

#### 45. IMPACT OF SODIUM FLUCTUATIONS ON PROGNOSIS IN HOSPITALIZED PATIENTS: A RETROSPECTIVE OBSERVATIONAL STUDY

Manlio A. Avila P<sup>1</sup>, Natalia Aceves L<sup>1</sup>, Jocelin L. Sandoval B<sup>2</sup>, Nancy M. Hirata M<sup>2</sup>, Cereza G. Cervantes D.C<sup>2</sup>, Claudia P. Barraquin S<sup>3</sup>, Manuel E. Cota A<sup>2</sup>, Carlos De Rosenzweig V<sup>4</sup>, Hiram J. Jaramillo R<sup>5</sup>

<sup>1</sup> Seventh-year Medical Student. Autonomous University of Baja California, Faculty of Medicine (Universidad Autónoma de Baja California, Facultad de Medicina), Mexicali B.C., México.

<sup>2</sup> MD. Autonomous University of Baja California, Faculty of Medicine (Universidad Autónoma de Baja California, Facultad de Medicina), Mexicali B.C., México.

<sup>3</sup> MD. Xochicalco University, Faculty of Medicine (Universidad Xochicalco, Facultad de Medicina), Mexicali B.C., Mexico.

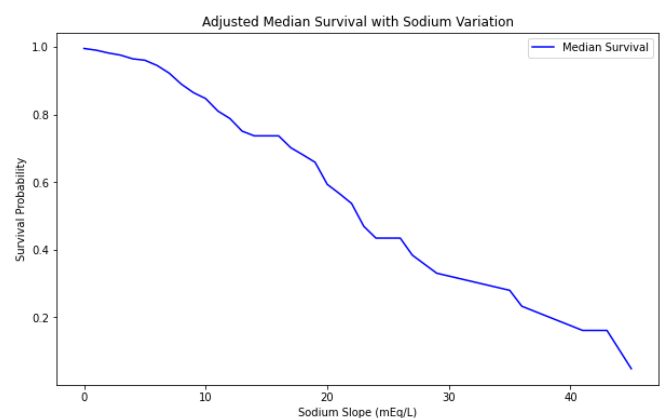
<sup>4</sup> Fifth-year Medical Student. Autonomous University of Baja California, Faculty of Medicine (Universidad Autónoma de Baja California, Facultad de Medicina), Mexicali B.C., México.

<sup>5</sup> MD. Chairman. Internal Medicine Department, Mexicali's General Hospital (Hospital General de Mexicali), Autonomous University of Baja California, Faculty of Medicine (Universidad Autónoma de Baja California, Facultad de Medicina), Mexicali B.C., México.

**BACKGROUND:** In hospitalized patients, electrolyte alterations have a significant impact in patient outcomes particularly dysnatremias. Hyponatremia and hypernatremia are the two main sodium disturbances, which have been associated with increased morbidity and mortality. Nevertheless, the particular influence of sodium variations during hospitalization in mortality risk remains an area less studied and therefore less understood. Our study seeks to investigate the relationship between sodium fluctuations and mortality in hospitalized patients at Mexicali General Hospital, Mexico. **METHODS:** We conducted a retrospective, single-center, observational study at a secondary care hospital in Mexicali, Mexico, from January 1, 2023, to May 31, 2023. The study included adult patients with normonatremia at admission (serum sodium levels between 135-145 mmol/L), with minimum hospitalization time of 48 hours and at least two sodium measurements. Patients with chronic kidney disease, tuberculosis, or pregnancy were excluded. Dysnatremia was defined as serum sodium levels outside the 135-145 mmol/L range during hospitalization. The primary outcome was to establish a relationship between the sodium fluctuation and mortality among all the patients that were hospitalized; while secondary outcomes demographic characteristics and a multivariable analysis to assess how these variables influenced the outcome. Statistical analyses included ANOVA, Fisher's exact test, unpaired t-tests, Kaplan-Meier survival curves, and multivariate analysis using the Cox Proportional Hazard Model. **RESULTS:** We had 284 patients from which 117 (41.2%) developed dysnatremia, with the highest incidence occurring in the intensive care unit (73.3%) and internal medicine services (50.4%). A total of 58 patients

(20.4%) died during hospitalization, and among those, 36 (62.1%) had developed dysnatremia, with hypernatremia being more common. The odds ratio for mortality among dysnatremic patients was 2.7 (95% CI: 1.5-4.8, p=0.0009). Patients who developed hyponatremia had a mean length of stay of 12.28 days compared to 9.12 days for eunatremic patients. although, mixed dysnatremia was associated with the longest hospital stay (22.33 days). Patients with greater sodium fluctuations had a higher mortality risk, with a mean sodium variation difference of 7.01 mEq/L (95% CI: 4.99-9.03, p<0.0001) between survivors and non-survivors. Multivariate analysis revealed that age and serum creatinine at admission were significant predictors of mortality, with each year of age increasing the risk of death by 1.35% (p=0.027) and each 0.1 mg/dL increase in creatinine raising the risk by 1.16% (p=0.008). **CONCLUSION:** Our findings underscore the importance of monitoring and managing sodium levels in hospitalized patients. Fluctuations in serum sodium levels during hospitalization are associated with increased mortality risk, particularly greater levels than 145 mmol/l and those in intensive care and internal medicine settings. Strategies aimed at the importance of closely monitoring and managing sodium levels improve outcomes in-hospital stay. Future research should focus on developing targeted interventions to stabilize sodium levels and further explore the mechanisms linking sodium dysregulation to mortality.

**Figure:** Relationship between Sodium Variation and Probability for Survival using Cox Proportional Hazards Model, adjusted for sex, age, initial creatinine, myocardial infarction, cerebrovascular diseases, GI bleeding, acute pancreatitis and traumatic brain injury.



**Key Words:** Hyponatremia, hypernatremia, mortality, classification, sodium fluctuation, sodium variation, hospitalization.