"DO STEM CELLS PLAY A ROLE IN FAT GRAFT SURVIVAL IN VOCAL FOLDS?"

Giovanna Cantarella - R.Mazzola, V.Lo Cicero, E.Montelatici, L.Lazzari, G.Sambataro

Background and Aim of the Study: Fat is theoretically the ideal implant for vocal fold augmentation because it is soft, easily available and biocompatible. However, reabsorption is reported as a frequent cause of long-term failure, although results vary widely among different authors. We hypothesize the cellular characteristics of the implanted fat might influence the final result. The aim of this study was to investigate the possibility that the adipose tissue currently used to treat glottic incompetence may contain a stem cell population that could play a role in long-term fat graft survival.
Methods: Fat samples harvested from twelve patients affected by severe breathy dysphonia who underwent vocal fold lipoinjection were analyzed by immunocytochemistry and reverse transcription polymerase chain reaction (RT-PCR). We explored the characteristics of the isolated cellular populations and their ability to differentiate towards different lineages.
Results: We isolated a stem cell population from the adipose tissue samples of all 12 patients undergoing vocal fold repair, and explored its characteristics and multilineage potential. Before the differentiation treatments, the isolated cells expressed mesenchymal markers and showed characteristics of multipotent adult stem cells similar to those of bone marrow-derived MSCs. Moreover, the AMSCs found in fat tissue were positive for some of the genes characteristic of embryonic and adult stem cells (Oct-4, Runx-1 and ABCG-2), thus confirming their possible multipotency. Under appropriate culture conditions, the AMSCs showed the morphological and phenotypic characteristics of different mesodermal and non-mesodermal cell lineages. Several tissue differentiations (osteogenic, adipogenic, endothelial and hepatic) were obtained.
Conclusions: These results support our hypothesis that the successful effect of vocal fold lipoinjection is based not only on mechanical filling but also on tissue regeneration mediated by AMSCs. Further studies are ongoing to investigate the potential of the stromal vascular cells and to confirm our in vitro results using an animal model of damaged vocal folds.