

INTISARI

Latar Belakang: Gagal ginjal kronik (GGK) menjadi permasalahan medis tingkat global hingga menyebabkan tingginya angka kematian. Fibrosis ginjal merupakan manifestasi akhir dari GGK yang ditandai penumpukan matriks ekstraseluler. Eksosom dari *Human Umbilical Cord Mesenchymal Stem Cells (HUC-MSC)* yakni produk turunan sel punca diharapkan menjadi pendekatan terapi baru fibrosis pada gagal ginjal.

Tujuan: Penelitian ini bertujuan untuk mengkaji skor fibrosis perivaskuler dan ekspresi mRNA BMP-7 pada model gagal ginjal kronik.

Metode: Penelitian ini menggunakan tikus Wistar jantan usia 3 bulan, berat 150-300 gram, dan sebanyak 35 ekor yang dibuat model GGK dengan 5/6 *Subtotal Nephrectomy* (5/6 SN). Tikus terbagi dalam 5 kelompok perlakuan yakni *Sham Operation* (SO), SN, SNE1 (dosis eksosom 48,30 µg), SNE2 (dosis eksosom 96,60 µg) dan SNE3 (dosis eksosom 193,20 µg). Pewarnaan Sirius Red digunakan untuk mengidentifikasi tampilan histopatologi fibrosis perivaskuler ginjal. RT-PCR digunakan untuk menilai ekspresi mRNA BMP-7. Analisis hasil dan data dilakukan menggunakan SPSS.

Hasil: Rerata skor fibrosis perivaskuler kelompok intervensi (SNE1, SNE2, dan SNE3) menunjukkan hasil skor lebih tinggi bermakna dibanding kelompok SN dengan nilai signifikansi 0,021; 0,009; dan 0,000. Namun, ekspresi BMP-7 menunjukkan hasil yang tidak berbeda bermakna dengan nilai signifikansi SN vs SNE1 ($p=0,907$), SN vs SNE2 ($p=0,837$), SN vs SNE3 ($p=0,979$).

Kesimpulan: Pemberian eksosom HUC-MSC menunjukkan skor fibrosis perivaskuler yang rendah tanpa perubahan ekspresi mRNA BMP-7.

Kata Kunci: Anti-fibrosis, BMP-7, Fibrosis ginjal, Gagal ginjal kronik, Eksosom, 5/6 *Subtotal Nephrectomy*, HUC-MSC.

ABSTRACT

Background: Chronic kidney disease (CKD) is a global medical problem that leads to high mortality rates. Renal fibrosis is the end-stage manifestation of CKD characterized by the accumulation of extracellular matrix. Exosomes derived from Human Umbilical Cord Mesenchymal Stem Cells (HUC-MSC), a stem cell-derived product, are expected to serve as a new therapeutic approach for fibrosis in kidney failure.

Objective: This study aims to examine the appearance of perivascular fibrosis and the expression of BMP-7 mRNA in a chronic kidney disease model.

Methods: This study used 35 male 3-month-old Wistar rats weighing 150–300 grams, which were made into a CKD model via 5/6 nephrectomy (SN). The mice were divided into 5 treatment groups: Sham Operation (SO), SN, SNE1 (exosome dose 48.30 µg), SNE2 (exosome dose 96.60 µg), and SNE3 (exosome dose 193.20 µg). Sirius Red staining was used to identify the histopathological appearance of renal perivascular fibrosis. RT-PCR was used to assess BMP-7 mRNA expression. Results and data were analyzed using SPSS.

Results: The mean perivascular fibrosis scores for the intervention groups (SNE1, SNE2, and SNE3) were significantly higher than those of the SN group, with p-values of 0.021, 0.009, and 0.000, respectively. However, BMP-7 expression showed no significant difference between SN and SNE1 ($p=0.907$), SN and SNE2 ($p=0.837$), and SN and SNE3 ($p=0.979$).

Conclusion: Administration of HUC-MSC exosomes resulted in low perivascular fibrosis scores without changes in BMP-7 mRNA expression.

Keywords: Anti-fibrosis, BMP-7, Renal fibrosis, Chronic kidney disease, Exosomes, 5/6 Subtotal Nephrectomy, HUC-MSC.