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New horizon for the middle ear surgery with regeneration of the tympanic membrane

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Recent progress in regenerative medicine has provided us with various scaffolds and growth factors that make it possible to accelerate tissue repair. Applying modern *in situ* tissue engineering principles, we developed a new regenerative treatment for tympanic membrane (TM) perforation using a combination of basic fibroblast growth factor (b-FGF), gelatin sponge, and fibrin glue without the need for conventional surgical procedures and cell transplantation. There are numerous advantages to this regenerative treatment. Skin incisions and harvesting of autologous tissues are not required. It is possible to regenerate normal TM morphology fully. High success/cure rates and ideal hearing improvements are possible. It can be performed within 20 minutes and is a simple, easy outpatient procedure.

This regenerative treatment for the TM perforation was approved in November 2019 by the National Health Insurance in Japan. Before the approval, Retympha® (Norvel Pharma Inc., Tokyo, Japan), a specialized medicine for TM perforation, received pharmaceutical approval in Japan.

We have been limited the adaptation of this treatment to patients with dry and no active inflammation in the TM and the tympanic cavity. In addition, temporal bone CTs were analyzed to ensure that all patients had proper aeration in the mastoid and tympanic cavities before treatment. We also initially selected patients without cholesteatomas or tumors in the tympanic cavity and no severe calcification/osseous metaplasia of the TM. However, to expand its adaptation, we attempted to apply this treatment to patients with the above lesions localized to the tympanic cavity by an endoscope.

This new regenerative therapy is useful not only for patients with simple TM perforations but also for some patients who need tympanoplasty. This innovative regenerative therapy that is an easy, safe, cost-effective, and minimally-invasive treatment will open the new horizon of middle ear surgery.

Biography

Shin-ichi Kanemaru graduated from Kyoto University, he worked in the Department of Otolaryngology of Osaka Red Cross Hospital and Kitano hospital. While he worked in Kyoto University Hospital as an assistant professor, he went abroad to London Tissue Repair and Engineering Center and got PhD in the study of regeneration of larynx at Kyoto University. At present, he takes up chief director of the Hearing Disturbance and Tympanic Membrane Regeneration Center in Kitano hospital, clinical professor in Kyoto University and concurrently serve as researcher in Translational Research Center for Medical Innovation, Foundation for Biomedical Research and Innovation, Kobe, Japan. My field of subspecialty is middle ear, inner ear, and skull base surgery and regenerative medicine in the field of head and neck. Regenerative treatment of tympanic membrane has been covered by National Health Insurance in Japan from 2019. I'm going to spread this treatment all over the world, especially, developing countries.

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