INVITED COMMENTARY

Considerations for the Endovascular Management of Thoracic Aortic Ruptures

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The authors of this manuscript have added significant value to the literature with their "real world" description of the outcomes following thoracic endovascular aneurysm repair (TEVAR) for descending thoracic aortic ruptures (rTEVAR) treated by multidisciplinary teams at six tertiary vascular centres in Sweden.[1] Prior data regarding outcomes for such interventions are limited to smaller numbers at single centres or pooled administrative data lacking clinical and anatomical detail. This report straddles and overcomes these limitations by its multicentre nature and robust detail. To provide a focused and meaningful analysis, acute type B dissections were not included. Nevertheless, heterogeneity of the treated aortic pathologies remains, as limited penetrating ulcers are included with extensive aneurysms. What can be seen clearly in this report is that rTEVAR is accompanied by significant morbidity and mortality. The authors have treated a sick group of patients including 64% presenting with haemothorax, 11% with mycotic aneurysms, and 11% with ruptures due to post-dissection aneurysms. The main post-operative complications which differ from reports of elective TEVAR are the higher incidence of peri-procedural stroke (15%), spinal cord ischaemia (SCI) (10%), and endoleaks (22%), the majority being type I.

It has been reported previously that covering the left subclavian origin can be associated with an increased incidence of stroke and SCI, and may be similar to extensive aortic coverage for SCI. This was not demonstrated in the present study potentially because of the high incidence of hypotension in this group of patients, another significant risk factor for stroke and SCI. Despite an extensive median length of aortic coverage (i.e. 241 mm), CSF drainage was not considered routinely when performing rTEVAR in these patients because every effort is focused on expeditious exclusion of life threatening rupture, and coagulopathies are often coexistent in patients with haemothorax.

The proximal seal zone was an issue in this emergency cohort reflected by nearly 40% of the patients requiring left subclavian artery coverage and 18% undergoing arch revascularisations, mostly through chimney type procedures. The authors have highlighted that the IFU for TEVAR often cannot be followed with rTEVAR, so that the resulting type 1A endoleak rate, considered by definition to be a technical failure, is reflected in the frequency of early and late secondary procedures. TEVAR planning should be performed on three dimensional (3D) workstations, taking into consideration vessel outerline to estimate the appropriate endograft length. If centreline is used, the selected endograft length is often too short and can result in type Ib endoleaks.[2] To be practical, when treating extensive lesions, separate proximal and distal components should be implanted to focus on the proximal and distal landing zones independently, and plan for a long overlap. Three dimensional imaging is also key to demonstrating the best working position. In this regard, fusion guidance can be very helpful to the operator by providing this information real time.[3]

In order to reduce the SCI, stroke, and type 1A endoleak rates in the setting of rupture, that is to provide a proper proximal landing while preserving flow to the supra aortic trunks (SAT), the current options are SAT debranching, chimney periscope sandwich (CHIMPS), and homemade and in situ laser fenestrations. In the near future an "off the shelf" branched endograft designed for left subclavian artery revascularisation will be available. This will be useful in the urgent setting if grafts can accommodate most anatomies, maximise the seal zone, and allow for rapid perfusion of the left subclavian artery.

The authors report that 92 of their 140 patients were dead by the end of their 17 month follow up period, with aortic related death being the most common cause. This high mortality rate is correlated with the significant comorbidities and the high incidence of haemodynamically unstable patients on admission, as well as the high number of aortic related secondary procedures in this fragile patient population. If we are to make any impact on both morbidity and mortality when treating thoracic aortic ruptures, centralisation at centres of excellence by experienced clinicians using 3D workstations for planning and hybrid operating rooms will be necessary to achieve optimal outcomes.

The authors should be congratulated for their well written and carefully analysed manuscript. This is yet another highly valuable study provided by Swedvasc, the Swedish vascular registry.

CONFLICT OF INTEREST

S.H. is a consultant for Cook Medical and GE Healthcare.

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