ABSTRACT

Background: Transient global brain ischemic injury ensues inflammatory processes in the hippocampus with upregulation of proinflammatory regulators such as tumor necrosis factor-alpha (*TNF-α*) and interleukin-1β (*IL-1β)*. Vitamin D in previous studies show anti-inflammatory effects. However, the effect of vitamin D on ischemic reperfusion injury models have not been investigated. This study investigates the effect of Vitamin D on rats' hippocampus with ischemic reperfusion injury models by evaluating mRNA expression of *IL-1β* and *TNF-α.*

Aim: To elucidate the effect of vitamin D in rats hippocampus with transient ischemic attack's model using mRNA expression of *TNF-α* and *IL-1β*.

Methods: In this study, Male Wistar rats (n=25, BW=150-300 grams) were used and divided into four groups. The first group (SO) consisted of rats that underwent an operation without carotid communis clamping (n=6). The second group of rats underwent bilateral common carotid artery occlusion (BCCAO) without vitamin D (n=6). The third group (VD1) received BCCAO with 0.125µg/kgBW of vitamin D (n=6), and the last group (VD2) of rats underwent BCCAO with 0.5µg/kgBW of vitamin D (n=6). Supplementation of Vitamin D was injected intraperitoneally once a day for ten days until the rats were terminated. RNA was extracted from hippocampal tissue and further processed into cDNA for the Polymerase Chain Reaction (PCR) or reverse-transcriptase PCR method. The Polymerase Chain Reaction results were expressed through white band after electrophorized. The mRNA *IL-1β* and *TNF-α* expressions were acquired through densitometry measurements using the ImageJ application, and normalization was performed with GAPDH expression serving as the housekeeping gene.

Result: The expression of interleukin-1β (*IL-1β)* in the transient global ischemic attack rat models with 0.125 µg/kgBW (p=0.119) and 0.5 µg/kgBW (p=0.044) vitamin D supplementation is lower than in the hippocampus of transient global ischemic injury rat models. Moreover, the expression tumor necrosis factor-alpha (*TNF-α*) mRNA in the transient global ischemic attack rat models with 0.125 µg/kgBW (p=0.000) and 0.5 µg/kgBW (p=0.001) vitamin D supplementation is significantly lower than in the hippocampus of transient global ischemic injury rat models.

Conclusion: The mRNA expression of *IL-1β* and *TNF-α* in the transient global ischemic attack rat models with 0.125 µg/kgBW and 0.5 µg/kgBW doses of vitamin D supplementation is lower than in the hippocampus of transient global ischemic attack rat models without vitamin D supplementation.

Keywords: Vitamin D, Transient global brain ischemic injury, *IL-1β*, *TNF-α*, Inflammation