

## INTISARI

### PENGARUH PEMBERIAN PIRACETAM TERHADAP PERUBAHAN HISTOPATOLOGIS PADA CEDERA MEDULA SPINALIS TIKUS ALBINO GALUR WISTAR (*Rattus Norvegicus*)

Franklin L. Sinanu\*, Wiryawan Manusubroto\*\*, Sugiyono\*\*\*

\*Residen Bedah Saraf, RSUP Dr. Sardjito/FK-KMK, Universitas Gadjah Mada

\*\*Divisi Bedah Saraf, RSUP Dr. Sardjito/FK-KMK, Universitas Gadjah Mada

\*\*\*Departemen Patologi, Fakultas Kedokteran Hewan, Universitas Gadjah Mada

**Latar Belakang:** Piracetam telah diketahui mempunyai efek neuroprotektif pada susunan saraf pusat. *Spinal Cord Injury* (SCI) didefinisikan sebagai suatu lesi traumatik akut pada medula spinalis yang berujung pada defisit motorik, sensoris, atau otonom. Pada SCI sekunder terjadi serangkaian proses yang saling berhubungan dan mendahului kerusakan sel yaitu iskemik, eksitotoksitas, gangguan elektrolit membran, produksi radikal bebas, disfungsi mitokondria, dan edema. Penelitian ini bertujuan untuk mengetahui pengaruh piracetam terhadap perubahan histopatologis pada cedera medula spinalis tikus.

**Metode:** Sembilan ekor tikus albino galur Wistar kelamin jantan umur 2 – 3 bulan dan berat badan 150 – 200 gram menjalani proses penjepitan medula spinalis selama 1 menit sebagai model *Traumatic SCI* (TSCI). Hewan dikelompokkan menjadi 3 kelompok secara acak, yakni kelompok Kontrol (n=3), Piracetam Akut (n=3), dan Piracetam Subakut (n=3). Pewarnaan HE digunakan untuk melihat edema dan nekrosis jaringan medula spinalis. Skor edema dan skor nekrosis dianalisis menggunakan *software* ImageJ. Data dianalisis dengan uji statistik *one-way* ANOVA dan *Kruskal-Wallis* yang dilanjutkan dengan uji *post-hoc* ( $p < 0,05$ ).

**Hasil:** Piracetam mempunyai pengaruh pada perubahan histopatologis edema dan nekrosis TSCI tikus ( $p < 0,05$ ). Uji *post hoc* menunjukkan pengaruh piracetam pada pemberian fase akut dan fase subakut ( $p < 0,05$ )

**Kesimpulan:** Terdapat perbedaan signifikan terhadap perubahan histopatologis pada cedera medula spinalis tikus yang diberi piracetam dan yang tidak diberi piracetam, baik pada fase akut maupun fase subakut.

**Kata Kunci:** SCI, TSCI, piracetam, neuroproteksi, *SCI model*

## ABSTRACT

### THE EFFECT OF PIRACETAM ON HISTOPATHOLOGICAL CHANGES IN SPINAL CORD INJURED RAT

Franklin L. Sinanu\*, Wiryawan Manusubroto\*\*, Sugiyono\*\*\*

\*Resident, Neurosurgery Division, Dr. Sardjito General Hospital/Faculty of  
Medicine, Public Health and Nursing, Universitas Gadjah Mada

\*\* Neurosurgery Division, Dr. Sardjito General Hospital/Faculty of Medicine,  
Public Health and Nursing, Universitas Gadjah Mada

\*\*\*Department of Pathology, Faculty of Veterinary, Universitas Gadjah Mada

**Background:** Piracetam has been known to have neuroprotective effects on the central nervous system. Spinal Cord Injury (SCI) is defined as an acute traumatic lesion in the spinal cord which leads to motor, sensory, or autonomic deficits. In secondary SCI there is a series of interconnected processes that precede cell damage, namely ischemic, excitotoxicity, electrolyte membrane disorders, free radical production, mitochondrial dysfunction, and edema. This study aims to determine the effect of piracetam on histopathological changes in rat spinal cord injury.

**Methods:** Nine male albino Wistar strain rats aged 2 – 3 months and weight 150 – 200 grams underwent spinal cord clamping for 1 minute as a traumatic spinal cord injury (TSCI) model. Animals were grouped into 3 groups randomly, namely Control group (n=3), Acute Piracetam (n=3), and Subacute Piracetam (n=3). HE staining was used to see edema and necrosis of spinal cord tissue. Edema and nekrosis scores were analyzed using ImageJ software. Data were analyzed by one-way ANOVA and Kruskal-Wallis statistical tests followed by post-hoc tests. ( $p < 0,05$ ).

**Results:** Piracetam has an influence on histopathological changes of edema and necrosis in spinal cord injured rat ( $p < 0,05$ ). Post hoc analysis showed the effect of piracetam were the same on acute and subacute phase.

**Conclusions:** There were significant differences in histopathological changes in spinal cord injury in rats given piracetam and those not given piracetam, both in the acute and subacute phases.

**Keyword:** SCI, piracetam, neuroprotection