

Original article

Hyponatraemia, mortality and haemodialysis: An unexplained association[☆]

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ABSTRACT

Background: As in the general population, in patients on haemodialysis (HD) hyponatraemia is associated with higher mortality risk. The objective of this article was to study the relationship between predialysis serum sodium (sNa) and mortality in an HD population. We also intended to define hyponatraemia and determine the characteristics of hyponatraemic patients in terms of anthropometric data, analytical features, dialysis measurements and hydration (bioimpedance).

Methods: Observational, descriptive study of a cohort of HD incident patients. The independent variable was the mean of each patient's sNa analysed during their first 6 months on HD.

Results: A total of 4153 patients were included in the study. Mean age was 64.7 years; 65.2% of the patients were male and 35% were diabetics. Mean follow-up time was 21.48 (SD) (1.31) months. sNa had a normal distribution, with a mean (SD) = 138.46 (2.7) mEq/l. Body weight, diabetes mellitus, systolic blood pressure, interdialytic weight gain, total ultrafiltration, serum glucose, albumin and creatinine, vascular access and haemodialysis type, acquire significant differences between sodium quartiles. Lean tissue index (LTI) in patients with low serum sodium, Q1 (135 mEq/l), was significantly lower than the LTI of patients from

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the other serum sodium quartiles. Patients with $sNa < 136$ mEq/l had a higher independent mortality risk (OR = 1.62) (Cox regression analysis).

Conclusions: HD patients with hyponatraemia patients have a poor prognosis and present malnutrition or fluid overload.

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Hiponatremia, mortalidad y hemodiálisis: una asociación no explicada

RESUMEN

Palabras clave:

Natremia
Hemodiálisis
Mortalidad
Hiponatremia
Diabetes

Introducción: Al igual que en la población general, en los pacientes en hemodiálisis (HD), la hiponatremia también se asocia a mayor riesgo de muerte. El objetivo de este trabajo es estudiar en la población en HD la relación entre natremia y mortalidad. Definir hiponatremia en HD y determinar qué peculiaridades tienen los pacientes hiponatremicos en relación con aspectos antropométricos, analíticos, dialíticos y de hidratación, mediante bioimpedancia. **Metodos:** Estudio observacional, descriptivo, de una cohorte de pacientes incidentes en HD. La variable independiente fue la media de las natremias medidas en los 6 primeros meses en HD.

Resultados: Se incluyó a 4.153 pacientes. La edad media era de 64,7 años y predominaban los hombres con un 64,2%. Un 34,8% eran diabéticos. El tiempo medio de seguimiento fue 21,48 (DE) (1,31) meses. Las natremias tenían una distribución normal, con una media (DE) de 138,46 (2,7) mEq/l. Las variables que presentan diferencias significativas en función de los cuartiles de natremia son: peso, diabetes, presión arterial sistólica, ganancia de peso interdialítica, ultrafiltración total, glucemia, albúmina y creatinina séricas y tipo de acceso vascular y de HD.

El índice de masa magra (LTI) en los pacientes con hiponatremia, Q1 (135 mEq/l), fue significativamente más bajo que el del resto de pacientes. Los pacientes con una natremia menor de 136 mEq/l tienen un riesgo independiente de mortalidad mayor que el resto (OR = 1,62) (análisis de regresión de Cox).

Conclusiones: Los pacientes en HD con hiponatremia tienen mal pronóstico y presentan desnutrición o sobrecarga de volumen.

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Introduction

Hyponatraemia, a blood sodium (Na) level under 135 mmol/l, is a common electrolyte disorder that is associated with high mortality in the general population.¹⁻³ This poor prognosis associated with hyponatraemia is more pronounced in certain populations: women, post-operative patients, cirrhotic patients and patients with heart failure.⁴⁻⁶ The poor prognosis is maintained even in individuals with moderate hyponatraemia, 130–134 mEq/l.²

Some patients with chronic kidney disease stage 5D (CKD5D), on a haemodialysis (HD), have hyponatraemia. The role of the kidneys in preventing hyponatraemia, tends to disappear when residual renal function (RRF) is lost such as in patients with CKD5D. In these patients, the sodium and water balance that occurs during dialysis sessions appears as a new factor in the development and maintenance of hyponatraemia.

Hyponatraemia in HD patients, as in the general population, has been associated with a greater risk of death.⁷⁻¹²

Those studies have found that low pre-haemodialysis blood sodium levels are associated with diabetes, neurological and psychiatric diseases, greater interdialytic weight gain (IDWG), and greater ultrafiltration (UF). The correlation between blood sodium levels and mortality has been maintained, taking into account the evolution blood sodium levels over the time.⁷

In HD patients, it is not clear whether the relationship between hyponatraemia and mortality is a cause-and-effect relationship or may be explained by some associated factor. The correlation between blood sodium levels and decline in brain function has been clearly demonstrated.^{6,13} Indeed, hyponatraemia may have a direct brain toxic effect and it causes encephalopathy. There are situations in which the association between hyponatraemia and mortality is even more pronounced; such situations include cirrhosis and heart failure, which also are common in HD patients.¹⁴ Nevertheless, there is no reason to believe that hyponatraemia in HD should be equivalent to hyponatraemia observed in the general population.

The aim of the present study is to evaluate the relationship between serum sodium concentration and mortality

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