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Original article

Overhydration prevalence in peritoneal dialysis – A 2 year longitudinal analysis☆

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ABSTRACT

Background and objectives: Hypervolemia is a major concern in dialysis patients, and is associated with increased cardiovascular risk and death. Cross sectional analysis have previously demonstrated that peritoneal dialysis (PD) patients are not more overhydrated when compared to haemodialysis´ ones. This study was designed to evaluate longitudinal trends in hydration status and corporal composition in a PD population.
Methods: We conducted a 2 year prospective observational study of 58 PD patients from a single centre. Incident and prevalent patients were included. Yearly measurements were performed using multifrequency electric bioimpedance. Overhydration (OH) was defined as an extra-cellular water (ECW)/total body water (TBW) over 15%. Clinical and biochemical variables were also explored.
Results: A total of 30 patients completed evaluation (female 63.3%, mean age 56.9 years, BMI 25.0 kg/m^2, diabetes 10.0%, APD-50.0%). Median PD vintage was 21.9 months, and 36.7% were anuric. At baseline 6.7% were overhydrated.
On longitudinal analysis no significant changes were found in hydration status, systolic blood pressure, pro-BNP, nor albumin levels. Similar results were found among incident (n=11; APD-45.5%; anuric- 9.1%) and prevalent (n=19; APD- 52.6%; anuric- 52.6%) patients (p>.05). However, at the second year, prevalent patients were moderately overhydrated compared to incident ones (median 10.2% vs 3.5%; p=.009). Nonetheless, no statistical difference was observed considering adequacy, TBW, or ECW. Moreover, nutritional parameters remained stable.

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Conclusions: Peritoneal dialysis maintenance without increasing volume status, nor major deleterious corporal composition trends, is feasible under careful therapy strategies. Longitudinal application of BIA may be a useful clinical tool to evaluate adequacy beyond Kt/V.

Prevalencia de la sobrehidratación en la diálisis peritoneal: estudio longitudinal de 2 años

Palabras clave:
Bioimpedancia
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Diálisis Peritoneal
Volumen
Nutrición
Prescripción
Hipertensión

RESUMEN

Antecedentes y objetivos: La hipervolemia constituye un gran problema en los pacientes de diálisis, y se asocia a un incremento del riesgo cardiovascular y muerte. Los análisis transversales han demostrado previamente que los pacientes de diálisis peritoneal (DP) no sufren de sobrehidratación, en comparación a los pacientes de hemodiálisis. Este estudio fue diseñado para evaluar las tendencias longitudinales de composición corporal e hidratación en una población de pacientes de DP.

Métodos: Realizamos un estudio observacional prospectivo de dos años a 58 pacientes de DP de un único centro. Se incluyó pacientes incidentales y prevalentes. Se realizaron mediciones anuales utilizando bioimpedancia eléctrica de multi-frecuencia. La sobrehidratación se definió como el ratio agua extra-celular (ECW)/agua corporal total (ACT) superior al 15%. También se exploraron variables clínicas y bioquímicas.

Resultados: Un total de 30 pacientes completarán el estudio (mujeres: 63,3%, edad media 56,9 años, IMC 25,0 kg/m^2, diabetes 10,0%, DPA-50,0%). La antigüedad media de DP fue de 21,9 meses, y el 36,7% padecía anuria. Al inicio, el 6,7% padecía sobrehidratación.

En los análisis longitudinales no se hallaron cambios en cuanto a hidratación, presión sanguínea sistólica, pro-BNP, o niveles de albúmina. Se hallaron resultados similares entre los pacientes incidentales (n = 11; APD- 45,5%; anuria- 9,1%) y prevalentes (n = 19; DPA- 52,6%; anuria- 52,6%) (p > 0,05). Sin embargo, al segundo año, los pacientes prevalentes estaban moderadamente sobrehidratados en comparación con los incidentales (media 10,2% frente a 3,5%; p = 0,009). En cambio, no se observó una diferencia estadística en cuanto a adecuación, ACT, o ECW. Además, los parámetros nutricionales permanecieron estables.

Conclusiones: La prevalencia de la diálisis peritoneal sin incremento de volumen ni alteración de los índices de composición corporal es factible si se aplican estrategias terapéuticas prudentes. La aplicación longitudinal de BIA puede constituir una herramienta clínica para evaluar la adecuación por encima de Kt/V.

Introduction

Hypervolemia is a "traditional" independent risk factor for cardiovascular disease and death among end-stage renal disease patients. It is associated with ventricular hypertrophy,[1] nutritional changes,[2,3] and inflammation.[4-6] Volume overload also promotes endothelial dysfunction[7] and nightly non-dipping[8] blood pressure in dialysis patients.

The importance of adequacy beyond small solute clearances in the overall patient survival was highlighted by peritoneal dialysis landmark studies such as CANUSA,[9] ADEMEX,[10] and NECOSAD.[11]

Residual renal function (RRF) plays a determinant role in the outcome of peritoneal dialysis (PD) patients.[11,12] Daily urine output over 250ml represents a 34% increase in survival benefit in peritoneal dialysis patients.[9] A reduction in the risk of death,[13] volume overload, and left ventricular dysfunction,[14] has been observed with increased fluid removal in PD, alongside with sodium restriction. Nevertheless, the ADEMEX study failed to demonstrate mortality differences between anuric patients and the rest, either within and between groups.[10]

It has been postulated that euvolemia is harder to achieve in PD patients. Nonetheless, in a cross sectional study, Devolder and colleagues[15] demonstrated that patients undergoing PD had a similar volume status when compared to equivalent hemodialysis ones.

Determining euvolemia is a challenging task. Reliable evaluation of overhydration can be attained through multifrequency bioimpedance analysis (BIA). We have previously documented that overhydration (OH) in PD patients, defined