

Predictive indicators of hyponatremia in adult pre-operative trauma patients

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Methods & Results

Methods

A retrospective cohort study was conducted using our Trauma Registry to identify 2911 adults undergoing major trauma surgery. Pre-existing conditions consistent with hyponatremia were determined a priori and included congestive heart failure, diabetes, and renal failure. Relative risk for hyponatremia based on pre-existing and demographic indicators was estimated using logistic regression.

Results

- Among hyponatremic patients [< 135 mEq/L, $n = 217$; 7.5%], the majority were female ($n = 129$; 59.4%), Caucasian ($n = 188$; 86.6%) with a mean age of 65.50 (SD=17.94). The normonatremic group ($n = 2679$; 92.0%) was predominately male ($n = 1439$; 53.7%), Caucasian ($n = 1898$; 70.8%) with a mean age of 53.43 (SD=22.36).
- Variables associated with hyponatremia included injury severity score (ISS) ($r^2 = .406$; $p < .001$), gender ($r^2 = .091$; $p < .001$), race ($r^2 = .096$; $p < .001$), age ($r^2 = -.123$; $p < .001$), diabetes ($r^2 = .113$; $p < .001$), hypertension ($r^2 = .126$; $p < .001$), and other pre-existing conditions ($r^2 = .166$; $p < .001$).
- Based on a logistic regression, the final model (Nagelkerke $R^2 = .145$) consisted of four predictive indicators:
 - ISS (Exp $\beta = 2.046$; $p = .004$)
 - race (Exp $\beta = .159$; $p = .050$)
 - history of hypertension (Exp $\beta = 1.580$; $p = .003$)
 - In the presence of other pre-existing conditions (Exp $\beta = 1.580$; $p = .003$)

Summary & Conclusion

Summary

- Hyponatremia has been linked to increased morbidity and mortality in patients with a variety of medical conditions.
- In 2012, a large scale retrospective cohort study* showed preoperative hyponatremia to be a predictor for peri-operative 30-day morbidity and mortality.
- We hypothesized that there are prognostic indicators which would predict the occurrence of hyponatremia in adult pre-operative trauma patients.

Conclusions

- There are 4 predictive indicators for pre-operative hyponatremia in trauma patients: Injury Severity Score (ISS), history of hypertension, race, and the presence of other preexisting conditions (renal failure, CHF, or diabetes).
- ISS is the strongest predictor for pre-operative hyponatremia.
- In trauma patients who are Caucasian, have a history of hypertension and multiple comorbidities and a lower ISS score, hyponatremia should be resolved pre-operatively to improve outcomes.

* Leung AA, McAlister FA, Rogers SO Jr, Pazo V, Wright A, Bates DW. Preoperative hyponatremia and perioperative complications. *Arch Intern Med.* 2012; 172(19):1474-81