British Heart Foundation

Factfile 10/2000

Dissection of the Thoracic Aorta

Introduction
Dissection of the thoracic aorta is an uncommon but potentially catastrophic event which requires early diagnosis and prompt treatment if the patient is to survive and escape complications (during the early hours of dissection, the hourly mortality is more than 1%). The dissection begins as a tear of the intima, most commonly in the ascending aorta and is followed by the creation of a false lumen in the medial layer of the aortic wall. The consequences include rupture (most commonly into the pericardium or into the left pleural space or mediastinum) haematoma formation or re-entry. The latter is more common in the case of dissection of the descending thoracic aorta. Complications include sudden death (often at home) from haemopericardium, stroke or heart attack due to involvement of the innominate or left common carotid and coronary arteries respectively. By contrast when the descending aorta is affected the renal arteries may be involved causing renal failure.

Causes
Hypertension is the single most important risk factor for dissection of the thoracic aorta. Others include cystic medial degeneration of the aorta, Marfan syndrome, a bicuspid aortic valve, blunt trauma as in road traffic accidents, pregnancy and inflammatory disease including disorders of connective tissue.

Diagnosis
Aortic dissection should be considered in the differential diagnosis of patients presenting with acute chest pain or collapse particularly those over 60 years. Typical symptoms are severe, tearing chest pain or, in the case of descending aorta, back pain. A difference in arm blood pressures or an absent or diminished arterial pulse may be present and neurological signs suggest involvement of the neck arteries.

Investigations in hospital vary according to the availability of imaging techniques. In most cases the chest x-ray is not helpful. In the acute situation the most commonly used investigation is trans-oesophageal echocardiography which has a high degree of specificity and sensitivity. Computerised tomography (CT) is widely available as a non invasive technique but only the new machines which have spiral, rapid imaging capability yield accurate anatomical detail of the ascending aorta. CT provides information about the size, location and the extent of the disease and can image intra-mural haematoma. Magnetic Resonance Imaging is less widely available but has emerged as an excellent method of diagnosis. It yields excellent detail of the intima and can display the totality of the dissection process. The information obtained is so complete that catheter angiography of the aorta can be avoided unless detail of the coronary arteries is required.

Treatment
All patients with an acute dissection of the ascending aorta should be considered for surgical treatment. Extensive irreversible injury to the central nervous system is arguably the only contra-indication. The ascending aorta is repaired using a Dacron graft and it is usually possible to repair the aortic valve. If the dissection extends beyond the ascending aorta the distal anastomosis can be secured and performed during a period of circulatory arrest. If the aortic valve is not normal, it is replaced. The approach to patients with intra-mural haematoma is similar to that for patients with acute aortic dissection but if the aortic arch is involved in the acute dissection, this too can be resected.

For patients with a dissection of the descending aorta, medical treatment in the initial procedure of choice. This consists of careful monitoring of blood pressure and urinary output in an Intensive Care Unit. Blood pressure is controlled with a continuous infusion of labetalol which has both alpha and beta antagonist properties and decreases the rate of ejection from the left ventricle. Surgery is indicated in patients with signs of impending rupture and in those with ischaemia of the legs or abdominal viscera, renal failure, paraperesis or paraplegia. With current techniques elective resection of the thoracic aorta can be accomplished with an operative mortality of 10 to 12% and rates of spinal ischaemic injury and renal failure of 3 to 15%.

Prevention
The identification of patients with hypertension and subsequent control of their blood pressure is the most important single preventive measure. However, patients with Marfan syndrome should have regular assessments made of the aortic root diameter as outlined in factfile 4/1997 and elective surgery performed when necessary.

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Factfile *is produced by the British Heart Foundation in association with the British Cardiac Society and is compiled with the advice of a wide spectrum of doctors, including general practitioners. It reflects a consensus of opinion.*

Further Reading

1. Petra R, Segesa L.K Aortic dissection. Lancet 1997:349:1461-64

2. Safi HJ, Miller CC, Reardon MJ, et al. Operation for acute and chronic dissection: recent outcome with regard to neurological deficit and early death. Ann. Thorac.Surg. 1998:66:402-411

3. Gott VL, Greene PS, Alego DE, et al. Replacement of the aortic root in patients with Marfan's Syndrome. New Eng. J. Med. 1993:340:1307-13