EDITORIAL

Successful use of chimney EVAR in ruptured cases is possible only in case of considering and accepting important preoperative standards

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The report from the Department of Vascular Surgery of the University of Larissa in the last issue of HJVES, demonstrate the feasibility of emergent endovascular repair in 3 ruptured pararenal aneurysms by the use of chimney grafts.[1] The technical success was 100%. The patients treated immediately and the results showed promising performance of this alternative approach.

The PERformance of the chImney technique for the treatment of Complex aortic pathoLogiES (PERICLES registry) gathered a total of 13 US and European centers proving comparable mid-term results to the fenestrated/branched technologies and supporting chimney EVAR (ch-EVAR) validity as an off-the-shelf and immediately available alternative.[2] In 2019 the European Society for Vascular Surgery included the use of parallel grafts as an alternative in the emergency setting, bail-out technique or when fenestrated devices are not available or contraindicated.[3]

However, use of ch-EVAR is demanding and can be associated with early or late failures. Especially, in case of ruptured pathologies due to the perioperative stress for urgent treatment there is a high risk to have suboptimal experience and outcomes. Consequently, we aim by this editorial to highlight important preoperative standards to minimize the risk of early and late failures.

PREOPERATIVE STANDARDS

Etiological factors for persistent gutter-related type IA endoleaks

The presumed Achilles heel of ch-EVAR is the concern regarding gutter endoleaks between the chimney stent and aortic main body stent-graft. The PERICLES registry collaborators identified two key factors associated with persistent gutter endoleak.[2] One was the degree of aortic stent-graft oversizing, and the other one was related to insufficient length of the new proximal seal zone. There is a clear recommendation of 30% aortic stent-graft oversizing and total seal length of at least 20mm.[2] These recommendations should be always take under consideration during preoperative planning and sizing.

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Placement of the chimney graft

Occlusion of a chimney graft can be the most devastating ch-EVAR complication. An occluded renal chimney graft is frequently asymptomatic or presented with mild non-specific symptoms. Stent rescue is technically challenging due to the presence of suprarenal stents, which constitute a barrier between the sheath and the occluded device. Moreover, the presence of the pins of the suprarenal stent can have potentially an interaction with the balloon of the chimney graft leading to inadvertent trapping and interaction of the sheath from the pins.

Consequently, there is a need to protect during placement the balloon of the chimney graft removing the balloon only within the sheath. We are aiming to have the sheath at the upper level of the suprarenal stent but always below the pins.

Use of chimney grafts in angulated renal arteries

The additional deployment of flexible nitinol stent aims to improve the transition of the chimney graft in angulated artery. Scali S et al[4] showed that relining of the stainless-steel rigid balloon expandable chimney grafts with the placement of nitinol stents in angulated renal arteries minimizing the risk of kinking and consequent stenosis and/or occlusion. Consequently, selection of shorter chimney grafts avoiding involving the angulated segment of the renal arteries can be a good alternative.

Risk of stroke

A noteworthy criticism of ch-EVAR for treatment of juxtarenal aneurysms is the risk of stroke related to the need to use upper extremity access. To address this concern, in an additional analysis of the PERICLES registry, Bosiers and colleagues reported a clinically relevant cerebrovascular event rate of 1.9%.[5] Not surprisingly, the use of bilateral upper extremity access was found to be an independent predictor factor associated with a 2.8-fold increased risk for postoperative stroke.[5] This important finding led to the recommendation not only for the monitoring of the ACT having prolonged time for the

elective cases but also for using a single arm access point (e.g. left upper extremity) with double punction of the axillary artery for double ch-EVAR procedures. In this context, evaluation of the left subclavian artery and the thoracic aorta should be performed preoperatively. In case of presence of excessive soft thrombotic plaques, ch-EVAR should be avoided due to the high risk of diffuse embolization and trush in several organs.

In summary, the use of chimney grafts is no longer a matter of faith but a fact. The evidence in the literature supports its complementary role for the treatment of juxtarenal aneurysms and in agreement with that the ongoing ENCHANT Study as a fully prospective multicentre trial of ch-EVAR (clinicaltrials.gov identifier: NCT03320252) will provide further evidence bringing the technique to a higher level of evidence (B) than f-EVAR (C). Consequently, if we do not want to keep looking at the tree but the forest, we have nowadays evidence to support the use of this approach as first treatment option in several challenging clinical entities. However, good outcomes are the result only in case of consideration and acceptance of important preoperative standards, as described here, highlighting the potential risk of also devastating complications.

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