INTISARI

Latar Belakang: Stroke iskemik mengakibatkan eksitotoksisitas yang menginduksi stres oksidatif, disfungsi mitokondria, neuroinflamasi yang akhirnya menurunkan fungsi memori. Eksosom turunan hWJ UCMSc memiliki efek proangiogenesis untuk memperbaiki fungsi neurologis.

Tujuan: Penelitian ini mengkaji pengaruh pemberian eksosom hWJ UCMSc terhadap fungsi memori spasial, ekspresi mRNA CD31, mRNA VCAM-1 dan mRNA VEGF-A pada lobus frontal tikus model iskemik serebral global transien.

Metode: Penelitian ini bersifat quasi eksperimental dengan *post-test only control group design.* Kami melakukan studi *in vivo* dengan model induksi *billateral common carotid artery occlusion* (BCCAO) dan injeksi eksosom hWJ UCMSc dosis tunggal. Dua puluh tujuh tikus dibagi menjadi 5 kelompok: SO *(Sham Operation)*, BCCAO, EXO1 (BCCAO + eksosom 8,5 x 10^4 partikel), EXO2 (BCCAO + eksosom 8,5 x 10^5 partikel), dan EXO3 (BCCAO + eksosom 8,5 x 10^6 partikel). Fungsi memori spasial dengan *Morris Water Maze* fase Probe. Ekspresi mRNA VEGF-A, CD31 dan VCAM-1 dengan metode RT-PCT.

Hasil: Penilaian *probe test* berdasarkan panjang lintasan dan waktu di kuadran target, kelompok EXO2 signifikan lebih panjang dibandingkan kelompok BCCAO. Ekspresi mRNA VEGF-A dan mRNA CD31 kelompok EXO2 signifikan lebih tinggi dibandingkan kelompok BCCAO. Ekspresi mRNA VCAM-1 kelompok EXO2 signifikan lebih rendah dibandingkan kelompok BCCAO.

Kesimpulan: Pemberian eksosom hWJ UCMSc memberikan efek yang signifikan lebih tinggi terhadap kemampuan memori spasial berdasarkan *probe test*. Hal ini disertai dengan ekspresi mRNA VEGF-A dan mRNA CD31 yang signifikan lebih tinggi pada kelompok EXO2 dan ekspresi mRNA VCAM-1 yang signifikan lebih rendah pada kelompok EXO2 di lobus frontal tikus model iskema serebral global transien.

Kata kunci: Eksosom, angiogenesis, lobus frontal, iskemik serebral global transien

ABSTRACT

Background: Ischemic stroke results in excitotoxicity that induces oxidative stress, mitochondrial dysfunction, and neuroinflammation, ultimately impairing memory function. hWJ UCMSc-derived exosomes have proangiogenic effects to improve neurological function.

Purpose: This study examines the effects of administering hWJ UCMSc exosomes on spatial memory function, expression of mRNA CD31, mRNA VCAM-1, and mRNA VEGF-A in the frontal lobe of a transient global cerebral ischemia rat model.

Methods: This study is a quasi-experimental research with a post-test only control group design. We conducted an in vivo study using the bilateral common carotid artery occlusion (BCCAO) induction model and a single dose injection of hWJ UCMSc exosomes. Twenty-seven rats were divided into 5 groups: SO (Sham Operation), BCCAO, EXO1 (BCCAO + exosomes 8.5 x 10^4 particles), EXO2 (BCCAO + exosomes 8.5 x 10^5 particles), and EXO3 (BCCAO + exosomes 8.5 x 10^6 particles). Spatial memory function was assessed using the *Morris Water Maze* in the Probe phase. Expression of mRNA VEGF-A, VE-Cadherin, and VCAM-1 was measured using the RT-PCR method.

Result: Assessment of the probe test based on the distance and time spent in the target quadrant showed that the EXO2 group demonstrated significantly longer distances compared to the BCCAO group. The expression of VEGF-A mRNA and CD31 mRNA was significantly higher in the EXO2 group than in the BCCAO group. Conversely, the expression of VCAM-1 mRNA was significantly lower in the EXO2 group compared to the BCCAO group.

Conclusion: hWJ UCMSC-derived exosomes significantly enhances spatial memory ability based on the probe test. This is accompanied by significantly higher mRNA expression of VEGF-A and CD31 in the EXO2 group, as well as significantly lower mRNA expression of VCAM-1 in the EXO2 group in the frontal lobe of rats with a transient global cerebral ischemia model.

Keywords: Exosomes, angiogenesis, frontal lobe, transient global cerebral ischemia