

## Prognostic factors of neuroinflammation and oxidative stress in brain injury patients at Cipto Mangunkusumo Hospital Jakarta

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### Abstrak

*Background:* This study aims to determine the association between neuroinflammation and oxidative stress with prognosis of brain injury patients and the association between neurosurgical procedure with neuroinflammation and oxidative stress conditions.

*Methods:* The study design is a prospective observation of 40 brain injury patients who underwent surgery. IL-6, uric acid, MDA, NR2A antibodies and GSH serum level of pre- and 1 day post-operation on brain injury patients were measured, and their association with GCS, GOS and neurosurgical procedures were analyzed.

*Results:* The post-operative IL-6 serum level showed a downward trend compared to pre-operative value (mean decrease: -190.61 pg/mL). The post-operative IL-6 level was significantly associated with GCS 7 days post-operation ( $p = 0.006$ ), with OR 24. The post-operative IL-6 serum level was significantly associated with GOS 3 months post-trauma ( $p = 0.016$ ) with OR 11.6. The post-operative uric acid serum level showed a downward trend compared to pre-operative value (mean decrease: -0.26 mg/dL). There was a significant difference between the mean value of post-operative uric acid serum level in patients with 7 days post-trauma with GCS  $\leq 8$  (mean: 4.16 mg/dL) and GCS  $> 8$  (mean: 2.71 mg/dL), ( $p = 0.042$ ). The post-operative MDA serum level showed a downward trend compared to pre-operative value (mean decrease: -0.08 nmol/mL). There is no significant association between MDA serum level, GCS and GOS and no significant association of NR2A antibody and GSH serum level with GCS, GOS and neurosurgical procedure. From the multivariate analysis, the most important neuroinflammatory variable associated with GCS and GOS is IL-6.

*Conclusion:* Neuroinflammation and oxidative stress may have prognostic values in brain-injured patients, in particular IL-6. Neurosurgical procedures may decrease the neuroinflammation process.