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Commentary: "A bald approach for a shaggy situation"

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CENTRAL MESSAGE

The authors describe a bailout technique to minimize the risk of embolization in a shaggy aorta.

In this issue of *JTCVS Techniques*, Wakabayashi and colleagues[1] describe a bailout technique using a trans-apical access combined with the use of extracorporeal membrane oxygenation (ECMO) for transcatheter aortic valve replacement (TAVR) deployment. This was done in a patient with previous aortic arch replacement and frozen elephant trunk creation that failed to provide adequate seal and exclusion of a descending thoracic aortic aneurysm. It was felt that other alternative access, such as transcaval, transcarotid, axillary, transaortic, or femoral, were not feasible due to the previous debranching arch surgery. There was severe tortuosity of the descending aorta and severe irregular mural thrombus, so-called "shaggy aorta," a condition that carries a high risk of atheroembolization with severe and devastating complications for the patient, including stroke, renal failure, paraplegia, and leg and intestinal ischemia. The lack of definition, classification, or scoring system for the treatment of this problem creates a dilemma in determining the best approach for treatment. This is despite efforts of some groups to create a score system to predict embolic complications.[2] What we know is that, regardless of the area of the aorta that needs to be treated by current endovascular (TEVAR) or open/hybrid techniques, the risk of mortality and complications is significantly higher in this group of patients, ranging from 0% to 28% for embolic complications (including stroke) with 5%-8% 30-day mortality.[2-4]

Several elegant techniques have been described to minimize the risk of stroke when hybrid reconstructions of the arch are chosen, including one from Ryomoto and colleagues,[5] using a mini-cardiopulmonary bypass circuit to maintain retrograde flow after debranching of the head vessels while TEVAR is deployed in the proximal arch. In the technique described by Yamauchi and colleagues,[6] balloon occlusion of the innominate artery and subclavian is performed. Perfusion of the head vessels is achieved via multiple grafts for debranching of the head vessels, using a roller pump and a filter placed between the axillary graft and the femoral artery.

In their case, Wakabayashi and colleagues incorporated the use of low-flow ECMO just long enough to maintain hemodynamic stability and used transapical TEVAR to minimize the risk of spinal cord ischemia and embolization. This is not the first report on use of the transapical platform to deploy TEVAR; several similar cases with good technical success have been reported in the literature.[7] The importance of this case report is that using a combination of different described techniques, the authors were able to minimize the risk of embolization in an already complicated case. It is important to mention that the risk of embolization with the transapical approach is not insignificant, since wires and catheters are manipulated through the aorta. This case, like the others, illustrates that the use of extracorporeal circulation might add significant value either as a way to maintain hemodynamic stability or to provide

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protection against embolization when a debranching graft exists or a filter is used. Certainly, this case will open the arena for further simplification, innovation, and incorporation of the principles of new technologies, such as dynamic flow reversal or cerebral protection systems,[8] already being used in carotid surgery, total endovascular arch repair, and TAVR.

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