DOI: https://doi.org/10.36489/saudecoletiva.2021v11i69p7000

Evidence about the occurrence of complications related to unbalanced volume of the chronic kidney patient

Evidências acerca da ocorrência de complicações relacionadas à volemia desequilibrada do paciente renal crônico

Evidencia sobre la ocurrencia de complicaciones relacionadas com el volumen desequilibrado del paciente de renal crónico

RESUMO

Objetivo: Buscar na literatura evidências acerca da ocorrência de complicações relacionadas à volemia desequilibrada do paciente renal crônico. Método: Trata-se de uma Revisão Integrativa com a finalidade de identificar na literatura evidências para embasar a construção da Escala para mensuração de risco para hipervolemia em pacientes renais crônicos em tratamento hemodialítico. A busca foi realizada entre os meses de agosto a outubro de 2020, nas seguintes bases de dados: LILACS, SCIENCE DIRECT, COCHRANE LIBRARY e nos portais PUBMED e EBSCO, com cruzamento de operadores. Na busca inicial foram encontrados 129 artigos, 02 Cochrane Library, 59 Lilacs, 12 Pubmed, 55 Ebsco e 01 Science Direct. Resultados: Após a realização de uma busca por evidências científicas, faz-se necessária a apresentação sucinta dos resultados encontrados. Na caracterização dos artigos, observou-se que 88% dos estudos são internacionais, sendo o objeto de estudo voltou-se para a investigação da relação da hipervolêmia e sua influência na função cardíaca e pulmonar dos pacientes renais crônicos. Conclusão: Portanto, grande parte dos problemas são decorrentes do excesso de líquido, com vistas a alertar os profissionais da saúde, principalmente os enfermeiros, possibilitando raciocinar sobre quais intervenções seriam eficazes.

DESCRITORES: Insuficiência Renal Crônica, Desequilíbrio Hidroeletrolítico, Diálise Renal.

ABSTRACT

Objective: Search the literature for evidence on the occurrence of complications related to unbalanced blood volume in chronic renal patients. Method: This is an integrative review with the purpose of identifying evidence in the literature to support the construction of the scale for measuring the risk of hypervolemia in chronic kidney patients undergoing hemodialysis treatment. The search was carried out between August and October 2020, in the following databases: LILACS, SCIENCE DIRECT, COCHRANE LIBRARY and in the PUBMED and EBSCO portals, with operators crossing. The initial search found 129 articles, 02 Cochrane Library, 59 Lilacs, 12 Pubmed, 55 Ebsco and 01 Science Direct. Results: After conducting a search for scientific evidence, it is necessary to briefly present the results found. In the characterization of the articles, it was observed that 88% of the studies are international, and the object of study turned to the investigation of the relationship of hypervolemia and its influence on the cardiac and pulmonary function of chronic kidney patients. Conclusion: Therefore, most of the problems are due to excess fluid, with a view to alerting health professionals, especially nurses, enabling them to reason about which interventions would be effective.

DESCRIPTORS: Renal Insufficiency Chronic, Water-Electrolyte Imbalance, Renal Dialysis.

RESUMEN

Objetivo: Buscar en la literatura evidencia sobre la ocurrencia de complicaciones relacionadas con el volumen sanguíneo desequilibrado en pacientes renales crónicos. Método: Se trata de una revisión integradora con el propósito de identificar evidencias en la literatura que sustenten la construcción de la escala para medir el riesgo de hipervolemia en pacientes renales crónicos en tratamiento de hemodiálisis. La búsqueda se realizó entre agosto y octubre de 2020, en las siguientes bases de datos: LILACS, SCIENCE DIRECT, COCHRANE LIBRARY y en los portales PUBMED y EBSCO, con operadores cruzando. La búsqueda inicial encontró 129 artículos, 02 Cochrane Library, 59 Lilacs, 12 Pubmed, 55 Ebsco y 01 Science Direct. Resultados: Luego de realizar una búsqueda de evidencia científica, es necesario presentar brevemente los resultados encontrados. En la caracterización de los artículos se observó que el 88% de los estudios son internacionales, y el objeto de estudio se centró en investigar la relación de la hipervolemia y su influencia en la función cardíaca y pulmonar de los pacientes renales crónicos. Conclusión: Por tanto, la mayoría de los problemas se deben al exceso de líquidos, con el fin de alertar a los profesionales de la salud, especialmente al personal de enfermería, que les permita razonar sobre qué intervenciones serían efectivas.

DESCRIPTORES: Insuficiencia Renal Crónico, Desequilibrio Hidroelectrolítico, Diálisis Renal.

RECEIVED: 28/06/2021 APPROVED: 21/07/2021

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INTRODUCTION

Chronic Kidney Disease (CKD) is an important and growing public health problem, regardless of the country's degree of development, both in terms of the number of people affected and the costs involved in the control and treatment of its complications. [1]

According to research carried out by the Brazilian Society of Nephrology (SBN - Sociedade Brasileira de Nefrologia) (2018) based on a sample of 291 Renal Replacement Therapy (RRT) units, the current estimated total is 126.583 patients on dialysis, there was a modest increase, 3% and 2% in the prevalence and prevalence rate of hemodialysis patients, respectively, in relation to the previous year. [2]

Fluid restriction may be necessary for those patients who, during the phases of reduction in the glomerular filtration rate, present a decrease in the volume of diuresis produced 2. Because, due to the lack of control over blood volume, fluid overload has a high prevalence in patients undergoing hemodialysis, with frequencies above 80%. 3

Among the fluid complications resulting from the dialysis procedure, the most frequent are: hypotension, muscle cramps, chest pain, nausea and vomiting, arterial hypertension, resulting from volume overload, acid-base imbalance and poor nutrition. 4

It is emphasized that the chronic renal patient faces many questions related to a new coexistence and adaptations in hemodialysis services. The non-adherence to the treatment proposed by the team is a factor of susceptibility to the patient to develop several complications, mainly related to volemic control.

Considering the seriousness of the risk situation to which this population is exposed and that the prevention of these volemic complications is almost entirely the responsibility of the professionals involved in the care, the objective was to search the literature for evidence on the occurrence of related complications to the unbalanced blood volemy of the chronic renal patient.

METHOD

It is a research method that allows the synthesis of the results of multiple studies related to a specific problem, contributing to the deepening of the researched topic and assisting in decision making. 5

This Integrative Review (IR) aimed to identify evidence in the literature to support the construction of the scale for measuring the risk of hypervolemia in chronic kidney patients undergoing hemodialysis treatment. The IR was carried out prior to the construction of the technology, including national and international scientific literature, with the objective of scientifically supporting the construction of the Resende Scale.

The Integrative Review (IR) carried out in this study recommends following the following steps: identification of the research topic; definition of inclusion criteria; selection of studies that made up the sample; analysis of the results of the articles; interpretation of results and summary of the review. 6

To guide the IR, the following question was formulated: What are the complications evidenced in volume disorders in chronic renal patients undergoing hemodialysis? (Table 1).

Upon determining the guiding question, a search was carried out to synthesize the Health Sciences Descriptors and their respective terms in English (Medical Subject Headings - MeSH). The following controlled terms were determined: "Chronic Kidney Failure", "Hydroelectrolytic Imba-

lance", "Hemodialysis", and "Technological Development", being performed the crossing with the Boolean operator AND.

The search was carried out from August to October 2020, in the following databases: LILACS, SCIENCE DIRECT, COCHRANE LIBRARY and in the PUBMED and EBSCO portals. It is noteworthy that the selection of these databases and portals was due to the presentation of studies made available for access by the entire scientific community.

The results found with the IR were analyzed using an instrument validated by Ursi that includes, among others, the identification of the study (title, authors, place and year), research objective, methodology used (how it was carried out), the main results/findings and conclusions of the study. 7

In the initial search, 129 articles were found, 02 Cochrane Library, 59 Lilacs, 12 Pubmed, 55 Ebsco and 01 ScienceDirect. After undergoing a thorough analysis, there were still 08 searches to compose this IR, summarized in table 2.

As inclusion criteria, the following were determined: 1) articles related to volume complications presented by chronic renal patients on hemodialysis; and 2) articles referring to hydroelectrolytic complications. As exclusion criteria, the following were adopted: 1) review studies, editorials, letters to the editor and chapters or books in full.

The data found in the search were carefully analyzed and interpreted, in order to detect the main evidences in the world scientific literature, and to contemplate the complications evidenced in chronic renal patients undergoing hemodialysis treatment with unbalanced blood volume.

RESULTS

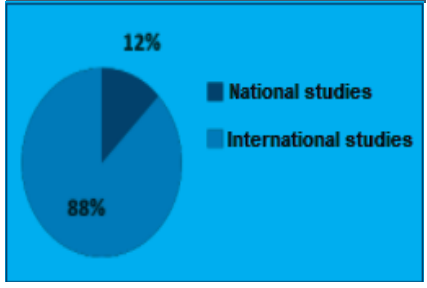
After conducting a search for scientific evidence, it is necessary to briefly present the results found. In the characterization of the articles, it was observed that 88% of the studies are international. It was found that, among international studies, China was the country with the greatest scientific production on the subject (Graph 1).

Reading the selected works resulted in apprehensions about the main findings evidenced by the volume disorder in chronic kidney patients. For the most part, the object of study was aimed at investigating the relationship between hypervolemia and its influence on cardiac and pulmonary function in chronic kidney patients. It was found that there was a predominance of studies with evidence strength IV, followed by level II. Research with evidence levels II, evidence derived from at least one well-designed randomized controlled clinical trial at evidence level IV is evidence from well-designed cohort and case-control studies. 8

Research has shown that fluid overload is associated with cardiac and pulmonary dysfunction and an increased risk of mortality from cardiovascular causes, as well as suggesting that volume control may be important to avoid complications for patients with chronic kidney disease, shown in table 2.

Analyzing table 1, we can see that hypertension and heart failure were reported in all studies analyzed, being among the main causes of complications related to the volume of renal patients, as well as left ventricular hypertrophy and peripheral edema, respectively, showing that volume control measures should be instituted for CKD as a way to prevent or reduce the risk of complications to which they are exposed.

Graph 1 - Distribution of studies according to their origin.



Source: Prepared by the author, 2021.

DISCUSSION

Regarding the occurrence of complications related to the patient's renal blood volume, studies show that although hemodialysis treatment is considered effective and increases the survival of CKD, it does not completely replace the patient's renal function. Thus, the individual may present several clinical manifestations resulting from uremia, namely: hematological, neurological, integumentary, cardiovascular, gastrointestinal, reproductive and musculoskeletal manifestations. 9

Among the complications found in this clientele, heart failure associated with dyspnea, orthopnea, pulmonary and peripheral edema, in addition to a possible increase in cardiac output, can be highlighted. 10 The presence of cardiovascular diseases (CVD) is responsible for the highest rates of morbidity and mortality in the population, especially those with CKD. 11

Linked to the cardiovascular problems present in patients with CKD undergoing hemodialysis treatment, there are pulmonary events, which are commonly identified in this clientele for various causes, with frequent cases of pulmonary congestion appearing. 12 This change is largely a reflection of left ventricular disorders, superimposed on fluid volume overload, being a strong predictor of death and cardiovascular events. 13

A study carried out with chronic kidney patients highlighted that among the cardiovascular and pulmonary alterations presented by the patients, edema stood out as the most frequent problem (81,2%), followed by changes in blood pressure (51,5%) and venous pressure central (47,5%). 14 Thus, as a consequence, although hemodialysis is performed, fluid accumulation is inevitable, in addition to this, the vast majority of renal patients do not effectively adhere to fluid restriction, aggravating their clinical condition. 15

Hypotension during dialysis is an alteration frequently present in these patients, representing one of the main complications resulting from hemodialysis. This change occurs due to the removal of excess fluid

Table 1 – Distribution of selected studies according to title, authors, journal, year of publication, method and level of evidence. Fortaleza, 2021.

ARTICLE	TITLE	JOURNAL YEAR COUNTRY	METHOD LEVEL OF EVIDENCE
A1	**Effects of fluid overload on heart rate variability in chronic kidney disease patients on hemodialysis**	**Manuela Ferrario, et al. BMC Nephrology 2014 Itália**	**Estudo observacional NE: IV**
A2	Mechanisms Contributing to Adverse Cardiovascular Events in Patients with Type 2 Diabetes Mellitus and Stage 4 Chronic Kidney Disease Treated with Bardoxolone Methy	Melanie P. et al Am J Nephrol Cochrane 2014 EUA	Ensaio Clínico Randomizado NE: II
A3	Echocardiographc findings in haemodialysis patients according to their state of hydration	Gioia et al Revista de la Sociedad Española de Nefrología.2017 MADRI	Estudo Observacional Transversal NE: IV
A4	Association of Fluid Overload with Cardiovascular Morbidity and All-Cause Mortality in Stages 4 and 5 CKD	Tsai et al.Clinical Journal of the American Society of Nephrology 2015 EUA	Estudo observacional NE: IV
A5	Prevalence of the nursing diagnosis "Excessive fluid volume" in patients undergoing hemodialysis	Fernandes et al. Rev Esc Enfer USP 2014 BRASIL	Estudo Transversal NE: IV
A6	Association of overhydration and cardiac dysfunction in patients have chronic kidney disease but not yet dialysis	Yilmaz et al. NEPHRO 2015 EUA	Estudo Observacional NE: IV
A7	Hyponatremia is Associated with Fluid Imbalance and Adverse Renal Outcome in Chronic Kidney Disease Patients Treated with Diuretics	Lim et al. Scientific Reports 2016 EUA	Estudo de coorte NE: IV
A8	Diuretics prescribing in chronic kidney disease patients: physician assessment versus bioimpedence spectroscopy	Khan et al. Clin Exp Nephrol 2016 EUA	Estudo observacional NE: IV

Fonte: Elaborado pelo autor, 2021.

during therapy, causing hypovolemia, which induces sympathetic activation of the nervous system, triggering an increase in heart rate and total peripheral resistance, which results in a vascular imbalance and interferes with maintenance of blood pressure. 16

On the other hand, hypertension is less common (21,2%) as a complication during hemodialysis sessions, being associated with greater intensity as a risk factor for the development of CKD. 17

Tabela 1 - Evidências acerca das principais complicações nos distúrbios de volume. Fortaleza, 2021.

EVIDENCES	ARTICLE	%
Arterial hypertension	**08**	**100**
Left ventricular hypertrophy	07	87,5
Hypotension	03	37,5
Acute lung edema	03	37,5
Peripheral edema	06	75
Cardiac insufficiency	08	100
Nausea	02	25
Vomiting	01	12,5
Cramps	02	25

Fonte: Elaborado pelo autor,2021.

CONCLUSION

Therefore, most of the problems found are due to excess fluid, responsible for aggravating heart and lung problems and/or being the precursor agent for the development of some diseases, such as heart failure and pulmonary edema, respectively.

Thus, the need to emphasize these problems is highlighted, with a view to alerting health professionals, especially nurses, as they deal with these patients on a daily basis, so that they can identify the occurrence early and better intervene.

These observations subsidize nurses to

look at prevention, when reasoning about which interventions would be effective when such changes arise, to outline care and education strategies aimed at preventive actions and health promotion in a process of care and health maintenance based on the humanization and quality of the health service.

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