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Bone Marrow-derived Mesenchymal Stem Cell Therapy in Retinitis Pigmentosa

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Background

To determine the effectiveness of bone marrow-derived mesenchymal stem cell therapy on visual acuity and visual field in patients with retinitis pigmentosa.

Objective

Stem cell treatment in retinitis pigmentosa provides improvement in visual acuity and visual field.

Methods

Forty-seven eyes of 27 patients diagnosed with retinitis pigmentosa were included in our study.

Allogeneic bone marrow-derived mesenchymal stem cells were administered by deep subtenon injection. Complete routine ophthalmological examinations, optical coherence tomography (Zeiss, Cirrus HD-OCT) measurements, and visual field (Humphrey perimetry, 30-2) tests were performed on all patients before the treatment and on the 1st, 3rd, and 6th month after treatment. The best corrected visual acuities of the patients were determined by the Snellen chart and converted to logMAR. Visual evoked potential (VEP) and electroretinogram (ERG) examinations of the patients before the treatment and on the 6th month after the treatment were performed (Metrovision) data were compared.

Results

Visual acuities were 0.74 ± 0.49 logMAR before treatment and 0.61 ± 0.46 logMAR after treatment. Visual acuity had a statistically significant increase ($p < 0.001$). The visual field deviation was found to be -27.16 ± 5.77 dB before treatment and -26.59 ± 5.96 dB after treatment ($p = 0.005$). The ganglion cell layer was 46.26 ± 12.87 μ m before treatment and 52.47 ± 12.26 μ m after treatment ($p = 0.003$). There was a significant improvement in

Pattern VEP 120° P100 amplitude compared to that before the treatment ($4.43 \pm 2.42 \mu\text{V}$) and that after the treatment ($5.09 \pm 2.86 \mu\text{V}$) ($p = 0.013$). ERG latency measurements were $18.33 \pm 15.39 \mu\text{V}$ before treatment and $20.87 \pm 18.64 \mu\text{V}$ after treatment for scotopic 0.01 ($p = 0.02$). ERG latency measurements for scotopic 3.0 were $20.75 \pm 26.31 \mu\text{V}$ before treatment and $23.10 \pm 28.60 \mu\text{V}$ after treatment ($p = 0.014$).

Conclusion

Retinitis pigmentosa is a progressive, inherited disease that can result in severe vision loss. In retinitis pigmentosa, the application of bone marrow-derived mesenchymal stem cells by deep subtenon injection has positive effects on visual function. No systemic or ophthalmic side effects were detected in the patients during the 6-month follow-up period.