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Biodesign as a graft material in paediatric ear surgery- endoscopic and open approach

Presenting Author: **Paramita Baruah**

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Learning Objectives:

Introduction: Biodesign is an artificial graft material. This work assesses the feasibility of performing middle ear reconstruction with biodesign and the short and long-term results on closure of perforations and hearing.

Methods: We performed a retrospective study of 18 children who had middle ear reconstruction using biodesign during endoscopic and conventional ear surgery for chronic suppurative otitis media. The surgeries were performed between February 2014 and February 2015 by the senior author.

Results: Nine surgeries were endoscopic tympanoplasty, 3 were endoscope-assisted tympanoplasty, 2 were conventional microscope tympanoplasty, two were endoscopic tympanoplasty for cholesteatoma and remaining two were combined approach tympanoplasty (CAT) for cholesteatoma. At 3 months follow up 17 (94%) of the grafts were intact while one had a pin-hole perforation. Over the period of follow-up of 12 months, one patient with cholesteatoma (endoscopic tympanoplasty) underwent a mastoidectomy for recurrence. One patient who underwent a CAT had a second look procedure while the other presented with recurrent disease. One patient (endosopic myringoplasty) underwent a revision endoscopic myringoplasty. The patient who had a pin hole perforation at 3 month follow up went on to develop a retraction and a tympanoplasty with cartilage grafting is planned. Rest of the patients (72%) have had no further trouble with their ears.

Conclusion: The early results with biodesign in the reconstruction of middle ear are very good (94% intact graft rate). The biodesign graft continues to do well in the group of patients undergoing myringoplasty even after a follow up of 12 months with intact grafts in 11 of 14 patients (78%).

Learning points: Biodesign is a good substitute for temporalis fascia, obviates the need for a separate scar with endoscopic ear surgery and is very useful in repeat mastoid surgeries where temporalis fascia may be scarce.

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Development of noninvasive techniques for tympanic membrane regeneration; animal study

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Learning Objectives: Tympanic membrane (TM) perforation, in particular chronic otitis media, is one of the most common clinical problems in the world and can present with sensorineural healing loss. Here, we explored an approach for TM regeneration where the latent progenitor or stem cells within TM epithelial layers may play an important regulatory role. We showed that potential TM stem cells present highly positive staining for epithelial stem cell markers and are present at low levels in all areas of normal TM tissue. Additionally, they are present at high levels in perforated TMs, especially in proximity to the holes, regardless of acute or chronic status, suggesting that TM stem cells may be a potential factor for TM regeneration. Finally, we propose a new therapy using stem cell growth factors for chronic TM regeneration. We developed an insulin-like growth factor-binding protein-releasing chitosan patch to promote TM stem cell growth toward TM regeneration in the chronic TM perforation model. Complete regeneration resulting in an intact TM occurred in 43.8% of chronically perforated animals; healing was dependent on perforation size in that small lesions (<50% area) were resolved in 66.7% of cases. Our study suggests that latent TM stem cells could be potential regulators of regeneration, which provides a new insight into this clinically important process and a potential target for new therapies for chronic otitis media and other eardrum injuries.

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