EDITORIAL

Intentional targeted false lumen occlusion after aortic type B dissection: Where do we stand?

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The incidence of aortic dissection (AD) has been increased from previously estimated at 3.5/ 100,000 patient-years to 14/100,000.[1,2] Patients with thoracic ADs not involving the ascending aorta and arch are defined as Stanford B (Debakey IIIa, IIIb).[3] Thoracic endovascular aortic repair (TEVAR) has been increasingly used for the treatment of type B aortic dissection (TBAD) offering better outcome in terms of mortality and morbidity compared to open surgical repair.[4]

However, after standard TEVAR, complete false lumen thrombosis is only achieved in around 40% of the patients by covering the proximal tear entry point alone.[5] Persistent perfusion from distal entry-tears may cause the lack of false lumen thrombosis, which can lead to late false lumen expansion during follow up in 30% of patients being treated with TEVAR requiring additional re-interventions.[6] False lumen patency is independently associated with poor long-term survival in chronic TBAD (cTBAD), while thrombosis of the false lumen may be an independent predictor of no further growth.[7]

Many techniques have been applied for the induction of complete false lumen thrombosis after TEVAR such as Candy-plug, the Knickerbocker, vascular and iliac plugs, coils and liquid embolization techniques.[8] Kölbel group[9] were the first ones to describe the Candy-plug technique in 2013 using a back-table modification of a Zenith thoracic TX2 Pro-Form stent-graft by adding a diameter-reducing suture to restrict the opening to a maximum diameter of ~10 mm still allowing for retraction of the dilator tip. A 20-mm Amplatzer Vascular Plug II (AVP; St. Jude Medical, St. Paul, MN, USA) was deployed in the waist of the candy-wrapper shaped pluginto the false lumen in a distal segment of the descending thoracic aorta and simultaneously a thoracic stent-graft was placed at the level of the celiac artery into the true lumen. Recently, Rohlffs et al.[9] presented the results of Candy plug technique in 18 consecutive patients showing that this technique is a feasible endovascular method to achieve false lumen occlusion and aortic remodeling in chronic aortic dissection patients and it is associated with low morbidity and mortality.

Knickerbocker technique is another option, which is based on the dilation of the middle part of a large diameter stent-graft that is placed in the true lumen.[10] In this technique, a short segment of the stent-graft is dilated with excessive force using a compliant balloon to rupture the dissection membrane and extending the stent-graft to the false lumen. The main advantage of this technique is that an access of the false lumen is not needed which may become a complicated procedure and additionally of other materials are required.

A large variety of devices along with solid as well as liquid embolization materials have been developed to occlude the false lumen such as coils, onyx, glue, iliac occluder devices, and various other vascular plugs.[8] The diameter of the false lumen still remains a limitation for most of the materials as most of these are commercially available up to 24mm, having as a result using more than one device or a lot of adjunctive embolization material.

Induction of false lumen thrombosis after endovascular treatment of type B aortic dissection is not commonly performed in Vascular Centers. However, a recent systematic review of the literature highlighted that those procedures achieve high technical success rate irrespectively of the technique (99%, 60/61 in one case it was not possible to introduce a covered stent into the celiac trunk and a persistent flow into the FL was present at the level of the attempted sealing), with low percentages of mortality (0%, 0/61), while it was also shown that the false lumen may remain completely thrombosed up to 62% during follow up.[8]

The time of the intervention remains a matter of debate as currently there is no hard evidence on the preferred timing for the induction of false lumen thrombosis. In the literature, patients were treated either under elective circumstances (false lumen expansion >5 mm expansion per 6 months; false lumen aneurysm >5.5 cm) or presence of symptoms/ or rupture.[8] Most of false lumen occlusion techniques demand experienced operators with a high technical skills level, which may be currently a limitation for those techniques. The development of referral centers and may increase the experience on these techniques producing even better outcomes.

Conflict of interest

N. Tsilimparis is proctor for Cook Medical

Tilo Kölbel has intellectual property with Cook Medical

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