Hybrid Repair of Kommerell Diverticulum in Right Aortic Arch: Anatomic Considerations

To the Editor:

We read with great interest the article written by Rosu and colleagues [1] about hybrid repair of right aortic arch with Kommerell diverticulum (KD). Their technique involves total debranching of supra-aortic trunks (SATs) and thoracic endovascular repair in zone 0. The authors are to be commended for this attractive single-stage approach. However, some comments need to be addressed.

In our experience, treatment of KD with new-onset dysphagia in right aortic arch shall address two issues: (1) exclusion of the aneurysm and (2) release of the esophagus by dividing the ligamentum arteriosum and opening the aneurysmal sac.

First, side clamping of the ascending aorta to perform total debranching of the SAT in zone 0 is associated with a high risk of retrograde aortic dissection. It has been described as a major concern in arch debranching [2]. This risk is all the greater in such patients with congenital arch anomaly. Besides, adding a debranching graft in a restricted space such as the mediastinum, although some space needs to be created to relieve the esophagus, appears as a paradoxical strategy.

Second, when dealing with right aortic arch lesions, some anatomic considerations should be pointed out. Dysphagia is explained by the fact that the trachea and the esophagus in the upper mediastinum are strained in the restricted angle between the right-sided arch and the KD. This angle is enclosed by a fibrous structure corresponding to a left ligamentum arteriosum, connecting the KD to the left pulmonary artery. In this report, the authors state that one of the benefits of arch debranching through sternotomy is to allow the division of the ligamentum arteriosum. Nevertheless, this surgical access encourages a division nearby the left pulmonary artery, with the risk of damaging the recurrent laryngeal nerve, as reported in the present case. Moreover, sternotomy is not the most appropriate access to open the aneurysmal sac after exclusion. For these reasons, rather than a sternotomy, we recommend the use of a left thoracotomy in case of right aortic arch.

In summary, hybrid repair is indeed an interesting option to solve a double problem using a minimally invasive approach: to exclude the KD while maintaining antegrade perfusion of SAT and to relieve the esophagus from compression by the ligamentum arteriosum. However, side clamping of the ascending aorta in patients with KD is not risk free, and sternotomy does not appear as the most appropriate access to treat the mediastinal compression.

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References

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Reply

To the Editor:

We appreciate the insights provided by El Batti and colleagues [1] on our article [2] regarding treatment of Kommerell diverticulum (KD) in right aortic arch. We agree with the principles mentioned: (1) exclusion of the aneurysm and (2) release of the esophagus by dividing the ligamentum arteriosum. Thoracic endovascular repair (TEVAR) is a widely accepted procedure allowing surgeons to successfully exclude aortic aneurysms in a less invasive manner. Hybrid aortic arch repair techniques have been successfully used to exclude KD in other reports [3] less invasively than conventional open repair via thoracotomy. Utilizing a median sternotomy approach in this case was necessary to perform the supraaortic debranching and allowed division of the left ligamentum arteriosum. Unfortunately, the left recurrent laryngeal nerve remains at risk during this manoeuver whether performed via sternotomy or thoracotomy, given the proximity of the 2 structures. Finally, intraoperatively, there was ample room between the debranching graft anteriorly and the esophagus, although we recognize that in cases with a very large KD compression by the graft may be a problem.

Iatrogenic type A aortic dissection is clearly a concern when side-clamping the ascending aorta and using a zone 0 proximal landing zone for TEVAR. In a retrospective series of TEVAR, the risk of type A dissection was 6.9% when a native proximal landing zone 0 was used and was higher when the ascending aorta diameter was 4 cm or greater as well (25%) [4], which fortunately was not the case in our patient. As mentioned in our article [2], given her age and muscular dystrophy, our patient did not seem to be a good candidate for conventional open repair and her anatomy required that the TEVAR proximal landing be in zone 0. We believed that her risk of type A dissection remained low. We thus opted for hybrid repair.

In conclusion, hybrid arch repair for KD is a valid approach that is beneficial in certain patients such as the one in our report [4]. Nonetheless, repair of KD should be tailored for each patient.

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