Chronic coronary periarteritis in two patients with chronic periaortitis

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SUMMARY Two cases of chronic coronary periarteritis associated with chronic periaortitis are described. In one, the chronic periaortitis took the form of perianeurysmal fibrosis around a thoracic atherosclerotic aneurysm; in the other it resembled idiopathic retroperitoneal fibrosis. The findings in the two subjects support the unifying concept of chronic periaortitis, to include conditions previously known as idiopathic retroperitoneal or mediastinal fibrosis, perianeurysmal retroperitoneal fibrosis and inflammatory aneurysms of the aorta. The observations are also compatible with the view that the disease is due to hypersensitivity to atheroma.

Chronic inflammation and fibrosis centred on the undilated abdominal or thoracic aorta is referred to as idiopathic retroperitoneal or mediastinal fibrosis.¹ Similar inflammation surrounding atherosclerotic aneurysms of the aorta has been called perianeurysmal retroperitoneal fibrosis by some² and "inflammatory aneurysm" by others.³ The histological appearances of the periaortic inflammation are indistinguishable in all these conditions and it has therefore been suggested they should all be referred to as "chronic periaortitis".^{4,5}

Entirely similar chronic inflammation and fibrosis has occasionally been reported around a coronary artery, in patients with chronic periaortitis, and has been held to support the arterial/aortic origin of the disease.^{4–6} Two recent necropsy subjects showing chronic coronary periarteritis in association with chronic periaortitis are therefore of interest.

Case reports

CASE 1

A 65-year-old man with angina pectoris complained of dysphagia. Investigation, including an aortogram, revealed a saccular aneurysm (5 cm diameter) of the descending thoracic aorta. At thoracotomy the aneurysm was adherent to the oesophagus, left main bronchus and the left lower lobe of the lung. It was dissected free, resected and the aorta repaired with a Dacron patch. Some post-operative bleeding was dealt with, but 17 days after the original operation the patient suffered a cardiac arrest and died despite

attempts at resuscitation.

At necropsy the aortic patch was intact. Numerous small areas of old and recent myocardial infarction were found in the lateral and septal walls of the left ventricle. The descending aorta and all its major branches showed very severe atherosclerosis but no other aneurysms nor adventitial fibrosis. The right coronary artery was occluded by recent thrombus 2 cm from its origin. The severely atherosclerotic anterior descending branch of the left coronary artery was surrounded 3 cm from its origin by a cuff of what appeared to be fibrous tissue (1 cm long × up to 0.5 cm diameter). There were no other significant findings.

Histological examination of the surgically-removed aneurysm showed that its wall was composed of adventitial fibrous tissue (up to 1 cm thick) surrounding a mass of atheromatous debris and overlying thrombus, protruding through a complete breach of the aortic media (Fig. 1a). Within the fibrous tissue the predominant, dense inflammatory infiltrate consisted of plasma cells and lymphocytes. There were also several foci of macrophages and multinucleate giant cells around atheromatous material, including cholesterol clefts and Oil Red O-positive lipid ("ceroid") which had not been dissolved out in the preparation of the paraffin sections. Haemosiderin-laden macrophages were present in small numbers. There was one small focus of granulation tissue containing neutrophils. Stains for micro-organisms were negative. The outer edge of the specimen included a very thin layer of adherent lung tissue, the pleural cavity having obviously been locally obliterated by the fibrosis. Only one of the

sections of aorta taken at necropsy showed any similar adventitial fibrosis. This was also at a site, in the thorax, where an atherosclerotic plaque protruded

through the media. The inflammatory infiltrate here was less dense than that around the aneurysm.

Sections of the anterior descending coronary

Fig. 1(a) Aneurysm (case 1), showing complete breach in media at lower end and attenuation elsewhere. Elastic Ponceau $S \times 2$. (b) chronic coronary periarteritis (case 1). The calcified plaque is somewhat disrupted. Elastic Ponceau $S \times 7$.

artery showed a precisely similar complete adventitial cuff of fibrous tissue, with lymphocytic and plasma cell infiltration, at a site where a large calcified atherosclerotic plaque protruded through the media (Fig. 1b). The thrombosed right coronary artery showed a small eccentric patch of similar adventitial fibrosis with some lymphocytes, again at a site where the media was missing and atheromatous material was in contact with the adventitia.

CASE 2

A 62-year-old man with 10 years' history of angina pectoris died soon after admission to hospital with myocardial infarction and a pulseless, painful left leg.

Necropsy showed a large recent infarct in the lateral wall of the left ventricle, very severe coronary atherosclerosis and thrombosis of the pin-hole lumen of the anterior descending branch. The abdominal aorta was also very atherosclerotic and the narrowed left common iliac artery was occluded by recent thrombus. Transverse slices through the coronary arteries showed that all three were apparently surrounded in their proximal, most atherosclerotic parts by a cuff of fibrous tissue (Fig. 2), up to 0.6 cm diameter, and somewhat eccentric in shape in parts. The abdominal aorta, which had been opened anteriorly, was subsequently sliced transversely and showed adventitial fibrosis (1 cm

Fig. 2 Macroscopic photograph of circumflex coronary artery (case 2).

thick) around the anterior and lateral aspects, but not posteriorly (Fig. 3). The adventitial fibrosis extended from the bifurcation to 5 cm above the bifurcation. The ureters were not involved in the fibrous tissue.

Histological examination of numerous sections of the affected coronary arteries showed that the macroscopic adventitial fibrosis was accompanied by dense lymphocytic and plasma cell infiltration which was centred on regions where the media had disappeared and where atheromatous intima was in direct contact with the adventitia (Fig. 4a). Segments of coronary artery with intact media showed no adventitial inflammation or fibrosis (Fig. 4b). The posterior segment of the abdominal aorta, although atherosclerotic, had an intact media and very little adventitial inflammation. The anterior and lateral

Fig. 3 Macroscopic photograph of transverse slice of lower abdominal aorta (case 2). The aorta has been opened anteriorly and the slice is viewed from below; the inferior vena cava is at bottom left. The posterior segment of the aorta (between arrows) has no adventitial reaction. The lateral and anterior segments (outside arrows) show massive pale adventitial inflammation and fibrosis.

parts had little or no recognisable media and were surrounded by dense fibrosis and inflammation, again principally lymphocytes and plasma cells.

Discussion

The nomenclature of this disease has been confused. Leaving aside the more eccentric variants of nomenclature, the main reason for this is the differing clinical presentations of the disease. "Idiopathic retroperitoneal fibrosis"¹ occurs around an undilated abdominal aorta, usually presents as ureteric obstruction, and hence is mostly documented in the urological literature. "Idiopathic mediastinal fibrosis"⁶ usually encountered by thoracic surgeons, is similarly named because it is often associated with, or even continuous with, retroperitoneal fibrosis. Also mainly encountered by urologists is "peri-aneurysmal retroperitoneal fibrosis",² a similar disease affecting the ureters but centred on an atherosclerotic aneurysm of the abdominal aorta rather than on the undilated aorta. In more recent years, the same condition, encountered by vascular surgeons as an incidental finding at operations on aortic aneurysms, has been called by them "inflammatory aneurysm".^{3,7,8} This is sometimes described as involving the duodenum, but it seems to differ from perianeurysmal retroperitoneal fibrosis only in that the ureters are not involved.

Of the cases reported here, case 1 might be called "perianeurysmal mediastinal fibrosis" or "inflammatory aneurysm of the thoracic aorta". Case 2 might be regarded as "idiopathic retroperitoneal fibrosis" without ureteric involvement. This proliferation of nomenclature seems unwise when the histological features of all the variants are identical, namely adventitial fibrosis and chronic inflammation, primarily lymphocytes and plasma cells. It is therefore preferable to group them all together as "chronic periaortitis".

Identical fibrosis and inflammation has been reported around coronary arteries on rare occasions, coincident with idiopathic retroperitoneal or mediastinal fibrosis⁹⁻¹¹ or with an inflammatory aneurysm.¹² Both the present cases show coronary periarteritis similar in histological appearances to those previously reported. Coronary chronic periarteritis of this characteristic appearance and of this severity has not, to our knowledge, been reported in the absence of chronic periaortitis. It is important to note that it is quite different in histological appearance from the polyarteritis nodosa-like lesions seen rarely in small arteries in association with chronic periaortitis.¹

The present two cases substantiate the association between coronary chronic periarteritis and chronic

Fig. 4(a) Severely inflamed segment of right coronary artery (case 2) showing adventitial thickening and lack of media. Haematoxylin and eosin $\times 64$.

Fig. 4(b) The opposite side of the same artery as in Fig. 4(a), showing an area of intact media with no significant atherosclerosis and no inflammation. Haematoxylin and eosin $\times 64$.

periaortitis and emphasise their histological similarity. Case 1 is unusual in that unlike most cases of perianeurysmal fibrosis the aneurysm was in the descending thoracic aorta rather than in the lower abdomen. In case 2, the coronary artery involvement was seen macroscopically at necropsy but the periaortitis was not noticed until the aorta was sliced transversely. If severely atherosclerotic arteries and aorta (especially aneurysms) were routinely sliced transversely at necropsy, more examples of this disease might be uncovered. Because it only becomes clinically evident when nearby organs are affected, the less advanced grades of the disease are presumably under-diagnosed, even at necropsy.

It is noteworthy that both patients reported here suffered from angina pectoris and both died from thrombosis of an affected coronary artery. One previous patient also died of thrombosis of the affected artery.¹⁰ It is not clear whether this is pure coincidence or whether chronic coronary periarteritis enhances the risk of thrombus formation.

The cause of chronic periaortitis and periarteritis is unknown, but its striking predilection for severely atherosclerotic parts of vessels, especially if the media is breached, suggests that it is caused in some way by the atheromatous material. The difference between one part of the circumference of the vessel having an intact media and little inflammation, and another atherosclerotic part having severe inflammation with a gap in the media, is well demonstrated by the cases described here. Lesser

degrees of chronic periaortitis and periarteritis are a commonplace histological finding and have frequently been attributed to a secondary reaction to atherosclerosis.¹³ Certain lipid components of the atheromatous plaque have been shown experimentally to cause fibrosis with some macrophage infiltration.¹⁴ However the presence of lymphocytes and plasma cells producing IgG and IgM in the adventitia has led to the suggestion that there may be hypersensitivity to antigens normally sequestered in the atheromatous material, but exposed by the medial destruction.^{15 16} The idea of some hypersensitivity reaction is also supported by the response of all forms of the disease to corticosteroid therapy and by the occasional finding in periaortitis of macrophages laden with insoluble lipid ("ceroid") in the adventitia and in nearby lymph-nodes.¹⁶

The reports of "inflammatory aneurysms" at first suggested that the inflammation was the cause of the aneurysm^{3 7 8} but comparison with ordinary atherosclerotic aneurysms showed that the inflammation was different only in degree, in these cases,¹⁷ which tallies with our experience. The aneurysm is caused by the atherosclerosis and medial thinning; the differing degrees of inflammation are secondary. The precipitation of some cases of periaortitis by vasoactive drugs such as methysergide is probably due to a direct effect on the vessel wall rather than hypersensitivity to the drug.¹⁸ Distant lesions, including polyarteritis nodosa-like arterial lesions, are reminiscent of the associations seen in connective tissue disease, but are at present unexplained.

The cases described here are compatible with the view that hypersensitivity to atheroma is the cause of the disease, but direct proof, as by demonstration of circulating immunoglobulins to atheroma, is still lacking.

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