Severe late (16 years) dysfunction of a bioprosthesis in the mitral valve position without dysfunction of a bioprosthesis in the aortic valve position

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Figure. Echocardiographic and gross anatomic images of the bioprosthesis in the mitral valve position for 16 years showing severe bioprosthetic regurgitation. (a) A midesophageal 4-chamber view showing 3 distinct defects in the porcine cusps (arrows). (b) A magnified image in the same projection showing multiple color flow jets with severe mitral regurgitation through the cusps. There was no perivalvular leak. (c) The excised bioprosthesis with 3 perforations in the cusps (arrows). This is a classic example of structural porcine bioprosthetic deterioration.

A man who was born in 1939 underwent replacement of both mitral and aortic valves with porcine bioprostheses in 1987 (age 48). Thereafter, he was asymptomatic until 2003 (age 64), when he developed signs and symptoms of heart failure. Cardiac catheterization in late 2003 disclosed the following pressures in mm Hg: pulmonary artery, 70/31; right ventricle, 70/18; right atrial mean, 9; pulmonary artery wedge mean, 30, with v waves averaging 54; left ventricle, 108/25; and aorta, 104/65. Left ventricular angiography disclosed a normalized left ventricular cavity and severe mitral regurgitation. Aortic root angiogram disclosed trace aortic regurgitation. The preoperative echocardiogram and the operatively excised (late 2003) bioprosthesis, which had been in the mitral valve position, are shown in the *Figure*. Coronary angiography preoperatively showed insignificant coronary arterial narrowing.

This case demonstrates that when bioprostheses are placed in both mitral and aortic valve positions during the same operation, the bioprosthesis in the mitral valve tends to degenerate more rapidly than a similar bioprosthesis in the aortic valve (1). The likely reason is that the closing pressure exerted on the mitral

bioprosthesis is the left ventricular systolic pressure, whereas the closing pressure exerted on the aortic prosthesis is the aorta's diastolic pressure, which in general is about a third lower than the left ventricular peak systolic pressure. In the present patient, the left ventricular peak systolic pressure was 108 mm Hg and the aorta's end-diastolic pressure was 65 mm Hg, a 40% difference.

1. Warnes CA, Scott ML, Silver GM, Smith CW, Ferrans VJ, Roberts WC. Comparison of late degenerative changes in porcine bioprostheses in the mitral and aortic valve position in the same patient. *Am J Cardiol* 1983;51:965-968.

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