30-day Mortality in Acute Non-surgical Patients Admitted with Hyponatremia

Authors: L Holland-Bill1
SP Ulrichsen2
CF Christianesen3
T Ring
HT Sørensen1
JOL Jørgensen3

Department: 1 Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus N, Denmark
2 Department of Nephrology, Aalborg University Hospital, Aalborg, Denmark
3 Department of Endocrinology and Diabetes, Aarhus University Hospital, Aarhus C, Denmark

Objectives

To examine the association between admission-hyponatremia and 30-day mortality in a large heterogeneous population of acute non-surgical patients.

Methods

We conducted a population-based cohort study in North and Central Denmark Regions, comprising approximately 1.8 million inhabitants. We identified all patients acutely admitted to non-surgical departments from January 1, 2000 to December 31, 2009, for whom serum sodium was measured on the day of admission using individual level linkage of the Danish National Patients Registry, the Danish Civil Registration System and the Clinical Laboratory Information System.

- Admission-hyponatremia was categorized as mild (130-134.9 mmol/l), moderate (125-129.9 mmol/l) and severe (<125 mmol/l).
- Thirty-day mortality for non-normonatremia and levels of admission-hyponatremia were estimated using the Kaplan-Meier method. Hazard ratios (HR) were estimated using a Cox regression model, adjusting for age, gender and Charlson comorbidity level.

Results

- Admission-hyponatremia was present in 55,185 patients (prevalence = 18.3%).
- Patients with hyponatremia at admission were older (median age 69.1 years [interquartile range: 55.9-79.6] vs. 61.6 years [interquartile range: 44.9-75.5]) and had higher comorbidity levels compared to patients with normonatremia.
- Cumulative 30-day mortality for patients with admission-hyponatremia was 9.7% (95% CI: 9.5-10.0) compared to 4.1% (95% CI: 4.0-4.2) in patients with normonatremia. Mortality was increased throughout the period.
- The adjusted HR was 1.87 (95% CI: 1.80-1.93) for any admission-hyponatremia compared with normonatremia. Adjusted HR for mild, moderate and severe hyponatremia compared with normonatremia was 9.7% (95% CI: 9.5-10.0) compared with 4.1% (95% CI: 4.0-4.2) in patients with normonatremia. Mortality was increased throughout the period.

Conclusions

- Admission-hyponatremia was associated with increased risk of death for all levels of hyponatremia, despite adjustment for older age and higher comorbidity level in hyponatremic patients.
- Risk of death increased with decreasing sodium levels.
- Even moderate hyponatremia was associated a more than 2-fold increased risk compared to normonatremia.