Aortic Dissection

The aorta is the main artery in the human body. It originates at the aortic valve in the left ventricle of the heart and runs through the chest into the abdomen where it splits into two arteries. It carries oxygenated blood from the heart to all parts of the body. The aortic wall has a layered construction consisting of an inner (intima), middle (media) and outer (adventitia) layer.

Acute aortic dissection is a serious, potentially life threatening condition, in which the inner layer of the aorta (the intima) tears. Blood gushes through the tear and causes separation of the inner from the middle layer along a variable length of the aorta. This gives the aorta a typical double barrel appearance on imaging with blood flowing in the original, true, lumen and in the newly formed channel, the false lumen. The blood filled false channel may rupture through the outer layer causing an invariably fatal internal bleeding.

Aortic dissection is a rare phenomenon. It occurs in less than 10 people per 100000 per year. It affects usually men in their 60 and 70s.

How might an Aortic Dissection present?

Acute aortic dissections are extremely dangerous with a significant proportion of patients dying before receiving emergency medical care. The symptoms are often vague and can be associated with other diseases, such as a heart attack, making diagnosis often difficult.

Clinical manifestations of aortic dissection may include the following:

- Acute onset severe pain that frequently is described as tearing, ripping, stabbing, or sharp. The pain may be localised in the anterior chest wall, at the back between the shoulder blades, the neck and/or jaw. Approximately10% of people with acute dissections will have no pain.
- Collapse
- Stroke
- Lower limb numbness and/or weakness
- Abdominal or flank pain

What causes Aortic Dissection?

It is unclear what causes an aortic dissection. However, there are several risk factors associated with aortic dissection, these include:

- High blood pressure

- Connective tissue disorders, such as Marfan disease, Ehlers-Danlos syndrome, and Turner syndrome
- Aortitis (inflammation of the aorta)
- Atherosclerosis
- Bicuspid aortic valve (only 2 flaps in the aortic valve, rather than normal 3)
- Blunt chest trauma e.g. seat belt injury during a car crash
- Previous heart surgery
- Coarctation of the aorta (narrowing of the aorta)

How do you diagnose Aortic Dissection?

Since the symptoms of an acute aortic dissection are very non-specific and may vary according to the location of the primary entry tear, the extent of the dissection and the degree of mal-perfusion of aortic side branches, it is impossible to diagnose an acute aortic dissection without imaging studies demonstrating the presence of an intimal flap.

A high index of suspicion based on history, signs and symptoms is required in order to arrange the appropriate diagnostic tests in a timely manner.

Common tests to diagnose an acute aortic dissection include:

1. Computed tomography angiography (CTa) of the chest and abdomen with iodinated contrast material which gives excellent images of the entire aorta and its side branches.
2. Transoesophageal echocardiogram alternatively utilises the proximity of the aorta to the oesophagus to obtain anatomical images of the ascending aorta, arch and proximal descending aorta.
3. Magnetic resonance angiogram (MRA) of the aorta

What is the treatment of an acute Aortic Dissection?

Primary determinant for the treatment of acute aortic dissections is the involvement of the ascending aorta in the dissection.

Aortic dissections involving the ascending aorta (so called type A aortic dissections) need urgent surgical repair. Involvement of the ascending aorta entails the risk of aortic valve regurgitation, coronary mal-perfusion and cardiac tamponade: it is estimated that 50% of patients with an acute type A aortic dissections will die within 2 days of symptom onset, thus urgent treatment is a prerequisite of survival. Currently, treatment of acute type A dissections involves emergency sternotomy and surgical repair of the ascending aorta with a polyester graft. Depending on the involvement of aortic valve or coronary ostia in the dissection, concomitant aortic valve repair

and/or coronary artery bypass graft may be required. Endovascular techniques for keyhole repair of type A dissections are in development but not ready for wider clinical application yet.

Aortic dissection that does not involve the ascending aorta (so called type B dissection) are nowadays primarily treated medically with antihypertensive and heart rate control medication. Interventions are reserved for those acute type B dissection patients that develop complications such as mesenteric, kidney or lower limb ischaemia, therapy resistant hypertension or chest pain, or aortic rupture. In these circumstances, treatment will involve placement of an aortic stentgraft (TEVAR) to cover the primary entry tear. It may require associated debranching procedures if the primary entry tear is very close to the origin of an important aortic side branch such as the left common carotid or subclavian artery.

How will this affect me in the future?

Approximately 50% of patients will develop post-dissection aneurysms of the thoracoabdominal aorta which may require treatment depending on the size of the aneurysm and fitness of the patient. Other complications associated with chronic aortic dissection include claudication and mesenteric ischaemia.

Thus in the longer term all patients with a : a) residual dissection following repair of an acute type A dissection, or b) type B dissection will require regular lifelong imaging surveillance with CTa or MRA scans to monitor the aorta for chronic complications.

What does the Circulation Clinic offer?

At the Circulation Clinic we believe clients with acute aortic dissection are best cared for in an NHS hospital and therefore our surgeons do not provide acute aortic dissection treatment outside of their NHS roles.

The Circulation Clinic is able to offer on-going care for clients with chronic aortic dissections including the treatment of associated complications. This is done within a multidisciplinary environment with each case reviewed by a panel of experts to ensure the most appropriate treatment is offered to our clients taking into account their individual requirements.