

Comorbidities and mortality among patients with renal disease: contractual nephrology care*

Co-morbidades e mortalidade de pacientes com doença renal: atendimento terceirizado de nefrologia

Co-morbilidad y mortalidad de pacientes con enfermedad renal: atendimento tercerizado de nefrología

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ABSTRACT

Objectives: To identify the causes of co-morbidities and mortality among patients with renal disease who attended the SARA clinic in 2007, and to examine the relationships among personal factors, comorbidities, and risk factors for mortality. **Methods:** This descriptive retrospective study reviewed medical records of 232 patients with acute renal failure (ARF) on hemodialysis. **Results:** The majority of patients were males (60.3%). A greater number of them were between 61 to 80 years old (37%) and the hemodialysis was performed in Critical Care Units. ARF was the main cause of hospitalization (87.9%). **Conclusion:** Common comorbidities included respiratory failure, respiratory infection, high blood pressure, and sepsis. The main causes of death were respiratory failure and sepsis.

Keywords: Renal dialysis; Renal insufficiency, chronic; Morbidity; Mortality

RESUMO

Objetivos: Identificar as causas de co-morbidades e mortalidade de pacientes com insuficiência renal aguda atendidos na Clínica SARA no ano de 2007; analisar as variáveis pessoais, as co-morbidades e os fatores de risco para mortalidade desses pacientes. **Métodos:** Estudo descritivo, retrospectivo, quantitativo, abrangendo 232 portadores de insuficiência renal aguda (IRA), em terapia hemodialítica no ano de e, os dados foram coletados através dos prontuários desses pacientes. **Resultados:** Do total de 232 pacientes, 140 (60,3%) pacientes eram do sexo masculino; houve predominância de pacientes com idade entre 61 a 80 anos (37%) e o atendimento, na maioria das vezes, foi em Unidade de Terapia Intensiva (66,4%). Dentre as causas de internamento, houve predominância das IRA (87,9%). **Conclusão:** Destacam-se, entre as co-morbidades, a insuficiência, infecção respiratória, a hipertensão arterial sistêmica e sepse. As principais causas de óbitos foram a insuficiência respiratória e a sepse.

Descritores: Diálise renal; Insuficiência renal crônica; Morbidade; Mortalidade

RESUMEN

Objetivos: Identificar las causas de comorbidades y mortalidad de pacientes con insuficiencia renal aguda atendidos en la Clínica SARA en el año 2007; analizar las variables personales, las comorbidades y los factores de riesgo de la mortalidad de esos pacientes. **Métodos:** Estudio descriptivo, retrospectivo, cuantitativo, en la que participaron 232 portadores de insuficiencia renal aguda (IRA), en terapia de hemodiálisis en el año de 2007 y, los datos fueron recolectados de las historias clínicas de esos pacientes. **Resultados:** Del total de 232 pacientes, 140 (60,3%) pacientes eran del sexo masculino; hubo predominio de pacientes con edad entre 61 a 80 años (37%) y la atención, en la mayoría de veces, fue en la Unidad de Cuidados Intensivos (66,4%). Entre las causas de internamiento, hubo predominio de las IRA (87,9%). **Conclusión:** Se destacan, entre las comorbidades, la insuficiencia, infección respiratoria, la hipertensión arterial sistémica y la sepsis. Las principales causas de óbitos fueron la insuficiencia respiratoria y la sepsis.

Descriptores: Diálisis renal; Insuficiencia renal crónica; Morbilidad; Mortalidad

* Study performed in a Hemodialysis Clinic, a referral service for patients with acute renal insufficiency in the city of Fortaleza (CE), Brazil.

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INTRODUCTION

In the last decades, specific sanitary measures such as control and eradication of major epidemics, basic sanitation, and antibiotic-therapy and chemotherapy advances, among other things, resulted in a sharp reduction in mortality from infectious and parasitic causes, contributing to the increase in life expectancy and population aging. Concomitantly, changes in life habits and, in particular, the progressive rise in industrialization and urbanization, have caused chronic-degenerative diseases to assume a major role in population health⁽¹⁾.

When a person is affected by a disease with chronic characteristics, they face several changes in lifestyle caused by innumerable restrictions resulting from its presence, the therapeutic requirements and the clinical control, in addition to the possibility of undergoing recurrent hospitalizations⁽²⁾.

The renal disease consists in a change in renal function, which continues for varying periods, and is characterized by two forms: acute renal insufficiency (ARI) and chronic renal insufficiency (CRI), both depending on the disease progress⁽³⁾. In addition, when diagnosed, a conservative or dialytic treatment must be established to restore the patient's physical, psychological and social well-being, otherwise, the occurrence of complications may lead to death⁽⁴⁾.

Despite the significant progress in the understanding of ARI physiopathological mechanisms, as well as in disease treatment, mortality indices continue to be excessively high⁽⁴⁻⁵⁾.

ARI is represented by a group who usually shows a slow and prolonged natural history. It is characterized by a long latency period and prolonged asymptomatic course, involving multiple risk factors with an important environmental participation, resulting in the inability of kidneys to perform their basic functions of excretion and maintenance of the organism's hydroelectrolytic homeostasis⁽⁶⁾.

In January 2004, the *Sociedade Brasileira de Nefrologia* (Brazilian Society of Nephrology) recorded 59,153 patients in dialytic treatment in Brazil, of which 89.25% were undergoing hemodialysis treatment specifically. Yet, the 2007 National Census showed that 73,605 patients were in dialytic treatment, of which 90.8% were undergoing hemodialytic treatment⁽⁷⁾.

During the dialytic treatment, patient comorbidity is high and associated with cardiovascular diseases, systemic arterial hypertension, anemia, susceptibility to infection, high prevalence of types B and C hepatitis, bone diseases, malnutrition and other less-defined causes⁽⁸⁾.

Mortality from renal insufficiency is 10 to 20 times higher than in the general population, even when adjusted for age, sex, ethnicity and presence of diabetes mellitus,

of which the cardiovascular disease is the most common cause of death⁽⁹⁾. They are also considered the most important causes of death in the world, to which 35 million deaths were attributed in 2005, almost 60% of world mortality and 45.9% of the global burden of diseases. According to the World Health Organization, if this trend continues, they will be responsible for 73% of deaths and 60% of the burden of chronic diseases in 2010⁽¹⁰⁾.

Considering the fact that this study was performed in a referral institution, which provides care on secondary and tertiary levels, serving patients from several regions of the state of Ceará and even from other Brazilian regions, the number of patients who arrive at the dialytic emergency room has become higher and higher, and only then are they diagnosed with renal disease, without their having ever been treated.

ARI manifestations are similar to those observed in chronic renal insufficiency. However, it should be emphasized that, due to the speed with which it occurs, these changes usually contribute to the high ARI mortality rate.

Laboratorial exams are requested during hospitalization and the first sample of urine excreted or catheterized from patients with ARI must be used to assess diagnostic urinary indices. Measurements of sodium, urea, creatinine and urine osmolarity, as well as a blood sample to analyze sodium, urea and creatinine, must be taken.

The use of diuretics in the ARI does not show benefits. Once diagnosed, a rigorous hydroelectrolytic control must be maintained, volume replacement must be restricted, and sodium balance must be controlled, using a sodium-poor diet (1g/day), in patients who are not submitted to dialysis; however, with more freedom (up to 3g/day) when already in the dialytic program^(3,5).

As socio-demographic characteristics and morbidity and mortality causes in the referral institution under study are unknown, researchers believe the results of this investigation can bring an important clinical contribution to the treatment and prevention of complications affecting these patients.

OBJECTIVES

This study aimed to: identify the causes of comorbidities and mortality in patients with acute renal insufficiency, cared for in the SARA Clinic in 2007; analyze personal variables, comorbidities, and risk factors for mortality in these patients.

METHODS

This study was descriptive, retrospective and quantitative in nature⁽¹¹⁾. It was performed in a

Hemodialysis Clinic, a referral service for patients with acute renal insufficiency in the city of Fortaleza (CE), which provides private services to patients hospitalized in this city's private hospitals.

The investigation included ARI patients, who underwent hemodialytic therapy as mentioned above, in 2007. The following were the requirements for inclusion of participants in the study: to have ARI; to be older than 18 years of age; to be of both sexes; to have been admitted by hospitals that have an agreement with the above mentioned clinic; and to have undergone hemodialysis treatment. Patients with chronic renal insufficiency, those with renal transplants and those who are organ donors were excluded.

Data collection was conducted daily by consulting medical records of patients cared for in this clinic, including the following variables: sex, age, place of origin, length of hospitalization, length of dialytic treatment, type of vascular access, comorbidities associated with treatment and patient destination (discharged, transferred, and deceased); and causes of death.

Data analysis was descriptive and absolute and relative frequency calculations were made with the SPSS software, version 11.5.

The research project was approved by the *Universidade Federal do Ceará* Research Ethics Committee (n. 94/08).

RESULTS

During data collection, 232 patients with renal disease in hemodialysis treatment were identified.

Of all the 232 patients, there was a higher number of males (60.3%); aged predominantly between 61 and 80 years (37%); and usually cared for in Intensive Care Units (66.4%). The period when the patient began treatment corresponded to about the 10th day (70.3%) and the end of treatment, a period that ranges from the referral/beginning to the end of dialysis, was recorded until the 15th day, whose innumerable causes are subsequently analyzed (Table 1).

Table 2 shows data associated with the clinical progress of patients under study. Among the causes corresponding to admissions, ARI was prevalent, with 204 patients (87.9%).

There were clinical and surgical complications associated with ARI, with 222 (95.6%) clinical causes predominating, especially cardiovascular complications, which most usually affect people's renal function. The type of vascular access most commonly used during treatment was: arteriovenous fistula – AVF (6.5%) and double-lumen catheter – DLC (93.5%), in patients who began hemodialysis treatment with AVF.

In terms of DLC location, the 20cm catheter on the femoral vein predominated (73.3%), which was replaced

more than once in the same patient, due to complications, such as bleedings, infections and obstructions.

Table 1 – Patients with ARI, according to identification data – SARA Clinic, Fortaleza (CE), Brazil, 2007

| Variables | N | % |
|---|-----|------|
| Sex | | |
| Male | 140 | 60.3 |
| Female | 92 | 39.7 |
| Age group | | |
| 18 – 20 years | 2 | 1.0 |
| 21 – 40 years | 45 | 19.4 |
| 41 – 60 years | 43 | 18.5 |
| 61 – 80 years | 86 | 37.0 |
| + 80 years | 56 | 24.1 |
| Locations | | |
| ICU | 154 | 66.4 |
| Emergency room | 3 | 1.3 |
| First-aid room | 75 | 32.3 |
| Beginning of treatment (Admission – beginning of treatment) | | |
| 1 st – 10 th day | 163 | 70.3 |
| 11 th – 20 th day | 40 | 17.2 |
| 21 st – 40 th day | 23 | 10.0 |
| 41 st – 60 th day | 6 | 2.5 |
| End of treatment (beginning of treatment – end of treatment) | | |
| 1 st – 15 th day | 170 | 73.3 |
| 16 th – 30 th day | 50 | 21.5 |
| 31 st – 45 th day | 6 | 2.6 |
| 46 th – 60 th day | 6 | 2.6 |

Table 2 – Patients with ARI, according to clinical data – SARA Clinic, Fortaleza (CE), Brazil, 2007

| Variables | N | % |
|-----------------------------------|-----|------|
| Causes for admission | | |
| ARI | 204 | 87.9 |
| CRI that became acute | 28 | 12.1 |
| ARI causes | | |
| Clinical | 222 | 95.7 |
| Surgical | 10 | 4.3 |
| Vascular access | | |
| Arteriovenous fistula | 15 | 6.5 |
| Double-lumen catheter | 217 | 93.5 |
| Double-lumen catheter (DLC) (217) | | |
| Femoral | 159 | 73.3 |
| Jugular | 44 | 20.3 |
| Subclavian | 14 | 6.4 |
| Length of permanence with DLC | | |
| 0 – 7 days | 115 | 53.0 |
| 8 – 14 days | 53 | 24.4 |
| 15 – 30 days | 41 | 18.9 |
| 31 – 60 days | 8 | 3.7 |
| Patient destination | | |
| Deceased | 140 | 60.3 |
| Transferred | 8 | 3.5 |
| Hemodialysis clinic | 22 | 9.5 |
| Dialytic discharge | 62 | 26.7 |

Mean length of permanence of DLC in patients was 7 days (53%).

As regards patient destination after hemodialytic treatment, deaths predominated (60.3%) and the main causes were respiratory insufficiency and sepsis.

By emphasizing comorbidities associated with ARI, as observed on Table 3, there was a predominance of 50 patients with respiratory infection/insufficiency, 48 with systemic arterial hypertension, 42 with septicemia, 35 with diabetes mellitus, and 30 with Acquired Immunodeficiency Syndrome (AIDS).

Table 3 – Main comorbidities, according to ARI patients – SARA Clinic, Fortaleza (CE), Brazil, 2007

| Comorbidities | N |
|-------------------------------------|----|
| Respiratory infection/insufficiency | 50 |
| Systemic arterial hypertension | 48 |
| Sepsis | 42 |
| Diabetes mellitus | 35 |
| AIDS | 30 |

DISCUSSION

Compromised renal function in critically ill patients, as previously shown, has been growing considerably, following the accelerated increase in population aging, associated with a broad range of etiologies, which occurs in distinct clinical situations.

Sample characteristics, in terms of the male sex predominance, older age group, admittance to the ICU, and period between the beginning and end of dialytic treatment, were similar to those found in the literature⁽⁶⁻⁸⁾.

The appearance of signs and symptoms of renal insufficiency are usually non-specific and, therefore, questioning its diagnosis to a great degree becomes necessary⁽³⁾.

Kidneys are particularly exposed to toxic aggressions from all body parts, because they receive 25% of the cardiac output volume and also because several substances, transported through the tubular epithelium, concentrate in the interstitium, causing percent loss of function.

In this study, greater ICU service predominated, with a high incidence of ARI patients (87.9%). Despite the advances in new intensive therapy techniques and continuous dialytic methods, mortality remains high. Until now, evidence shows that patient survival or death in ICUs depends more on factors associated with the patient than on the types of dialysis used⁽¹²⁾.

The ARI clinical picture is mainly associated with the patient's underlying disease and the resulting metabolic changes. Due to oliguria and anuria conditions, the main kidney functions, i.e. the maintenance of hydroelectrolytic and acid-base balance and excretion of nitrogen products,

are compromised. Thus, to be submitted to dialytic treatment, people with ARI need a vascular access at first, which is usually temporary, DLC in 93.5% of cases.

In hemodialysis, the blood, full of toxins and nitrogen residues, is removed from the patient and sent to a machine, a dialyzer, where it is cleaned and subsequently returned to the patient. In addition, it is necessary to establish an ideal vascular access for blood to be removed, cleaned and returned to the body, and also for the dialysis process to occur adequately^(3,5).

The methods to establish this access in patients with ARI involve percutaneous puncture of a major blood vessel (internal jugular, subclavian and femoral)^(3,5).

An ideal access is that with universal application, which can be inserted in multiple locations and does not require maturation time. Thus, the femoral catheter predominated, with 73.3%.

Catheter time of permanence was found not to be different from literature data, which recommends the temporary use during a maximum of three weeks⁽¹³⁻¹⁴⁾. This is because infections continue to be the most frequent complications in patients with ARI, with an incidence varying between 45% and 80%⁽⁵⁾.

The presence of the catheter can lead to higher risk of bacteremia, which may result in serious complications such as septic shock, endocarditis, septic arthritis, osteomyelitis, epidural abscess and septic emboli. Risk of hospitalization and death from infection is two to three times higher in patients who use a catheter, when compared to those who use an AVF or a graft⁽¹³⁾.

During dialytic treatment, patient comorbidities and mortality are high and directly associated with the age group. This analysis of associations with comorbidities and ARI in the literature is very scarce.

The increase in life expectancy of the population is an obvious reason to explain the increase in the proportion of older patients admitted by a tertiary care institution. At the same time, the following four factors affecting renal hemodynamics have been attributed to a greater incidence of ARI in the older population: the renal aging process itself; the greater frequency of pathological conditions in this age group; the excessive drug use by these patients; and the ever more frequent use of intervention and surgical procedures in this specific group of patients. In addition, the increase in ARI patients' age group reported could also be responsible for the change in patient profile shown by a more recent study⁽¹⁵⁾.

Currently, mortality from ARI remains high, despite complex and efficient dialytic techniques, and the reduction in overall survival among these patients can be a result of the increase in the frequency of sepsis and/or the association with multiple organ dysfunction, as exposed by this study.

At the same time, there has been an increase in mean age of patients with ARI and an expansion in the recommendation of aggressive treatments, contributing to the patients' poor progress.

Patients with high levels of urea, creatinine and potassium and hypervolemic patients, who rarely have the necessary vascular access for dialysis, are susceptible to high morbidity and higher risk of mortality⁽⁶⁾. All this can be explained by a syndrome characterized by the abrupt reduction in glomerular filtration, followed by endogen metabolism toxin retention, and acid and base and hydroelectrolytic disorders.

Despite the recognition and treatment of each of these diseases found, about 20% to 30% of deaths most affecting patients with ARI in ICUs result from infectious processes, further increasing in-patient mortality rate⁽⁵⁾.

CONCLUSION

Findings show that there was a high rate of critically

ill patients in ICUs, including a high hospitalization rate, where patient condition progressing to ARI is determined.

Comorbidities identified in this study can be explained by the great number of older patients, with a more frequent emphasis on those of infectious or cardiovascular origin, such as: respiratory insufficiency/infection, systemic arterial hypertension, septicemia, diabetes mellitus and Acquired Immunodeficiency Syndrome. In addition, these comorbidities are directly proportional to the high mortality rate found among such patients.

Knowledge about the nephrotoxicity mechanisms and the main clinical and metabolic disorders resulting from renal insufficiency can change the mortality rate of patients cared for in hospitals, especially in the ICUs.

With the technological and scientific progress, particularly in terms of genetics, many diseases can be detected even before signs and symptoms appear. In addition, it is possible to predict whether descendants of patients with certain diseases have a higher risk of developing them.

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