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Extrinsic Compression of the Left Anterior Descending Coronary Artery During Percutaneous Pulmonary Valve Implantation

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A 49-year-old man with a history of Ross procedure 7 years prior because of bicuspid aortic valve and bacterial endocarditis developed a symptomatic pulmonary homograft dysfunction (peak systolic transvalvular gradient of 98 mm Hg with moderate insufficiency) and right heart failure (Figs. 1A and 1B, Online Video 1). Because of the high surgical risk, percutaneous pulmonary valve implantation (PPVI) was planned. Pulmonary homograft valvuloplasty using an 18/30-mm Mullin-X balloon catheter was conducted (Fig. 1C, Online Video 2), followed by placement of a 35XL Andra stent (Andramed Gmbh, Reutlingen, Germany) (Fig. 1D, Online Video 3), with simultaneous selective coronary angiography, verifying patency of the left coronary artery. Because of stent underexpansion, balloon post-dilation was performed, causing asymmetric stent expansion (Fig. 1E) and

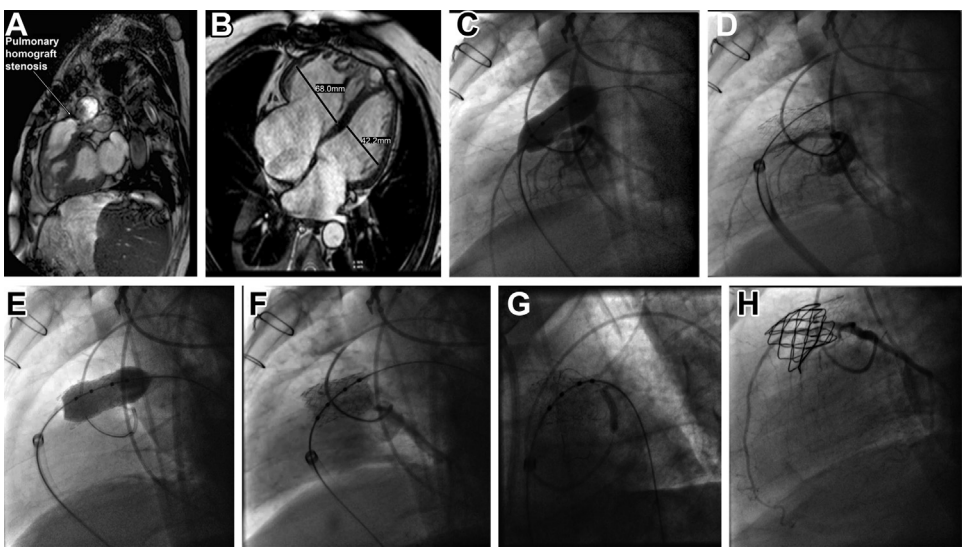

Figure 1. Cardiac Magnetic Resonance and Angiographic Images of the Narrowed Pulmonary Conduit, Severe Right Ventricular Dilation, and PPVI Procedure

(A) Cardiac magnetic resonance images showing turbulent flow within the tubular part of the stenotic pulmonary homograft and **(B)** enlargement of the right heart chambers. **(C)** Fluoroscopic images showing balloon valvuloplasty of the stenotic pulmonary homograft, **(D)** patency of left coronary artery after placement of the Andra stent in the stenotic pulmonary homograft, **(E)** post-dilation of the Andra stent, **(F)** extrinsic compression of the left anterior descending coronary artery (LAD) after post-dilation of the Andra stent, **(G)** implantation of a bare-metal stent from the distal left main to the LAD, and **(H)** the final result after the implantation of an 18-mm Melody Valve, preserving the coronary flow in the LAD (Online Videos 1 to 6).

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extrinsic compression of the ostial left anterior descending coronary artery (LAD) (Fig. 1F, Online Video 4). Immediately, coronary angioplasty with implantation of a bare-metal stent 3.5/23-mm from the distal left main to the proximal LAD (Fig. 1G, Online Video 5) was performed, recovering coronary blood flow and hemodynamic stability. The echocardiogram revealed normal left ventricular function without mechanical complications. PPVI with an 18-mm Melody valve (Medtronic Inc., Minneapolis, Minnesota) was then successfully accomplished (Fig. 1H, Online Video 6). Clinical follow-up at 6 months confirmed a remarkable improvement in the patient's functional class and symptoms.

PPVI is increasingly being used among adult interventional cardiologists (1) because of its lower morbidity, good patient acceptance, and efficacy. Coronary artery compression is an extremely rare and life-threatening procedure-related complication described mainly in children following repair of various forms of congenital heart disease or related to coronary anomalies (2). Even with documentation of unimpaired coronary flow with maximal balloon inflation, a provisional and protective approach before valve implantation (e.g., placement of an intracoronary wire in the LAD) must be taken into consideration in selected high-risk cases.

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APPENDIX

For accompanying videos, please see the online version of this paper.