

INTISARI

EFEK VITAMIN D TERHADAP EKSPRESI mRNA NF-kB DAN IL-6 PADA HIPPOCAMPUS TIKUS MODEL CEDERA ISKEMIA SEREBRAL GLOBAL TRANSIEN

Latar Belakang: Cedera iskemia serebral global transien menyebabkan inflamasi steril pada hippocampus dan mengaktifkan faktor transkripsi *nuclear factor kappa beta* (NF-kB). Aktivasi NF-kB menginduksi mediator inflamasi terutama *interleukin 6* (IL-6) yang meningkatkan progresivitas cedera iskemia reperfusi. Vitamin D diduga memiliki efek antiinflamasi pada beberapa model penyakit. Namun, peran vitamin D pada model otak belum banyak diketahui.

Tujuan: Penelitian ini bertujuan untuk mengkaji peran vitamin D terhadap inflamasi ditinjau dari ekspresi mRNA NF-kB dan IL-6 pada hippocampus tikus iskemia serebral global transien yang diinduksi dengan *bilateral common carotid arteries occlusion* (BCCAO).

Metode: Tikus Wistar jantan (n=24, usia 2-3 bulan, berat 140-300 gram) dibagi dalam 4 kelompok secara acak (n=6): SO (kontrol), BCCAO (iskemia serebral global transien tanpa vitamin D), VD1 (iskemia serebral global transien + injeksi vitamin D 0,125 µg/kgBB/hari), dan VD2 (iskemia serebral global transien + injeksi vitamin D 0,5 µg/kgBB/hari). BCCAO dilakukan dengan penjepitan arteria carotis communis dengan klem selama 20 menit lalu dilepas dan dijahit seperti semula. Terminasi tikus pada hari ke-10 setelah BCCAO untuk mengambil jaringan hippocampus kemudian dilakukan ekstraksi mRNA. Ekspresi NF-kB dan IL-6 dinilai menggunakan *reverse transcriptase* PCR. Uji statistik menggunakan *one-way* ANOVA diikuti *post-hoc* LSD. Nilai $p < 0,05$ dianggap signifikan secara statistik.

Hasil: Pada kelompok BCCAO, ekspresi mRNA NF-kB ($p=0,016$) dan IL-6 ($p=0,011$) lebih tinggi signifikan terhadap kelompok SO. Ekspresi mRNA NF-Kb kelompok VD2 ($p=0,009$) lebih rendah secara signifikan dibandingkan dengan kelompok BCCAO. Ekspresi mRNA IL-6 pada kelompok VD2 ($p=0,031$) lebih rendah secara signifikan dibandingkan dengan kelompok BCCAO.

Kesimpulan: Pemberian vitamin D dapat menurunkan inflamasi di hippocampus dengan menurunkan ekspresi mRNA NF-kB dan mRNA IL-6.

Kata kunci: Vitamin D, iskemia serebral global, inflamasi, IL-6, NF-kB

ABSTRACT

THE EFFECT OF VITAMIN D ON mRNA NF-kB AND IL-6 EXPRESSIONS IN RAT'S HIPPOCAMPUS WITH TRANSIENT GLOBAL CEREBRAL ISCHEMIA

Background: Transient global cerebral ischemia injury causes sterile inflammation in the hippocampus and activates the transcription factor nuclear factor kappa beta (NF-kB). Activation of NF-kB induces inflammatory mediators, especially interleukin 6 (IL-6), which increases the progression of ischemia-reperfusion injury. Vitamin D is thought to have anti-inflammatory effects in several disease models. However, not much is known about the role of vitamin D in brain models.

Objective: This study aims to study the role of vitamin D on inflammation in terms of NF-kB and IL-6 mRNA expressions in the hippocampus of rats with transient global cerebral ischemia induced by bilateral common carotid artery occlusion (BCCAO).

Methods: Male Wistar rats (n=24, 2-3 months old, weighing 140-300 grams) were randomly assigned into 4 groups (n=6): SO (control), BCCAO (transient global cerebral ischemia without vitamin D), VD1 (transient global cerebral ischemia + injection of vitamin D 0,125 µg/kgBW/day), and VD2 (transient global cerebral ischemia + injection of vitamin D 0,5 µg/kgBW/day). BCCAO was performed by clamping the common carotid artery with a clamp for 20 minutes then removing it and suturing it as before. Rat was terminated on the 10th day after BCCAO to take hippocampus tissue and then carried out mRNA extraction. NF-kB and IL-6 expressions were measured using reverse transcriptase PCR. One-way ANOVA was used for statistical test followed by post-hoc LSD. A p value <0,05 was considered statistically significant.

Results: In the BCCAO group, NF-kB (p=0,016) and IL-6 (p=0,011) mRNA expressions were significantly higher than in the SO group. NF-Kb mRNA expression in the VD2 (p=0,009) group was significantly lower compared to the BCCAO group. IL-6 mRNA expression in the VD2 (p=0,031) group was significantly lower compared to the BCCAO group.

Conclusion: Vitamin D administration can reduce inflammation in the hippocampus by reducing the expressions of NF-kB mRNA and IL-6 mRNA.

Key words: Vitamin D, global cerebral ischemia, inflammation, IL-6, NF-kB