology during dialysis sessions and is hard to manage. There is strong evidence that itching is not an isolated dermatological change, but a systemic manifestation.³¹

The successful completion of the dialytic therapy is associated with the availability of a nursing staff trained for holding this treatment type. Accordingly, the quest for nursing interventions appropriate to different situations in meeting patient undergoing hemodialysis and continuing education for the nursing staff constitute actions that might improve the quality of nursing care and, consequently, decrease the indexes of complications during hemodialysis treatment.¹⁰

Before the main complications that take place during the dialysis procedures, patient monitoring, detection of abnormalities and rapid intervention by the nursing professional become essential elements to ensure a safe and efficient procedure towards the patients. As the nurse is a professional who assists more closely the patient during the hemodialysis sessions, he/she must be able to promptly intervene and thereby avoid other potential complications.

The realization of preventive nursing interventions is crucial for the safety of patients undergoing hemodialysis, since these actions prioritize assessment of the clinical picture and of the level of consciousness of patients with CRF, ascertainment of the individualized programming and triggering of all safety devices and sensors.^{10,26}

The aforementioned assessment refers to physical examination, with emphasis on the hemodynamic and skin changes, tissue perfusion and respiratory pattern, being that the vital signs will be measured and recorded every thirty minutes in stable patients. Regarding the diabetics, the blood glucose will be checked.^{15,10}

Finally, nursing professionals must seek constant updating of procedures and care to be performed during hemodialysis sessions, so that there is reversal and exclusion of any complications that might be lethal.⁵

CONCLUSION

The results of this study allow us to conclude that the analyzed papers were mostly from the LILACS database, and the

approach of descriptive type was prevalent. The largest number of studies was published in the period from 2006 to 2010.

According to the results of the studies, the main complications that affect patients with CRF during hemodialysis procedures were: infection of double-lumen catheters and arterial hypotension.

Studies assert that the nurse's role is essential to detect and prevent complications during the dialytic session and that its intervention must be effective and with quality, with emphasis on comfort and safety of the patient with chronic kidney disease, because the daily care of these people has been a great challenge to be faced, whether for professionals and for those who experience such situation.

It is hoped that the results of this study might sensitize health professionals, especially nurses, in relation to the demands for care in patients submitted to hemodialysis. Moreover, we draw attention to the necessity of expanding the knowledge on the possible complications arising from this therapy and on how to act against them, in order to minimize the discomfort, suffering and, even, death rates of such patients.

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Corresponding Address

Richardson Augusto Rosendo da Silva
Universidade Federal do Rio Grande do Norte
/ Campus Central
Departamento de Enfermagem
Rua Lagoa Nova, S/N
CEP: 59078-970 – Natal (RN), Brazil