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Patch tracheoplasty by in body tissue engineering using collagenous connective tissue membranes (biosheets)

Background & Aim: In body tissue engineering, collagenous connective tissue membranes (biosheets) are useful for engineering cardiovascular tissue. The present study aim was to evaluate the use of biosheets as a potential tracheal substitute material in vivo in a rabbit model.

Methods: **Group 1:** Rectangular-shaped Gore-Tex® (4×7 mm) was implanted into a 3×6 mm defect created in the midventral portion of the cervical trachea. **Group 2:** Rectangular-shaped dermis was implanted into a tracheotomy of similar size. **Group 3:** Biosheets were prepared by embedding silicone moulds in dorsal subcutaneous pouches in rabbits for 1 month. Rectangular-shaped biosheets were implanted into a tracheotomy of similar size in an autologous fashion. All groups (each containing 10 animals) were sacrificed 4 weeks after implantation.

Results: All materials maintained airway structure for up to 4 weeks after implantation. Regenerative cartilage in implanted biosheets in group 3 was confirmed by histological analysis. Tracheal epithelial regeneration occurred in the internal lumen of group 3. There were significant differences in the amounts of collagen type-II and glycosaminoglycan between group 3 and groups 1 or 2.

Conclusion: We confirm that cartilage can self-regenerate onto an airway patch using biosheets.

Biography

Makoto Komura was graduated from the Teikyo University Medical Department in 1987. He has completed his PhD from Teikyo University, Japan. He is a Pediatric Surgeon, Professor and Chairman of Department of Pediatric Surgery at Saitama Medical University. He has published more than 30 papers in reputed journals and serving as an Editorial Board Member of Regenerative Therapy.

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