

## Relationship between Magnesium Concentration and Severity of Traumatic Brain Injury in Patients Treated in Hasan Sadikin Hospital, Bandung from March 2011 – August 2011

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**Background** : Neuronal damage in traumatic brain injury is caused by primary injury at the time of the event and also delayed processes following the injury. Alterations in ion homeostasis have been implicated for the occurrence of this progressive secondary injury cascade. Magnesium is one of the most important ions and affects many metabolism in the CNS. Magnesium ( $Mg^{2+}$ ) levels in the blood have been shown to be depressed for hours to days following head injury. In TBI patients, a decrease in the serum magnesium ( $Mg^{2+}$ ) concentration is considered to be related to the severity of the injury, however, this phenomenon is still not completely understood.

**Objective** : To define the relationship between levels of ionized magnesium concentration and severity of traumatic brain injury.

**Methods and Design** : Analysis of data through a retrospective review of medical records and from a systematized database pertaining to patients with head injury caused by trauma treated in Neurosurgery ward Hasan Sadikin Hospital, Bandung from March 2011 – August 2011. A GCS score was assigned and blood was obtained within 24 h upon presentation.

**Results** : Patients were grouped into three categories – Group 1 (GCS 14-15) Group 2 (9-13) and Group 3(GCS <9), consisting of 18 patients each. There were 40 males and 14 females with average age of 32 years. Levels of ionized  $Mg^{2+}$  in Group 1 were,  $\bar{x}$  = 2,12 mg/dl,  $p=0.0$ , CI =0.27 (0.14 – 0.40 ), Group 2  $\bar{x}$  = 1,84 mg/dl,  $p=0.0$ , CI = 0.47 (0.34 – 0.60) and Group 3  $\bar{x}$  = 1,65 mg/dl,  $p=0.0$ , CI = 0.19 (0.06 – 0.32).

**Conclusion** : Decrease in the serum magnesium ( $Mg^{2+}$ ) concentration is considered to be related to the severity of the injury.

**Key word** : magnesium, traumatic brain injury

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Abbreviations used in this paper: CT = computerized tomography; TBI = traumatic brain injury; GCS = Glasgow Coma Scale; ICH = intracerebral hemorrhage; SDH = subdural hemorrhage; CC = cerebral contusion; IVH = intraventricular hemorrhage; SAH = subarachnoid hemorrhage; Mg<sup>2+</sup> = magnesium; NMDA = n-methyl-D aspartate