SESSION: Inherited Retinal Disorders / Stem Cell Treatments
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Moderators: Nur Acar Göçgil, Ayşe Öner

Bone marrow-derived mesenchymal stem cell therapy in patients with retinitis pigmentosa

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Purpose: To determine the effectiveness of bone marrow-derived mesenchymal stem cell therapy on visual acuity and visual field in patients with retinitis pigmentosa. Method: 47 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, visual field (Humphrey perimetry, 30-2) tests were performed on all patients before and at the 1st, 3rd, and 6th months after treatment. The best corrected visual acuities of the patients were determined by Snellen chart and converted to logMAR. Visual evoked potential (VEP) and electroretinogram (ERG) examinations of the patients before the treatment and at 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. This increase in visual acuity was statistically significant ($p<0.001$). The visual field deviation was found -27.16±5.77 dB before treatment and -26.59±5.96 dB after treatment ($p=0.005$). Ganglion cell layer was 46.26±12.87 µm before treatment and 52.47±12.26 µm after treatment ($p=0.003$). There was a significant improvement in Pattern VEP 120° P100 amplitude compared to before treatment (4.43±2.42 µV) and after treatment (5.09±2.86 µV) ($p=0.013$). ERG latency measurements were 18.33±15.39 µV before treatment and 20.87±18.64 µV after treatment for scotopic 0.01 ($p=0.02$). ERG latency measurements for scotopic 3.0 were 20.75±26.31 µV before treatment and 23.10±28.60 µV after treatment ($p=0.014$).
Conclusion: Retinitis pigmentosa is a progressive, inherited disease that can result in severe vision loss. In retinitis pigmentosa, 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.

Psychophysical assessment of low visual function in patients with retinitis pigmentosa with the full-field stimulus threshold (FST) test

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Aim: The full-field stimulus threshold (FST) test was developed to evaluate the efficiency and safety of treatments of hereditary retinal diseases. In this study we used FST test in patients with retinitis pigmentosa (RP) and compare the results with perimetry and electrophysiological tests.

Methods: 17 RP patients and 7 normal subjects were tested during the study. Routine examination and ophthalmological tests including perimetry, optical cohorence tomography, flash and multifocal electroretinography and FST tests were performed to the RP patients. Controls received FST test after routine ophthalmological examination. The FST test was performed to measure the perception threshold of white or chromatic ganzfeld flash stimulations. The rods are more sensitive to blue than to red stimuli and cones have the same sensibility for red and blue stimuli. The FST test was done monocularly on the MonCvONE-CR systems manufactured by Metrovision with dilated pupil after 30 min dark adaptation. Full field flashes were presented every 3 seconds. The patient press the button every time he/she perceives light.
Results: We were able to obtain reliable thresholds of FST from all study eyes which has flat flash electroretinography. The mean values of white, blue and red FST were significantly lower in patients compared with the controls (Table 1) ($P<0,05$). There was a correlation between FST test values, visual acuity and Ring 4-Ring 5 amplitudes of mfERG. There was not a correlation between FST values and perimetry and central ring amplitudes.
Conclusion: The FST test is a fast and a reliable exam which can be done in subjects with poor visual acuity and / or reduced visual field. The results of this study confirm that the FST can measure retinal sensitivity in severely affected RP subjects with flat flash ERG and can be used for evaluation of treatment results in hereditary retinal diseases.

Cystoid macular edema in rod dystrophy

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A case report of CME in a 35year old male patient suffering from rod dystrophy. His left eye affected with CME was treated with non-steroidal anti-inflammatory eyedrops, systemic steroids, acetazolamide, dorzolamide, and dexamethasone intravitreal implant. The recurrence of CME, always appearing after several weeks after its regression, necessitated permanent oral steroid use. Adverse effects of this treatment included cataract, urolithiasis, striae, obstipation, moonface, overweight, neuropathy, and dyspnoea. A parabulbar steroid (triamcinolone) injection brought a two months lasting regression of edema and temporary withdrawal of oral steroids. After the second injection, the benefit lasted one month only with vision drop down to 0.05. We performed vitrectomy with ILM peeling in his left eye, which was followed by an improvement lasting three months. The third parabulbar steroid stabilized the residual edema. After the cataract surgery, the vision improved to 0.5. In the meantime, the CME appeared in the right eye. A parabulbar injection brought an immediate benefit lasting nine months, enabling the withdrawal of oral steroids for one year. The benefit of the second parabulbar steroid lasted almost four months after which the recurrence of CME necessitated oral steroids with many adverse effects. The benefit of the third injection lasted two months only. We started treating his eye using aflibercept intraocular injections. The benefit lasted one month only; the patient had to continue oral steroids. We continued with aflibercept injections in three monthly intervals and in the meantime, we applied parabulbar triamcinolone. After the fifth aflibercept and tenth triamcinolone we switched to brolucizumab. The benefit lasted two to three months and the eleventh parabulbar triamcinolone was applied. The patient is now treated with brolucizumab applied in bimonthly intervals. He is waiting for the cataract surgery in his right eye, and we think about possible vitrectomy with ILM peeling in his right eye.

Henle's Fiber Layer volumetric analysis in patients with cone dystrophy

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Purpose: To evaluate Henle's Fiber Layer (HFL) thickness and volume parameters in patients with cone dystrophy with directional optical coherence tomography (D-OCT).

Methods: Macular 20x20° standard and D-OCT images were acquired from patients diagnosed with hereditary cone dystrophy with evident foveal ellipsoid zone defect in OCT, and age-matched healthy controls. HFL thickness and volume parameters were calculated from manual segmentation through D-OCT images and comparative analysis is performed.

Results: Twelve eyes of 6 patients were compared to 12 eyes of 6 age-matched healthy controls (mean age: 33.7±13.7 and 29.7±16.5 years respectively; P=0.064). Patients had lower total HFL volume (0.48±0.07 against 0.72±0.05 mm^3; P<0.001) and mean HFL thickness (17.0±2.5 against 25.4±1.7 µm; P<0.001) than healthy controls. HFL parameters in patients for both central subfield (volume: 0.01±0.00 mm^3; thickness: 7.0±4.7 µm) and inner 1-3 mm ETDRS zone (volume: 0.09±0.02 mm^3; thickness: 15.0±3.6 µm) were significantly lower than those in healthy controls for subfield (volume: 0.03±0.00 mm^3; thickness: 48.8±5.6 µm) and inner 1-3 mm ETDRS zone parameters (volume: 0.26±0.01 mm^3; thickness: 41.1±2.1 µm) (all P<0.001), while no difference was found in outer 3-6 mm ETDRS zone between patients (volume: 0.38±0.05 mm^3; thickness: 18.1±2.6 µm) and healthy controls (volume: 0.42±0.03 mm^3; thickness: 19.8±1.7 µm) (P=0.094 and 0.083, respectively).

Conclusion: HFL assessment might be a useful OCT biomarker in patients with cone dystrophy. HFL thinning is observed in foveal and parafoveal areas of patients with cone dystrophy, while perifoveal HFL parameters are found comparable to healthy controls.