# Hyponatremia in Patients with Traumatic Brain Injury: Etiology, Incidence and Severity Correlation (2009)

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**Background**

Hyponatremia is common in neurosurgical population, prominently in patients with Sub-Arachnoid Hemorrhage (SAH) and Traumatic Brain Injury (TBI). Two commonetiologies, namely the Syndrome of Inappropriate Anti-Diuretic Hormone (SIADH) andCerebral Salt Wasting Syndrome (CSWS), are primarily responsible. Differentiationamong two conditions is based on volume status of patient. Given a typical case scenario,distinction might not appear difficult. Yet, exceeding number of cases have a borderlinepicture with diagnostic confusion and impediment in therapeutic intervention.Researchers are thus making an attempt of differentiation based on biochemicalalterations.

**Methods**

This is a prospectively designed study on hyponatremia in patients with Traumatic Brain Injury. All patients above 16 years with moderate to severe head injury and mild ones with intracranial lesion on CT scan were enrolled in the study. Over a period of 6 months, 40 patients fulfilled the criteria. Serum sodium level was monitored daily till 14th day. Central Venous Pressure (CVP) measurement was done for the assessment of volume status. All patients with moderate or severe head injury and those who underwent surgical evacuation of lesion had routine Central Venous Pressure catheter insertion. In the remaining, Central Venous Pressure was inserted after detection of hyponatremia. Correct position of Central Venous Pressure catheter was confirmed in all the cases with postprocedure check x-ray; with contrast injection if necessary. Measurement of Fractional Excretion of Uric Acid (FEUA) was done in all cases at the detection of hyponatremia and after its correction.

**Results**

Of 33 patients that remained for analysis, nine (27.27%) developed hyponatremia. Mean age of hyponatremic patients was 38.44 years with 55.6% patients of 17-30 age group, and male to female ratio of 3.5:1. Mild, moderate and severe head injury formed 36.36, 27.27 and 36.36% respectively. Hyponatremia occurred at the same incidence of 33.33% in both mild and moderate injuries, while in severe cases, the incidence was only 16.66%. Hyponatremia was seen in Rotterdam CT score two, three and four in increasing incidence of 22.2, 33.3 and 44.4% respectively (r 0.983, p value 0.017), while there was no significant correlation with initial Glassgow Coma Scale (p value 0.15).

**Conclusions**

Hyponatremia is common in traumatic brain injury, with an incidence of 27.27% among high risk patients. Most of them can be attributed to Syndrome of Inappropriate Anti Diuretic Hormone, though Cerebral Salt Wasting Syndrome also occurs in a few. CT scoring of injury has better correlation to its occurrence rather than initial Glassgow Coma Scale. With prompt identification and treatment, hyponatremia doesn't result in prolonged hospital stay or any undue morbidity and mortality. Measurement of Fractional Excretion of Uric Acid doesn't appear consistent enough for the differentiation of Syndrome of Inappropriate Anti Diuretic Hormone or Cerebral Salt Wasting Syndrome.

**Keywords:** etiology; hyponatremia; incidence; severity; traumatic brain injury.