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Approaching challenging necks by EVAR

Tulio Pinho Navarro*

Proximal neck is a key point in determining long-term success of endovascular aortic repair¹⁻³. The most common instructions for graft use recommend a neck length of 1.5 cm and an angulation of up to 60°. Therefore, a short (<1.5 cm) and angulated (>60°) neck is an off-label indication for most devices¹, leading to high rates of treatment failure. However, some approaches may improve results in high-risk patients.

Perioperative endovascular maneuvers to achieve effective sealing of endografts in challenging proximal necks include high-pressure ballooning, deployment of proximal cuff, slow and controlled deployment, use of the bending-the-wire technique to realign the axis of the aneurysm and of the neck, and the use of appropriate C-arm angulation⁴.

Some strategies are available to overcome angulated necks, e.g., deployment of Palmaz stents⁵. However, in mid-term follow-up, patients were found to be at high risk for graft-related events⁶. The use of thoracic endografts could be considered for proximal sealing prior to deploying the bifurcated graft⁷. Finally, extending the proximal neck using the hybrid approach can be achieved by renal debranching^{8,9} or proximal aortic neck banding¹⁰.

The chimney technique is an alternative to fenestrated/branched endografts because it is simple, has a low cost, and is readily available. A systematic review¹¹ has concluded that this complementary technique has good short-term results, but long-term outcomes remain the subject of significant concern¹².

Fenestrated/branched endografts may allow implantation at a more favorable level for the proximal landing zone¹³. A meta-analysis¹⁴ concluded that it is a viable alternative to open repair. However, there is no level-1 evidence available, and current

findings are weak, leaving many unanswered questions.

Currently, there are some new devices, based on novel concepts. The Nellix endoprosthesis, for example, has its use intended for favorable and adverse anatomy. Despite early promising results, longer-term studies are needed¹⁵. Endostapling and endoanchoring systems seem to be very promising and have proven to be feasible and safe^{16,17}, reducing the rates of endoleak type 1A and endograft migration in a systematic review¹⁸. Notwithstanding, results are not conclusive, and no randomized controlled trials have been published¹⁸.

From a different perspective, new generation devices represent an evolution of the endografts. The Endurant endograft was designed with the goal of extending its applicability¹⁹ to short necks (1.0 cm) and high angulations (75°). Early reports¹⁹ have concluded that it can be deployed safely, even in highly angulated anatomies (mean 80.8° angulation)²⁰, with satisfactory results, but mid- and long-term data are awaited to verify durability. The new repositionable C3 Excluder endograft allows proximal accurate and controlled deployment with the ability to reposition the graft, reducing the need for additional cuffs, but again, no long-term data are available²¹. Finally, an initial study with the Aorfix endovascular endograft supported its application in highly angulated necks (90°)²². Once again, however, no mid- or long-term results are available.

In conclusion, endograft technology has substantially improved²³. However, unfavorable anatomy continues to represent a major drawback, restraining endovascular procedures. More substantial data and stronger, evidence-based results are needed. Appropriate patient selection and operator training will allow improvement of long-term results²³.

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