Pulmonary valve replacement (PVR) is a common reoperation, typically required approximately 10 years following right ventricular outflow tract reconstruction and especially true in cases of tetralogy of Fallot. However, an improved prosthetic valve is required.

Methods and Results: A fresh decellularized pulmonary allograft was used for PVR to correct pulmonary valve regurgitation in a 35-year-old man 33 years following tetralogy of Fallot repair. The postoperative course and short-term valve function were excellent. This is the first case of a decellularized pulmonary allograft in Japan.

Conclusions: Fresh decellularized pulmonary allografts have the potential to become a new source of material for PVR in patients who have undergone right ventricular outflow tract reconstruction. (Circ J 2016; 80: 1041 – 1043)

Key Words: Decellularized pulmonary allograft; Pulmonary valve regurgitation; Pulmonary valve replacement; Tetralogy of Fallot
therefore, there is a strong need for new-concept valves with markedly improved durability. Recently, Miyazaki et al.\(^9\) reported the usefulness of fan-shaped expanded polytetrafluoroethylene (ePTFE) valved conduits with bulging sinuses at a decade follow-up. The ePTFE valves were covered by thin fibrous tissue and revealed focal regions of endothelialization, suggesting good biocompatibility; furthermore, they impeded cellular penetration and calcification. However, durability over a longer term (decades long) follow-up is unknown, and the ePTFE valve does not undergo adaptive growth in the follow-up period.

Cebotari et al.\(^10\) reported a retrospective clinical follow-up of the surgical implantation of a new-concept biological valve (fresh decellularized allograft) in children and young adults; these new valves were compared mostly with xenograft and allograft valves in pediatric cardiac surgery. The fresh decellularized allografts maintained the extracellular matrix formation, provided superior performance, and showed very promising early results concerning durability and adaptive growth. Moreover, the authors observed no evidence of significant early activation of the cellular immune response with the use of fresh decellularized pulmonary allografts, which corresponded with the excellent mid-term results of these valves in clinical use.\(^11\) Furthermore, there appeared to be autologous regeneration of these valves.

In conclusion, we present the first successful Japanese case of a decellularized pulmonary allograft (provided from Germany) being used to treat PVR. Longer-term follow-up and further studies are needed, but this new-concept biological valve may provide promising long-term results for young patients with pulmonary valve insufficiency.

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References


