INVITED COMMENTARY

Complex endovascular aortic repair in Greece: first steps towards centralization

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In the current issue Matsagkas et al.[1] present their experience on 41 consecutive patients with complex aortic aneurysms (juxtarenal & pararenal) that were treated with advanced endovascular techniques [Chimney EVAR (ChEVAR), Fenestrated/branched EVAR (F/BEVAR)] during the period 2016 and 2019. This is probably the largest documented experience with complex aortic endovascular repair in Greece and the authors should be congratulated and thanked for sharing these data.

Technical success rates were very good (95%) and in line with other published experience. This is notable considering that this series had also a learning curve effect at least for the first cases. Moreover, 17% of the patients were previously operated in the aorta, and it is a well known factor that redo complex endovascular aortic procedures have an increased risk for technical difficulties and problems both with regard to planning and execution.[2]

Despite that most of the procedures were performed with a mobile C-arm, operation duration, and fluoroscopy times remained within normal values. One could therefore argue that although a hybrid room is the ideal environment to perform complex aortic endovascular procedures, a standard OR with a mobile C-Arm should not be considered prohibitive at least for pararenal pathologies.

Thirty-day mortality was 10%. Although most patients did not die due to "absolutely aneurysm related" causes, as the authors stated, these data show that complex endovascular aortic procedures have a significantly higher impact on patient outcome compared to standard EVAR, which means that patient selection should be also more critical. Particularly for the management of most complex thoracoabdominal aortic aneurysms, our experience in Nuremberg has shown that one "should think twice" before offering such complex procedures in very high-risk patients (ASA IV). Obviously sometimes it is indeed very difficult to deny treatment particularly when patients are referred to a large volume center as a last resort option.

One patient suffered a renal bleeding probably due to perforation of a small renal branch during wire manipulations. Such complications are fortunately relatively rare, but upon occurrence most of the time have devastating clinical outcomes unless treated immediately. Centers aiming to perform complex aortic endovascular procedures should therefore be prepared to handle such complications urgently as this was done in authors' center. This includes, appropriate material availability (different types of coils etc.) and personnel with respective expertise always available. This is also an additional reason why these procedures should be preferentially centralized.

Stroke is a potential complication during complex endovascular procedures as noted in two patients in this series.[1] Upper access required for ChEVAR and BEVAR carries certainly a risk of debris dislodgement in the aortic arch and therefore stroke. ChEVAR in particular may require more than one upper accesses with multiple passages of the sheaths through the aortic arch increasing potentially the risk of stroke compared to FEVAR (performed via femoral access only) or BEVAR (only one upper access with one sheath passage for all target vessels).[3] Lately new generation steerable sheaths enable catheterization of downward branches via femoral access, providing thus an option to avoid upper access and this could potentially reduce the risk of stroke in these procedures.

Long waiting times may be indeed a problem for customized fenestrated-branched stent-grafts as highlighted by the authors. Our experience showed that real-life waiting times are about 12 weeks. During this waiting period there is an ongoing risk of aneurysm rupture, which approached 2% in 1000 patients that were planned to undergo a F/BEVAR procedure in Nürnberg within the period 2010-2019. This shows that there is need for improvement in order to reduce the waiting time and rupture related mortality before F/BEVAR. Patients at higher risk for rupture (e.g. those with very large aneurysms) should be identified and probably treated with off-the shelf devices, even if that means dealing with some anatomical imperfections. Prompt graft measurement and order to avoid the physician-related delay is also mandatory. Quicker

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graft construction and delivery is obviously desirable, but resources are limited. Logistical efforts to mate the delivery date with an OR date are also justified, but often face both hospital organization and patient willingness problems. Finally, waiting for cost authorization may also contribute to the problem in some hospitals.

Where do all the above leave us? Complex endovascular aortic repair requires high-level of logistical organization, technical expertise, and ability to handle complications of the procedure in due time. These prerequisites can be better fulfilled in higher volume centers. Every effort for centralization of these procedures in Greece would be therefore beneficial both for the patients and the further development of the technique. Furthermore, creation of a few aortic centers in Greece could be also financially beneficial for the country given that many patients with complex aortic pathologies seek treatment abroad with much higher hospitalization expenses.

No conflict of interest.

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