Treatment of iatrogenic acute mitral regurgitation

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Familial hypercholesterolemia is a severe genetic disease that is characterized by high levels of low-density lipoprotein cholesterol with cutaneous xanthomas and aorta-coronary arteriosclerosis. Also, aortic valve disease is common in these patients, but mitral valve involvement is very uncommon.^{1,2}

In December 2000, a 27-year-old woman who was given a diagnosis of familial hypercholesterolemia 3 years ago was admitted to the Ankara University Faculty of Medicine Cardiovascular Department with chest pain ending in 10 minutes and dyspnea for 2 years. Plasmapheresis was performed 6 times, and she was taking 40 mg of atorvastatin once a day.

In the physical examination there were xanthomas in her hands, legs, knees, and lumbosacral areas and xantholemmas in her eyelids. Also, a 4° to 6° systolic ejection murmur, radiating to the neck, was audible in all listening areas.

As determined with coronary angiography, the ventriculogram showed no abnormalities, but there were severe lesions in the left anterior descending, the right coronary, and the circumflex arteries, with a subvalvular aortic gradient of 65 mm Hg.

As determined with transthoracic echocardiography, the aortic root was 2.2 cm, and the maximum aortic gradient was 67 mm Hg, whereas pulmonary artery pressure was 30 mm Hg. The aortic leaflets were thicker, with calcified nodules. As determined with transesophageal echocardiography (TEE), the aortic root was 1.7 cm, and the maximum aortic gradient was 115 mm Hg.

The patient was given a diagnosis of 3-vessel disease and aortic stenosis, and aortic valve replacement and coronary artery bypass grafting were planned.

After a median sternotomy, the right and left internal thoracic arteries were prepared for the left anterior descending and right coronary arteries, and a saphenous vein graft was prepared for the circumflex artery. Arterial cannulation to the ascending aorta and 2-stage venous cannulation to the right atrial appendage were performed; then the patient was cooled to 32°C. Topical cooling with ice slush was also used, and cardiac arrest was achieved with tepid

blood cardioplegia. First, distal anastomoses were performed during crossclamping. Then the aortic valve was opened. The root was narrow, calcific, and cone shaped. The aortic root was enlarged with the Manouguian procedure, and the valve was replaced with a Sorin 21 bileaflet mechanic valvular prosthesis (Sorin Biomedica Spa, Saluggia, Italy). After the proximal aorta-saphenous anastomosis and reaching a rectal temperature of 36°C, we tried to wean the patient off of cardiopulmonary bypass (CPB), but both ventricles were distended, and left atrial pressure increased. Intraoperative TEE was performed, and 3° to 4° mitral valvular insufficiency was detected. Then we restarted CPB, the left atrium was opened, and a thin anterior mitral leaflet and impaired movement of the valve caused by the patch were seen. The mitral valve was replaced with a Sorin 27 bileaflet mechanical bioprosthesis by protecting the anterior and posterior leaflets, and we weaned the patient from CPB. The patient remained in the cardiovascular intensive care unit for 2 days and was moved to the ward without any inotropic support.

The maximum aortic gradient was 42 mm Hg, and the mean gradient was 24 mm Hg. Also, the function of mitral and aortic prostheses was normal. The patient was discharged on the tenth day with warfarin, aspirin, and atorvastatin without any problem.

Discussion

Characteristically, coronary artery disease is common in patients with familial hypercholesterolemia, and atheromatous changes always exist at the aortic root and valves. Lipid infiltration causes accumulation and thickening at the aortic cusps and a decrease in mobility. Aortic stenosis at the level of the root and valve is common, but mitral valvular lesions are uncommon.^{1,2}

In our case aortic stenosis was present with severe coronary lesions. In addition to coronary bypass, we enlarged the aortic root with the Manouguian procedure and replaced the aortic valve, but the Dacron graft placed caused acute iatrogenic mitral insufficiency at the anterior leaflet. There was 3° to 4° mitral insufficiency on TEE. Later, we could wean the patient from CPB without any problem by replacing the mitral valve.

Manouguian aortic root enlargement was first defined by Manouguian and colleagues in 1979.³ Because it was indicated in the first report, one of the most important complications of the Manouguian procedure is iatrogenic mitral regurgitation.^{3,4} If this occurs, a second operation is usually required. When performing the Manouguian procedure, one must also perform mitral valve replacement if the mitral annulus is enlarged too much.⁵ In our case, after we performed the Manouguian procedure, we could not wean the patient from CPB. Grade 3-4 mitral insufficiency was detected during perioperative TEE, after which we performed mitral valve replacement, and then we could wean the patient from CPB without any problem.

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