

INTISARI

PENGARUH DURASI PAPARAN TRAUMA LISTRIK TERHADAP GAMBARAN HISTOPATOLOGIS DAN IMUNOREAKTIFITAS TERHADAP *NEURON SPECIFIC ENOLASE* PADA MEDULA SPINALIS TIKUS ALBINO GALUR WISTAR (*Rattus Norvegicus*)

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Latar Belakang: Trauma listrik dapat menyebabkan pola cedera yang sangat kompleks. Cedera medula spinalis dapat terjadi sebesar 2-6% dari keseluruhan trauma listrik yang terjadi. Belum ada penelitian eksperimental untuk mengevaluasi kelainan patologis melalui gambaran histopatologis dan gangguan fungsional neuron medula spinalis menggunakan parameter imunohistokimia.

Tujuan: Penelitian ini bertujuan untuk menilai pengaruh durasi waktu trauma listrik dengan mengamati perubahan histopatologis dan imunoreaktivitas *neuron specific enolase* pada neuron medula spinalis tikus.

Metode: Tikus dibagi menjadi tiga kelompok; kelompok kontrol; kelompok paparan listrik 15 detik; kelompok paparan listrik 45 detik. Masing-masing kelompok berjumlah 3 ekor. Arus listrik yang diberikan adalah arus bolak-balik (220 V, 50 Hz, 0,5 A) dengan *inlet* pada kepala dan *outlet* pada ekor. Setelah paparan trauma listrik, tikus didekapitasi. Diambil sampel dari medula spinalis segmen servikal. Diamati perubahan histopatologis dengan pewarnaan *hematoksin-eosin* dan imunoreaktivitas *neuron specific enolase* pada neuron. Perubahan histopatologis berupa pelebaran pembuluh darah dan imunoreaktivitas *neuron specific enolase* dihitung secara kuantitatif menggunakan *image analyzer software* (Image J version 1.43).

Hasil: Penelitian menunjukkan peningkatan rerata diameter pembuluh darah sesuai dengan durasi waktu dan menunjukkan perbedaan signifikan antar 3 kelompok ($p < 0,05$). Imunoreaktivitas *neuron specific enolase* pada sel neuron medula spinalis didapatkan peningkatan rerata jumlah imunoreaktivitas sesuai durasi waktu dan pada studi perbandingan didapatkan hasil signifikan antar kelompok kontrol dan kelompok 45 detik ($p < 0,05$).

Kesimpulan: Pada penelitian ini, trauma listrik menyebabkan pelebaran pembuluh darah pada medula spinalis tikus. *Neuron specific enolase* menjadi *marker* potensial untuk menilai kerusakan neuron secara fungsional akibat trauma listrik.

Kata kunci: trauma listrik, kerusakan neuron, *neuron-specific enolase*, imunoreaktivitas, medula spinalis tikus.

ABSTRACT

EFFECT OF DURATION ELECTRICAL INJURY ON HISTOPATHOLOGY CHANGES AND NEURON SPECIFIC ENOLASE EXPRESSION IN THE SPINAL CORD INJURED RAT

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Background: Electrical trauma can cause a very complex pattern of injury. Spinal cord injuries can account for 2-6% of all electrical trauma cases. There are no experimental studies to evaluate pathological abnormalities through histopathological features and functional disorder of spinal cord neurons using immunohistochemical parameters.

Aim: This study aims to assess the effect of duration of electrical trauma by observing histopathological changes and the immunoreactivity of neuron specific enolase in rat spinal cord neurons.

Method: Rats were divided into 3 groups; control group; 15 second electrical exposure group; 45 second electrical exposure group. Each group consist of 3 rats. The electric current supplied is alternating current (220 V, 50 Hz, 0,5 A) with the inlet on the head and outlet on the tail. After exposure to electrical trauma, mice were decapitated. Samples were taken from the cervical segment of the spinal cord. Histopathological changes were observed with *hematoxylin-eosin* staining and *neuron specific enolase* immunoreactivity were calculated using images analyzer software (Image J version 1.43).

Result: The study showed an increase in the average diameter of blood vessels according the duration of time and showed a significant difference between the 3 groups ($p < 0,05$). The average number of immunoreactivity of the *neuron specific neuron* in the neuronal cels increased according to the duration of time and in comparative study, significant result were obtained between the control group and the 45 second group ($p < 0,05$).

Conclusion: In this study, electrical trauma caused dilatation of blood vessels in the spinal cord of rats. *Neuron specific enolase* is a potential marker to assess functional neuronal damage due to electrical trauma.

Keywords: electrical trauma, neuronal damage, *neuron specific enolase*, rat spinal cord.