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Do mesenchymal stem cells enhance the healing of chronic tympanic membrane perforations?

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Purpose: Assessment of a possible healing enhancement of human mesenchymal stem cells in chronic tympanic membrane perforations. Chronic tympanic membrane perforation commonly arises as a result of either trauma or otitis media resulting in conductive hearing loss and recurrent or chronic infection. It is a clinical problem in otolaryngology and the only treatment of choice is surgery restituting the perforation by suitable graft materials. In recent years stem cells have gained interest for its tremendous capability to mature into different specific cell types. We intend to test a simple treatment that could replace surgery so that the patients could be treated with a simple office technique. Material and methods: A laser myringotomy of 0.2mm diameter was made bilaterally in postero-superior quadrant of pars tensa of 12 Sprague Dawley rats. A cortisone solution was instilled bilaterally for 10 consecutive days to make a chronic perforation model. At 4 weeks after cortisone instillation a 0.5ml solution of human mesenchymal stem cells (1.2×10^6 /ml) was applied in right ears after refreshing the perforation edges. A saline solution was applied in the same way on the left ears for controls. Otomicroscopy was performed weekly after the stem cell treatment and the condition of perforations was documented. Six rats were treated with injection prograf (Tacrolimus) to prevent host versus graft rejection. The TMs were embedded according to standard method for light and electron microscopic examination. Results: 4/10 stem cell treated ears had closed perforations as compared with 2/10 saline treated control ears. Light and electron microscopic assessments are underway. Conclusion: The number of mesenchymal stem cells treated ears were closed twice as many as compared with control ears after one month. The number of studied animals is small, so the difference is not statistically significant and no major conclusions can be drawn. The tendency is, however, in favour of stem cell treatment.