ABSTRACT

Background. Rats induced by a single dose of trimethyltin (TMT) (8 mg/kg of body weight, intraperitoneal) and sacrificed on day 28 affter induction are often being used as an animal model of hippocampal degeneration. However, kidney damage caused by TMT on this animal model is not known. Malfunction of the kidney may contribute to the pathology of the brain.
Objectives. The aim of this study is to elucidate the function and the histopathological structure of the kidney tissue of a rat model of hippocampal degeneration induced by TMT.
Methods. Ten male Sprague-Dawley rats (8 – 10 week-old, 150 – 200 gr of body weight) were divided into two groups, control group and TMT group. On day 28 after receiving TMT injection (8 mg/kg of body weight, intraperitoneal), the rats were sacrificed. Peripheral blood samples obtained from retro orbital veins were used to measure blood urea and creatinine level. Paraffin blocks of kidney tissue were made and sectioned at 5 µm thickness. Kidney tissue sections were stained using Hematoxylin-Eosin and Verhoeff and analyzed qualitatively. The histopathological scoring was conducted by two observers based on chronic lesion renal tissue and Endothelial, Glomerular, Tubular, and Interstitialis (EGTI) scoring systems. The results of both observers were compared and calculated using Cohen's kappa test to measure inter-observer reliability.
Results. The weight of TMT-induced rats was significantly not different compared to that of control rats. The blood urea and creatinine levels were not different between TMT-induced and control rats. The histopathological observation found thickened glomerular capsule, cast formation in renal tubules, inflammatory cell infiltration, hemorrhage in tubulointerstitial area, and swollen and ruptured endothelium. The EGTI score was higher in TMT-induced rats. However, only low grade kidney damage was observed in TMT-induced rats. No chronic lesions were found. A near perfect agreement between observers was reported.
Conclusions. On day 28 post single dose TMT-induction (8 mg/kg of body weight, intraperitoneal), low grade kidney damage is observed, but without any changes in kidney function.

Keywords. *trimethyltin, rat, kidney, nephrotoxic, degeneration*

INTISARI

Latar belakang. Tikus yang diinduksi *trimethyltin* (TMT) dosis tunggal (8 mg/kgBB, intraperitoneal) dan diterminasi pada hari ke-28 sering digunakan sebagai hewan model degenerasi hippocampus. Namun, kerusakan ginjal pada model tersebut masih belum banyak diketahui. Kerusakan dan gangguan pada ginjal dapat berkontribusi terhadap kelainan patologis pada otak.

Tujuan penelitian. Tujuan penelitian ini adalah untuk mengetahui fungsi dan gambaran histopatologis pada jaringan ginjal tikus model degenerasi hippocampus dengan induksi TMT.

Metode. Sepuluh tikus jantan Sprague-Dawley (usia 8 – 10 minggu, 150 – 200 gr) dibagi menjadi dua kelompok, yaitu kelompok kontrol dan kelompok TMT. Pada hari ke-28 setelah induksi TMT (8 mg/kgBB intraperitoneal), tikus dikorbankan. Sampel darah perifer diambil melalui vena retroorbitalis untuk mengukur kadar ureum dan kreatinin darah. Blok parafin ginjal dibuat dan diiris dengan ketebalan 5 µm. Irisan jaringan ginjal diwarnai dengan Hematoxylin-Eosin dan Verhoeff serta dianalisis secara kualitatif. Penilaian histopatologi dilakukan oleh dua pengamat dan dilakukan berdasarkan sistem skor lesi kronis jaringan ginjal dan *Endothelial, Glomerular, Tubular, and Interstitialis* (EGTI). Untuk validasi pengamat, dilakukan uji *Cohen's kappa*.

Hasil penelitian. Tidak terdapat perbedaan signifikan pada berat badan tikus kelompok TMT dengan tikus kontrol. Kadar ureum dan kreatinin darah antara tikus kelompok kontrol dan TMT juga tidak berbeda bermakna. Pengamatan histopatologi menemukan penebalan capsula glomerularis, pembentukan *cast* pada tubulus renalis, infiltrasi sel imun, perdarahan pada area tubulointerstitialis, serta pembengkakan dan ruptur endothelium. Skor EGTI tikus kelompok TMT lebih tinggi dari tikus kontrol namun masih menunjukkan kerusakan ginjal derajat ringan. Tidak ditemukan lesi kronis. Tingkat kepercayaan pengamatan hampir sempurna.

Kesimpulan. Pada tikus model degenerasi hippocampus yang diinduksi TMT ditemukan kerusakan ginjal derajat ringan tanpa disertai gangguan fungsi ginjal.

Kata kunci. *trimethyltin, rat, kidney, nephrotoxic, degeneration*