SEGMENTAL ASYNERGY OF THE LEFT VENTRICLE IN A CASE OF TIGHT AORTIC STENOSIS ASSOCIATED WITH MILD ISCHEMIC HEART DISEASE

Kanji Iga, M.D., Kenjiro Hori, M.D., Tadashi Matsumura, M.D.
Hiromitsu Gen, M.D., Yutaka Okita, M.D.
and Shigeo Miki, M.D.

Emergency aortic valve replacement with double aorto-coronary bypass surgery was performed to treat severe intractable congestive heart failure in an 82-year-old man. Mild circumflex and left anterior descending artery lesions were present and the pressure gradient across the aortic valve was 80 mmHg despite a low cardiac output. The preoperative anteroseptal akinesia seen by two-dimensional echocardiography was normalized after surgery. Thus, even in patients with segmental left ventricular dysfunction, tight aortic stenosis might be present when concomitant mild ischemic heart disease is present.

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SEGMENTAL left ventricular dysfunction is usually caused by ischemic heart disease, and stunned or hibernating myocardium is a reversible form of such dysfunction.

We described here a patient who had reversible segmental asynergy of the left ventricle and tight aortic stenosis associated with mild ischemic heart disease.

CASE REPORT

The patient was admitted to our hospital with rapidly progressive dyspnea of 2 days' duration. As pulmonary edema was severe, he was transferred to the intensive care unit and respiratory support was begun. On physical examination, the blood pressure was 110/80 mmHg and the pulse rate was 96 beats/min. A grade 1/6 systolic murmur and a crepitation were heard over the entire chest. Electrocardiography showed a QS pattern in leads V1 and V2 and ST segment depression in V3 through V5. Chest radiographs revealed pulmonary edema, while two-dimensional echocardiography showed left ventricular enlargement with anteroseptal akinesia and normal posterior wall motion (Fig. 1-A). Echogenicity was increased at the aortic valve, but the peak velocity across the valve could not be obtained by continuous-wave Doppler echocardiography due to the poor echo response of this subject. Serial measurement of the serum creatine phosphokinase level showed no increase. A Swan-Ganz catheter showed that the pulmonary capillary wedge pressure was 22 mmHg and the pulmonary artery pressure was 45/20 mmHg. The cardiac index was 1.91 l/min/m² by the thermodilution method. As his congestive heart failure could not be controlled with medications, emergency coronary angiography was performed; this showed mild lesions in both the

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Department of Cardiology, Tenri Hospital
Mailing address: Kanji Iga M.D. Department of Cardiology, Tenri Hospital, 200 Mishimacho, Tenri City 632, Japan
Fig. 1. A: Coronary angiography showed no significant stenosis on the right, but mild stenotic lesions were seen in both the left anterior descending and circumflex arteries.
B: Pull-back pressure recording from the left ventricle to the ascending aorta. The peak-to-peak gradient was 80 mmHg.

Fig. 2. A: Two-dimensional echocardiography performed at the time of congestive heart failure shows akinesia in the anteroseptal and apical regions and normal posterior wall motion.
B: Two-dimensional echocardiography 45 days after surgery shows mild concentric hypertrophy of the left ventricle and normal left ventricular wall motion.

left anterior descending artery (LAD) and the circumflex artery (LCX) (Fig. 2). The pressure in the ascending aorta was 95/62 mmHg with a slow upstroke, and calcification was seen in the aortic valve. The left ventricular pressure was 170/22 mmHg and a
pull-back tracing revealed an 80 mmHg peak-to-peak pressure gradient between the left ventricle and the aorta (Fig. 2). Aortic valve replacement (AVR) with a Carpentier-Edwards bovine xenograft (24A) and double aorto-coronary bypass were performed. The postoperative course was uneventful, and two-dimensional echocardiography at 45 days after surgery showed the complete resolution of left ventricular anteroseptal akinesia (Fig. 1-B).

DISCUSSION

In response to chronic pressure overload, concentric hypertrophy occurs to normalize left ventricular wall stress! An inverse linear relation exists between left ventricular wall stress and the ejection fraction. When left ventricular motion is impaired in association with increased afterload, the decrease in the ejection fraction is not ascribable to true myocardial depression but to increased afterload, and this situation is called afterload mismatch. The disturbance of left ventricular wall motion seen in patients with afterload mismatch is uniform rather than segmental, and an improvement in ejection fraction can be expected when the increased afterload is corrected. On the other hand, when left ventricular motion is markedly or segmentally impaired in patients with aortic stenosis and congestive heart failure, AVR can no longer normalize left ventricular motion because the presence of concomitant myocardial disease is likely?

The patient described here suffered from severe intractable congestive heart failure associated with anteroseptal akinesia. Emergency coronary angiography showed mild atherosclerosis in the LAD and LCX, which could not in itself explain the patient’s severe segmental asynergy. Tight aortic stenosis was confirmed by cardiac catheterization. As the anteroseptal akinesia disappeared completely after successful AVR and aorto-coronary bypass surgery, this segmental asynergy was apparently due to the combined effect of tight aortic stenosis superimposed on mild ischemic heart disease.

The prognosis of congestive heart failure in patients with pure tight aortic stenosis is very poor, so surgical replacement or balloon valvuloplasty is mandatory even in the elderly. Afterload-reducing agents are deleterious for patients with tight aortic stenosis. Therefore, the diagnosis of this condition is very important because it is correctable by the appropriate interventions. The noninvasive diagnosis of aortic stenosis associated with congestive heart failure is difficult in the elderly due to the paucity of peripheral signs. With the development of continuous-wave Doppler echocardiography, the pressure gradient across the aortic valve can be accurately estimated, but directing the echo beam parallel to the aortic flow remains difficult in the elderly. The presence of tight aortic stenosis should be considered when an aortic flow murmur is audible in elderly patients who have severe congestive heart failure associated with segmental left ventricular asynergy, if echocardiography fails to produce adequate information concerning the aortic valve.

REFERENCES