Treatment Of Uncomplicated TBADS: 25% Develop Problems: Factors Predicting Which Patients Will Develop Complications So They Can Get Early TEVAR.

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The current evidence for managing patients with type B aortic dissection (TBAD) is based on two small randomised trials, registry data and large single centre series. A recent meta-analysis has shown that endoluminal treatment is safer than open surgery for complicated TBAD. (1) The majority (up to 70%) of patients are uncomplicated and are treated medically, but the long-term outlook for these patients is variable with mortality rates varying between 50-85% at five years. The two randomised controlled trials ADSORB and INSTEAD have both shown a benefit in terms of aortic remodelling with the insertion of stent grafts into patients with uncomplicated type B dissection. (2,3) INSTEAD also showed a benefit in both long-term survival and aortic related intervention. However, endoluminal repair can also be associated with complications such as stroke, paraplegia, retrograde type A dissection, device collapse and iatrogenic intimal tears. Furthermore false lumen thrombosis is not guaranteed and the reintervention rate is high. These problems weigh heavily against a policy of treating all uncomplicated patients with stent grafts. However, if a high risk subgroup of uncomplicated TBADs can be identified then they may benefit from early endovascular intervention.

Risk stratification in TBAD is currently by CT scan using static images to assess false lumen thrombosis and the dimensions of the true and false aortic lumens. A rapid expansion of the aorta (>1cm per year) and an absolute aortic diameter of 5.5-6cm are indications for intervention. (4) The degree of false lumen thrombosis has been proposed as a means to predict poor survival with partial thrombosis having a much worse outcome compared with fully patent or fully thrombosed false lumens. (5) The explanation for this is that the mean arterial pressure within the false lumen is increased with an elevation in the diastolic pressure due to an impaired outflow which results in aortic expansion and rupture.

Some factors measured by CT have been suggested to predict aortic expansion. Some of these are contradictory. For instance an early Japanese paper showed that an initial aortic diameter greater than 4cm was indicative of continued aortic expansion, while a recent paper from IRAD suggested that an initial aortic diameter less than 4cm was a risk factor for continued growth. (6,7) An initial diameter of the false lumen of >22mm has been shown to be associated with poor outcome. (8)

Measurements of the size and position of the primary entry tear have also been shown to predict the rate of aortic expansion and therefore survival. Small tears in the distal thoracic aorta are relatively benign with a good prognosis, whereas large proximal entry tears confer the worst outcome. (9) An entry tear on the outer convex surface of the distal aortic arch has a lower incidence of aortic related complications than one on the inner concave surface. (10,11) Dissections which have a spiral morphology have an increased incidence of adverse aortic events compared to those which are straight. (12)

The uptake on positron emission tomography combined with CT scan (PET-CT) has been shown in a small series to be associated with progression of aortic dissection, the need for
intervention and death. \(^{(13)}\) It has also been used to distinguish acute from chronic dissection. \(^{(14)}\)

New functional imaging techniques such as four dimensional magnetic resonance angiography (4D-MRA) can provide functional and anatomical data in a single examination. Information about the haemodynamics in the false lumen can identify flow characteristics which have been associated with increased aortic expansion and these include stroke volume and the degree of helical flow. \(^{(15)}\) 4D-MRA can also identify secondary entry tears which may be important in planning endoluminal intervention and reducing secondary reinterventions. \(^{(15)}\) MR using a blood pool agent has been shown to be more accurate in assessing the amount of false lumen thrombosis compared with conventional CT which overestimates the volume by a factor of five. \(^{(16)}\)

Functional imaging has the capability of accurately measuring the haemodynamic parameters in the false lumen and larger prospective studies are required to correlate these findings with long-term survival. The effect of early intervention in a group at risk of rapid aortic expansion also needs to be defined.

References:
12. Trimarchi et al (poster), SVS 2011