

Subaortic membrane in an adult patient with coronary artery disease

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ABSTRACT

A case of subaortic membrane with coronary artery disease in a 48-year-old man is described. He was referred to our hospital for cardiac murmur, which was discovered on routine clinical examination. He had no significant past medical history apart from dizziness while exercising. Subaortic membrane was totally excised; left internal thoracic artery was anastomosed to left anterior descending artery by end-to-side technique. The postoperative 2-year course of the patient was uneventful.

Saudi Med J 2005; Vol. 26 (1): 127-129

Congenital aortic stenosis results from an obstruction of the left ventricular outflow tract (LVOT). Subaortic stenosis is less common than aortic valve stenosis. Subvalvular aortic stenosis accounts for 8-30% of patients with congenital LVOT obstruction.¹ Structurally membranous or fibromuscular subaortic stenosis was located a few millimeters below the aortic valve.² The discrete form of subvalvular aortic stenosis has been classified as either a thin, fibrous membrane (type I) or a thicker fibromuscular band (type II).² Subaortic membrane in adults is not common, and subaortic membrane associated with coronary artery disease in an adult is not yet found in literature. We present an adult patient with subaortic membrane associated with coronary artery disease in this report.

Case Report. A 48-year-old man complained with dizziness on exertion for one year. There were no anginal symptoms. Risk factors were hypercholesterolemia, smoking and a family history of coronary artery disease. Physical examination showed normal arterial blood pressure (120/85 mm

Hg) and no findings of congestive heart failure and palpable thrill. On auscultation, a grade 4/6 systolic ejection murmur was heard on the left lower sternal border and was well transmitted to the apex. First and second heart sounds were normal. Pulmonary examination, biochemical screening and chest x-ray revealed no abnormalities. The electrocardiogram was normal with a sinus rhythm at 85 beats per minute. Echocardiography visualized a linear, discrete, circular of bright echo just below the aortic valve (**Figure 1**). There was also no aortic regurgitation and abnormal motion of the leaflets. There was a 60 mm Hg pressure gradient among the aorta, subaortic chamber and left ventricle at cardiac catheterization. At coronary angiography, 80% stenosis of proximal left anterior descending artery (LAD) was found (**Figure 2**). The patient underwent open-heart surgery several days later. Subaortic membrane was totally excised following transverse aortotomy. The discrete subaortic membrane originated from the commissure between the left and the right coronary cusps. It was extending toward the commissure between the right and the

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Received 10th July 2004. Accepted for publication in final form 27th September 2004.

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noncoronary cusps (Figure 3). The fibrous component of the obstruction has been enucleated, any myectomy was not judged as necessary. LITA was anastomosed to LAD by end-to-side technique. Echocardiography showed minimal subaortic gradient and aortic regurgitation after the operation. The postoperative course was uneventful, and the patient was discharged from the hospital on the 7th postoperative day.

Discussion. Cheevers³ recorded the first description of subvalvular aortic stenosis in 1842. The etiologic factors for the discrete form of subvalvular aortic stenosis occur due to congenital, inflammatory, genetic and acquired causes.^{3,4} Fixed subaortic stenosis can be discrete or diffuse. The most common type of discrete stenosis is made of a crescent or, less common, a complete ring of fibrous tissue that lies 5-10 mm beneath the aortic valve.⁵ Morphologically, subaortic stenosis is a pathological complex, part of which is an endocardial abnormality. The abnormality involves not only the subaortic ridge but also the leaflets of the adjacent valves.⁶ Histologically, these membranous structures were composed entirely of fibroelastic tissue.^{7,8}

Discrete subaortic stenosis is a progressive cardiac abnormality in which the LVOT is obstructed by subvalvar fibromuscular tissue. Aortic insufficiency is the most common acquired lesion of the aortic valve in a discrete form of subvalvular aortic stenosis. This may result from trauma to the valve leaflets by the abnormal jet flow pattern caused by the lesion.⁹ However, there were no preoperatively aortic insufficiency by echocardiography and aortography in the present case.

Two major problems may occur after operation. First, it causes damage to the aortic valve resulting in aortic regurgitation with mild gradients. Indeed, minimal aortic insufficiency with gradient was found postoperatively by echocardiography in our patient, but it was clinically insignificant. Second, there is a high recurrence rate after surgical resection. On follow up echocardiography, before discharge and 2 years after surgery, residual or recurrence of the subaortic membrane was not determined in our case. Transthoracic echocardiography was accurate enough to describe the subaortic membrane and motion of the leaflets in our case. At age 48, the patient had cardiac catheterization and coronary arteriography. Aortography demonstrated the presence of subvalvular obstruction without valvular obstruction and aortic regurgitation. A peak systolic outflow gradient of 60 mm Hg was noted at cardiac catheterization. Also, coronary angiography showed



Figure 1 - Subaortic membrane demonstrated by echocardiography.

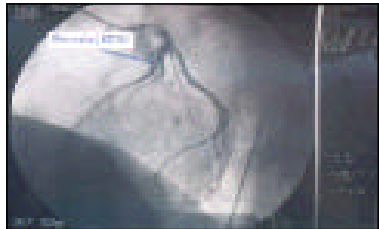


Figure 2 - Coronary angiography demonstrated 80% stenosis of proximal left anterior descending artery.



Figure 3 - The operative view of the subaortic membrane.

80% stenosis of the proximal LAD. Two different reports showed that incidence of long term complications is related to the residual gradient after operation.^{10,11} Parry et al¹² described in a recent study that an aggressive surgical approach to discrete subaortic stenosis produces excellent relief of the obstruction, significantly reducing the associated aortic regurgitation at midterm follow up. In addition, the authors preferred a very aggressive (if necessary) myectomy to relieve the obstruction. Rayburn et al¹³ reviewed their 14-year experience with 23 patients who have undergone operation for discrete membranous subaortic stenosis. They found that the aggressive myectomy in concert with membrane resection constitutes a safe treatment for discrete membranous subaortic stenosis and is associated with low rate complications.¹³ In this case, the muscular component that has not been found as part of discrete obstruction remains intact. Complete relief of the LVOT obstruction can be obtained by enucleation alone and no myectomy was required.

A patient with subaortic membrane seldom reaches the period of adulthood without symptoms. In addition, coronary artery disease may be seen in a person at the age of 48. We were the first to meet such extreme condition. The outcome has been excellent in this case by surgical procedure.

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