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Transcatheter Pulmonary Valve Implantation in Patients with Quadricuspid Pulmonary Valve Regurgitation

Case 1: A 50-year-old female patient presented with recurrent syncope and reduced exercise tolerance. Transthoracic echocardiogram (TTE) showed severe pulmonary regurgitation (PR) (Figure 1A). Computed tomography (CT) revealed a quadricuspid pulmonary valve (QPV) with 4 equal cusps (Figure 1B). Transcatheter pulmonary valve implantation (TPVI) was chosen as the most suitable option based on the patient's clinical condition. A P36-25 mm self-expandable Venus P-valve (Venus Medtech, Hangzhou, China) was implanted (Video 1). Post-implantation angiography showed no perivalvular leakage and proper valve positioning and function (Figure 1C). At 2-year follow-up, the patient had no recurrence of syncope, and TTE showed satisfactory valve function with no perivalvular leakage (Figure 1D).

Case 2: A 35-year-old woman was admitted for TPVI. She underwent surgical repair for severe pulmonary stenosis and atrial septal defect 5 years ago, with an uneventful recovery. Transthoracic echocardiogram revealed severe PR (Figure 1E). Computed tomography imaging showed QPV with 1 rudimentary cusp (Figure 1F). the patient underwent a successful TPVI with a P32-30 mm self-expandable Venus P-valve (Figure 1G, Video 2). At the 10-year follow-up, the patient remained stable, and her TTE showed a persistently good valve function and no perivalvular leakag (Figure 1H).

Quadricuspid pulmonary valve is a rare congenital malformation that can be associated with significant valvular dysfunction and thus often requires early intervention.[1] While surgery has been the mainstay of treatment, TPVI has emerged as a promising alternative in selected cases with suitable anatomy.

These cases demonstrate the feasibility of TPVI in quadricuspid anatomy with excellent long-term efficacy. To the authors' knowledge, these are the first 2 cases reporting TPVI in QPV. Larger studies with long-term follow-up are warranted to confirm the safety and efficacy of TPVI in QPV.

E-PAGE ORIGINAL IMAGE

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Videos 1, 2: The final pulmonary angiogram reveals the valve implanted in the pulmonary trunk, with no residual pulmonary regurgitation detected.

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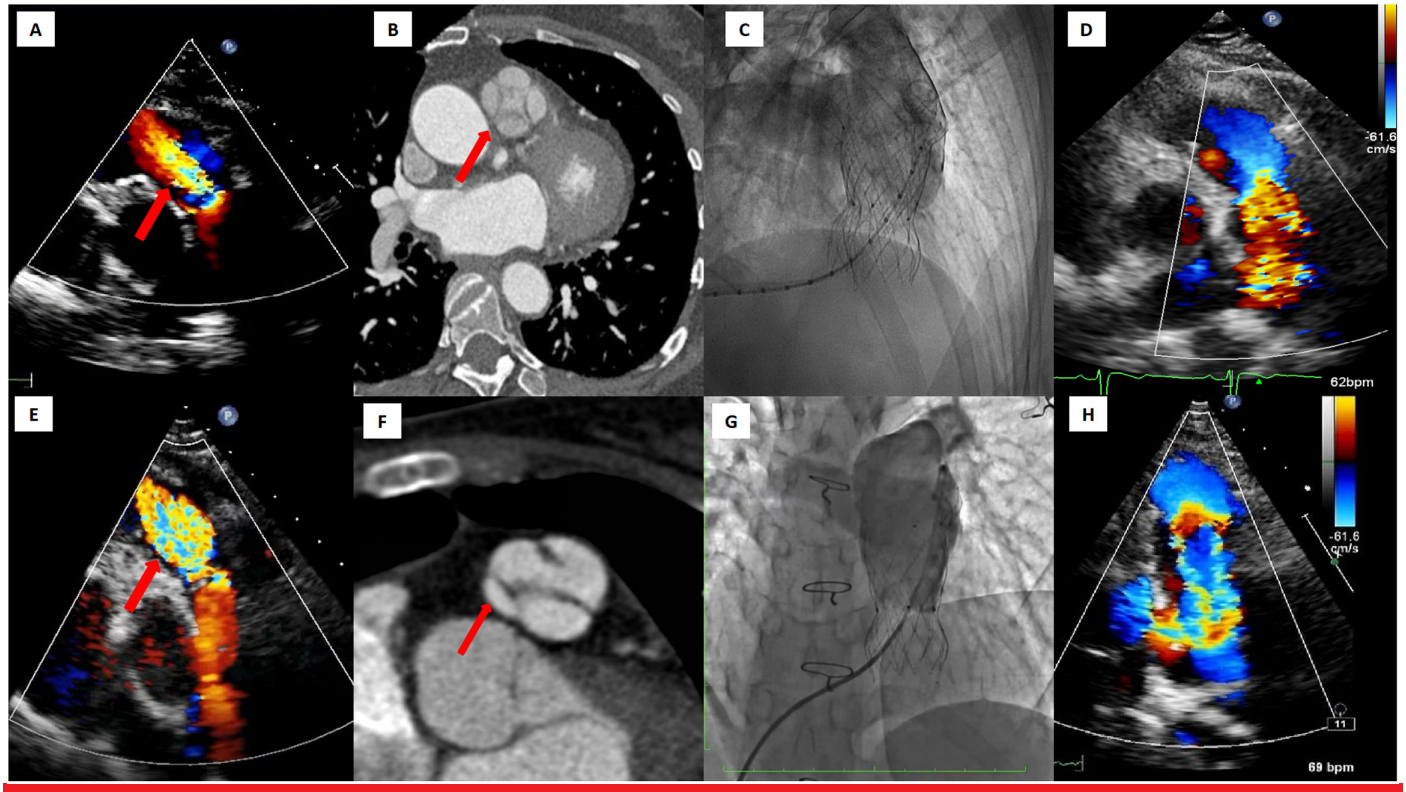

Figure 1. Case 1. (A) Transthoracic echocardiogram (TTE) shows severe pulmonary valve regurgitation. (B) Reconstructed Computed tomography (CT) angiography shows a quadricuspid pulmonary valve with 4 symmetrical cusps (arrow). (C, D) The result of transcatheter pulmonary valve implantation with no pulmonary regurgitation. Case 2. (E) Transthoracic echocardiogram shows severe pulmonary valve regurgitation. (F) Reconstructed CT angiography shows a quadricuspid pulmonary valve with 1 rudimentary cusp (arrow). (G, H) The result of transcatheter pulmonary valve implantation with no pulmonary regurgitation.

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