Case reports

Annuloaortic ectasia in a case of Takayasu's arteritis associated with Hashimoto's disease

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SUMMARY A 51 year old woman was diagnosed as having Hashimoto's disease and annuloaortic ectasia associated with severe aortic regurgitation. The histology of the wall of the ascending aorta showed typical features of Takayasu's arteritis. Though almost all cases of annuloaortic ectasia have been ascribed to cystic medial necrosis of the aorta with or without stigmata of Marfan's syndrome, Takayasu's arteritis should be considered as one of the aetiologies of annuloaortic ectasia with severe aortic regurgitation.

Annuloaortic ectasia is a disease with an idiopathic aneurysmal dilatation of the ascending aorta and aortic annulus and is frequently associated with aortic regurgitation.¹ The aetiology of annuloaortic ectasia has been ascribed to cystic medial necrosis, with or without stigmata of Marfan's syndrome, in virtually all cases.¹⁻⁴ It is also known that Takayasu's arteritis is complicated by aneurysmal dilatation of the ascending aorta and/or aortic regurgitation.⁵⁻⁸ The degree of aortic regurgitation, however, is usually mild, and patients with both Takayasu's arteritis and severe aortic regurgitation are rare. We report here a case of Hashimoto's disease and annuloaortic ectasia caused by Takayasu's arteritis in a 51 year old woman who was successfully treated by repairing the dilated ascending aorta and replacing the aortic valve.

Case report

A 51 year old woman was referred to our clinic in September 1980 because of orthopnoea and palpitation. A heart murmur had been detected in 1962. She had had left shoulder pain for 11 years and the clinical diagnosis was an aneurysm of the ascending aorta with aortic regurgitation. She had also had a goitre for 10 years.

Physical examination suggested the presence of severe aortic regurgitation complicated by left sided heart failure. The goitre was hard (right lobe 4×2.5 cm, left lobe 3.5×2.5 cm). She was thin (156 cm, 42 kg), but had no arachnodactyly, deformity of the thorax, or dislocation of the lenses. There were no abnormalities of the ocular fundi.

The chest x-ray film showed distinct cardiomegaly (cardiothoracic ratio 76%) with a pronounced

dilatation of the ascending aorta and left ventricular enlargement (Fig. 1A). An electrocardiogram showed a conspicuous left axis deviation, bi-atrial overload, and considerable left ventricular hypertrophy. C-reactive protein was 2+ and the erythrocyte sedimentation rate (Westergren) in one hour was 37 mm. Triiodothyronine was 1.38 nmol/l (0.9 ng/ml) (normal range 1.38 to 3.23 nmol/l), thyroxine 68.21 nmol/l (5.3 µg/dl) (normal range 51.48 to 180.18 nmol/l), thyroid stimulating hormone 97.9 µU/ml (1 to 5), thyroid test 102400X, and microsome test 102400X. A thyroxine stimulating hormone test resulted in a normal increase in thyroid stimulating hormone but no increase in the levels of thyroxine or triiodothyronine. After the congestive heart failure had been treated with diuretics and digitalis, catheterisation was carried out. An aortogram disclosed an aneurysmal dilatation of the ascending aorta associated with severe aortic regurgitation (Fig. 1B). There were no other stenotic or dilated regions in the aorta or its main branches. Histological examination of the thyroid gland showed fibrosis and chronic infiltration of inflammatory cells with lymph follicle formation in the interstitial spaces, atrophied follicles, and acidophilic degeneration of the follicular cells (Fig. 2). The preoperative diagnosis was an annuloaortic ectasia with severe aortic regurgitation complicated by Hashimoto's disease.

Surgical treatment of the annuloaortic ectasia with severe aortic regurgitation, consisting of an aortic graft and aortic valve replacement, was performed. The dilated ascending aorta was inflamed and adhered to the adjacent tissues. The aortic annulus was intact but moderately dilated. This was thought to be secondary to the dilatation of the ascending aorta.

Histological examination of the aortic wall showed

Fig. 1 A chest x-ray (A) and aortogram (B). The chest x-ray shows pronounced cardiomegaly and pulmonary congestion. The aortogram of the ascending aorta shows an aneurysmal dilatation of the ascending aorta associated with severe aortic regurgitation (Seller's classification IV). Ao: ascending aorta, AoV: aortic valve.

pronounced proliferation of the connective tissue which tended to hyalinisation. There was perivascular infiltration of lymphocytes, plasma cells, and mononuclear cells in the adventitia. The media showed chronic granulomatous inflammatory changes represented by several epithelioid cells and a few giant

cells, and destruction of the elastic fibres and internal elastic lamina. The intimal thickening consisting of fibrinoid and fibrous tissue was uniform and devoid of elastic fibres (Fig. 3). After the operation the patient completely recovered and the symptomatic improvement was remarkable.

Fig. 2 Histology of the thyroid gland (original magnification $\times 100$): chronic infiltration of inflammatory cells with lymph follicle formation is present. Follicular cells are atrophied and acidophilically degenerated.

Fig. 3 Histology of the wall of the ascending aorta: Haematoxylin-eosin staining (A) and elastic van Gieson staining (B) (original magnification $\times 20$). There is an obvious fibrous thickening with hyalinisation and perivascular inflammatory infiltrate in the adventitia. The media is very thin with destruction of elastic fibres and shows chronic granulomatous inflammation containing a few giant cells (C) (original magnification $\times 400$). In the intima, there is much thickening devoid of elastic fibres.

Discussion

We treated a 51 year old woman who had Hashimoto's disease and annuloaortic ectasia caused by Takayasu's arteritis. The preoperative diagnosis of annuloaortic ectasia was made on the basis of the angiographic findings of dilatation of the ascending aorta and aortic annulus associated with severe aortic regurgitation. The diagnoses of Hashimoto's disease and Takayasu's arteritis were made on the basis of the histological findings from the thyroid gland and the aortic wall, respectively. Giant cell arteritis was excluded since there was no involvement of temporal arteries or other medium sized muscular arteries. In addition, the primary lesion of the aortic wall was in the adventitia, not in the media or the intima, and furthermore the disease had probably begun earlier when the patient was found to have had a heart murmur at the age of 33.

The term annuloaortic ectasia was first used by Ellis *et al.*¹ in 1961 to describe an aneurysmal dilatation of the ascending aorta and aortic annulus frequently associated with valvular regurgitation. They also mentioned that the basic structural defect in the aortic wall in a case of annuloaortic ectasia may be cystic medial necrosis which may or may not be accompanied by stigmata of Marfan's syndrome, which is thought to be transmitted in an autosomal dominant manner. In fact some degree of cystic medial necrosis with annuloaortic ectasia is found in virtually all cases of Marfan's syndrome² and aortic rupture is one of the major causes of death. Wagenvoort *et al.*³ found that Marfan's syndrome and idiopathic dilatation of the ascending aorta were virtually identical in the gross and histological findings in the cardiovascular system. Emanuel *et al.*⁴ reported that 25 (37.3%) of the 67 first degree relatives

had one or more stigmata of Marfan's syndrome, including cardiovascular abnormalities affecting the aortic valve or aortic wall in six (9%) of the 67 examined, skeletal abnormalities in 18 (26.9%), and ocular abnormalities in five (9.8%) of 51. Thus, it has been thought that in the definitive form and in "formes frustes" of Marfan's syndrome, cystic medial necrosis is responsible for the aneurysmal dilatation of the ascending aorta and aortic annulus. To our knowledge, however, there is no report which has referred to other causative disorders of annuloaortic ectasia.

On the other hand, in some cases of Takayasu's arteritis, aneurysm or aneurysmal dilatation of the aorta and/or its main branches can occur with or without stenotic lesions.⁵⁻⁹ Nasu⁸ reported that in 76 cases coming to necropsy in Japan, 14 (18%) had an aneurysm of the aorta and its main branches, and 18 (24%) had aneurysmal dilatation, and he emphasised the clinical importance of aneurysmal changes among the various manifestations of Takayasu's arteritis. Saito⁹ found that the longer the history of the disease, the greater the tendency toward an aneurysm. In our patient, who had a long history of Takayasu's arteritis, it was suggested that it was not Marfan's syndrome, but aneurysmal change of the ascending aorta typical of Takayasu's arteritis that induced annuloaortic ectasia associated with severe aortic regurgitation. Thus, annuloaortic ectasia may be heterogeneous in aetiology and Takayasu's arteritis may be one of the aetiologies of annuloaortic ectasia with severe aortic regurgitation. In comparing Takayasu's arteritis with Marfan's syndrome there are considerable differences with regard to their natural history and treatment. It should be emphasised that in patients with annuloaortic ectasia, attention should be given to Takayasu's arteritis in

addition to Marfan's syndrome, especially in cases of young women with weak or no arterial pulsation and positive signs of systemic inflammation.

Our patient also had Hashimoto's disease, one of the most typical autoimmune diseases.¹⁰ It is uncertain, however, whether this association of Takayasu's arteritis and Hashimoto's disease was a fortuitous one or caused by a single process such as an autoimmune disorder.

We thank Drs H Kohno, J Tanaka and K Tokunaga for their surgical assistance and M Ohara for comments on the manuscript.

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