A 62-year-old man was referred for shortness of breath and exercise intolerance. Three years earlier, he had presented an inferior myocardial infarction treated by right coronary artery stenting. Because of the development of papillary muscle and ventricular septal rupture, mitral valve replacement (Medtronic 27-mm Mosaic bioprosthesis) and repair of the ventricular septal defect (VSD) using a bovine pericardial patch had subsequently been performed. Residual VSD was detected by echocardiography (Panel A and B, Supplementary data online, Video S1). Left ventricular ejection fraction was 40%. On cardiac catheterization, QP/QS ratio was 2.0. The detection of a mean mitral prosthesis pressure gradient of 10 mmHg (Panel F) raised the suspicion of prosthesis dysfunction that, however, was subsequently ruled out by transoesophageal echocardiography (Panel C, Supplementary data online, Video S2). The VSD was successfully closed using a percutaneous approach (Occlutech mVSD Occluder 12/19 mm, Panels D and E, Supplementary data online, Video S3). The mean mitral pressure gradient dropped to 5 mmHg (Panel G), in the absence of changes in heart rate and diastolic filling period. The patient became thereafter asymptomatic.

Because pressure gradient is proportionate to the square of mean flow rate, high flow rate only marginally increases pressure gradient in a normal native mitral valve. By contrast, in the presence of VSD-related increased pulmonary flow, the mild obstruction inherent to a normally functioning mitral prosthesis may result in the development of a significant resting pressure gradient, which may simulate prosthetic dysfunction. In such case, the beneficial effects of VSD closure include the reduction in transmural pressure gradient.

(Panels A and B, Supplementary data online, Video S1) Transthoracic modified apical four-chamber view showing the VSD. (Panel C, Supplementary data online, Video 2) Mid-diastolic 3D transoesophageal echocardiographic view showing normal motion of mitral bioprosthesis leaflets. (Panels D and E, Supplementary data online, Video S3) Transthoracic modified apical four-chamber view obtained after closure of the VSD, showing the absence of significant residual shunt. (Panels F and G) Continuous wave Doppler interrogation of the mitral valve obtained from the apex. The 10 mmHg mean transmural pressure gradient drops to 5 mmHg after VSD closure. MPG, transmural pressure gradient.

Supplementary data are available at European Heart Journal - Cardiovascular Imaging online.