ABSTRAK

PROFIL KADAR *GLIAL FIBRILLARY ACIDIC PROTEIN SERUM (GFAP)* PADA PASIEN CEDERA OTAK BERAT

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Pendahuluan. *Glial fibrillary acidic protein* merupakan protein yang sangat spesifik untuk otak *(highly brain specific protein)* yang tidak dihasilkan sel lain di luar sistem saraf pusat, dan petanda yang sangat spesifik untuk otak. *GFAP* merupakan indikator destruksi sel. *Glial Fibrillary Acidic Protein (GFAP)* yang dilepaskan berhubungan dengan peningkatan tekanan intrakranial dan pada cedera otak. *GFAP* dilaporkan sebagai salah satu faktor prognostik penting dibandingkan petanda lain pada pasien cedera otak. Penelitian ini bertujuan menganalisis profil kadar *GFAP* serum pada pasien cedera otak berat sebagai faktor prognostik dan indikator perbaikan kerusakan jaringan otak.

Metode. Penelitian ini menggunakan desain longitudinal dengan jenis analitik observasional. Kadar *GFAP* serum diambil dari darah vena perifer penderita, dan diukur dengan alat ELISA. Kadar *GFAP* serum diperiksa pada hari pertama pasien datang ke Instalasi Gawat Darurat dan didiagnosis sebagai cedera otak berat dan hari ke-2, ke-3, ke-4 perawatan di rumah sakit.

Hasil. Jumlah sampel penelitian sebanyak 25 orang pasien cedera otak berat, dimana laki-laki 20 orang (80 %) dan perempuan 5 orang (20 %). Umur pasien cedera otak berat terbanyak ≤ 25 tahun sebanyak 8 orang (32 %) dengan rerata umur 35,92 ± 13,80 tahun. Jenis lesi pada cedera otak berat berdasarkan hasil CT Scan kepala berturut-turut adalah cedera difus (DAI) 7 (28 %), EDH 4 (16 %), EDH + ICH 2 (8 %), EDH + SDH 1 (4 %), ICH 5 (20 %), ICH + SDH 2 (8 %), SDH 3 (12 %), dan SAH 1 (4 %). Berdasarkan jenis tindakan yang dilakukan, operasi sebanyak 18 (72 %), sedangkan yang non operasi 7 (28 %). Berdasarkan penyebab cedera, kecelakaan

lalu lintas 23 (92 %) dan jatuh 2 (%). Rerata kadar GFAP serum pada hari pertama, kedua, ketiga, dan keempat berturut-turut 2,72±1,44 ng/ml, 1,85±0,85 ng/ml, 1,67±1,26 ng/ml, dan 0,79±0,35 ng/ml. *Outcome* pasien cedera otak berat, pasien hidup 19 (76 %) dan meninggal 6 (24 %). Peningkatan kadar *GFAP* serum selama perawatan terjadi pada pasien dengan *outcome* yang buruk, sedangkan penurunan kadar *GFAP* serum didapatkan *outcome* yang baik.

Simpulan. *GFAP* bersifat spesifik pada otak dan berguna sebagai biomarker untuk pasien cedera otak berat, dimana peningkatan kadarnya dapat digunakan sebagai faktor prognostik untuk kematian dan *outcome*.

Kata kunci. Profil, *Glial Fibrillary Acidic Protein*, cedera otak berat, prediktor.

ABSTRACT

PROFILE OF SERUM *GLIAL FIBRILLARY ACIDIC PROTEIN* (GFAP) LEVELS IN PATIENTS WITH SEVERE TRAUMATIC BRAIN INJURY

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Introduction: Glial fibrillary acidic protein is a highly specific protein for the brain which is not generated by other cells outside the central nervous system, and is a very specific marker for the brain. *GFAP* is an indicator of cell destruction. Glial fibrillary Acidic Protein *(GFAP)* is released related to increased intracranial pressure and brain injury. *GFAP* is reported as one of the important prognostic factors compared to other markers in patients with brain injury. The aim of this study was to analyze the profile of serum *GFAP* levels in patients with severe traumatic brain injury as a prognostic factor and indicator of brain tissue damage repair.

Method. This study used an observational analytical longitudinal design. Serum *GFAP* was taken from venous blood of patients, and measured using enzyme linked immunosorbent assay techniques (ELISA). Serum *GFAP* levels were examined on the first admission day of the patient in the ER and was diagnosed as a severe traumatic brain injury and on the 2nd, 3rd, 4th day of hospitalization.

Results: Total samples were 25 patients of severe brain injury, where male patients was 20 (81.5%) and 5 females (20%). Severe traumatic brain injury patients mostly aged ≤ years were 8 (32 %), with mean age of 35.92 ± 13.80 years. Types of lesions in severe traumatic brain injury based on the results of head CT scan were DAI 7 (28 %), EDH 4(16 %), EDH + ICH 2 (8 %), EDH + SDH 1 (4 %), ICH 7 (20 %), ICH + SDH 2 (8 %), SDH 3 (12 %), and SAH 1 (4 %). Based on the type of treatment, surgery 18 (72 %), while non surgery 7 (28 %). Based on the cause of the injury, traffic accidents 23 (92 %) and falling down 2 (8 %). *GFAP* levels of serum on the first day ,

second, third, and fourth were 2,72 ± 1,44 ng / ml, 1,85 ± 0,85 ng / ml, 1,67 ± 1,26 ng / ml and 0,79 ± 0,35 ng / ml, respectively. Outcome of patients with severe traumatic brain injury, survived 19 (76 %) and who died 6 (24 %). Increased levels of serum GFAP occur during treatment in patients with poor outcomes, whereas decreased levels of serum GFAP showed a good outcome.

Conclusions. *GFAP* is specific for the brain and is useful as a biomarker for patients with severe traumatic brain injury, so increasing levels can be used as a prognostic factor of mortality and outcome.

Keywords. Glial fibrillary Acidic Protein, severe traumatic brain injury, predictor