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Invited Commentary

Commentary on 'The Best Conditions for Parallel Stenting during EVAR: An In Vitro Study'

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The concept of the chimney graft (CG) was first introduced by Greenberg et al[1] with the use of renal stents to depress the proximal edge of stent graft fabric that protruded a few millimetres above the renal artery ostium.

The CG involves concurrent deployment of a standard aortic endograft and covered stents into the visceral arteries such that the proximal portion of the visceral stent lies parallel to the aortic stent with the distal portion preserving flow to the overstented visceral vessel.

Indications for this technique include restoration of flow in aortic branches accidentally or intentionally covered during endovascular aneurysm repair (EVAR) when the aneurysm neck is too short to provide adequate seal, and the SG needs to be placed across the aortic branches. This is particularly true in urgent cases when it is not possible to delay for the manufacture of a branched/fenestrated graft, which otherwise would be indicated, such as symptomatic or ruptured abdominal aortic aneurysms. It is also significantly cheaper than branched/fenestrated endografts.

Evidence surrounding the use of CG consists of case reports and small case series only and the long-term durability of the CG remains unclear. Intuitively they have design flaws compared to branched/fenestrated grafts. The contact of the endograft to the vessel wall may be decreased by the visceral grafts; subsequently there is a poorer graft/wall interface and therefore a reduction in the radial sealing force.

"Gutters" between the vessel wall, the stents, and the endografts may be difficult to seal and lead to subsequent endoleaks. The mechanism of seal around the CG stents and gutters is likely to be multifactorial.

A recent systematic review analysed 75 patients who underwent a chimney procedure for the preservation of 96 branches. Three perioperative deaths were recorded and 3 chimney grafts occluded during follow up. The authors were able to justify the use of chimney grafts in the emergency setting only, as the data for long term follow up was lacking.[2] Lee et al recently published their series of 28 patients who underwent planned chimney/snorkel graft repair.[3] Fifty-six snorkel grafts were placed with technical success in 98.2%. One renal snorkel graft occluded at 3 months (98.2% overall primary patency), two type 1a endoleaks were noted which resolved at the 6-month scan. Resch et al have analysed their 25 patient series of planned chimney repair within the visceral segment.[4] During a mean follow up of 10 months, only 1 chimney graft occluded and 3 patients had a type 1 endoleak, 2 of which did not require intervention.

Endovascular repair in the setting of adverse anatomy has been the focus of much research over the past decade and is an evolving field. Mestres and coauthors have nicely described an in-vitro study using silicon aneurysmal neck models to determine the best conditions for parallel stenting during EVAR. This is the first time an attempt has been made to objectively demonstrate the features that are critical in the use of chimney grafts, by mimicking the morphological conditions encountered. This data shows the need for continued evaluation and the need for more robust evidence in the use of chimney grafts.

References

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