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Editorial

Endovascular Treatment of Abdominal Aorta Aneurysms with Hostile Anatomy – The Reality and the Dream

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The rapid dissemination of endovascular treatment for abdominal aorta aneurysms was a consequence of the excellent, immediate results of the procedure, which caused it to quickly surpass open surgery.[1] In properly selected patients, endovascular treatment can reduce the risk of death and complications in the acute phase compared with surgical treatment, although long-term mortality is similar for both procedures.[2,3] The clinical effectiveness of endovascular treatment is undeniable, as shown by the extremely high five-year survival rate and by the low incidence of late disruption.

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The high percentage of elderly patients with advanced atherosclerotic disease and frequent comorbidities who presented high surgical risk was also a strong stimulus for the quick acceptance of endovascular treatment. Although patients who are not candidates for surgery also present a high mortality rate within 30 days after endovascular treatment,[4] age is a relatively unimportant factor, and there are data indicating good results for even very elderly patients who have undergone endovascular treatment.[5]

Despite a high rate of technical success in select cases, anatomical limitations in patient selection were quickly recognised and challenged. Although endovascular treatment was developed to eliminate lesions from the connections among normal portions of the vessel along the proximal and distal route to the aneurysm, the strategy was extended to a large number of patients presenting unfavourable anatomy. The major point of vulnerability is in the neck of the prosthesis landing, due to augmented diameter, short extension or unfavourable angulation. The frequency of hostile anatomy in this patient population can be as high as 50% to 60%.[6,7]

In this issue of the ***Revista Brasileira de Cardiologia Invasiva***, Metzger et al.[8] reported their experience treating a small group of patients with hostile anatomy, defined by the presence of a strong angulation in the proximal aortic neck or in the emergence of the iliac arteries. In the authors' experience, the use of a device whose characteristics were ideal for this situation produced acceptable success and complication rates. In order to put these data into perspective, the results are summarized here.

In initial studies to evaluate endovascular treatment of abdominal aorta aneurysms, the unfavourable anatomical characteristics included angulation of the proximal neck > 30 degrees, neck extension < 15 mm, and conical morphology and neck diameter > 28 mm. For the distal neck, unfavourable anatomical characteristics included angulation in the iliacs > 90 degrees, diameter > 18 mm or < 6 mm and, finally, the presence of a stenotic lesion > 50%.[9] Presently, most manufacturers of devices designed for endovascular treatment of abdominal aorta aneurysms recommend a proximal neck angle < 60 degrees and at least 10 mm long (for suprarenal fixation) as a criterion of anatomical indication, reflecting a great advance in such devices.

Traditionally, for endovascular procedures in general, hostile anatomy is a risk factor for reduced success, complications, and death. In the case of aortic disease, hostile anatomy also carries an additional late risk in the form of a greater incidence of leaks. The availability of several devices has allowed for the treatment with multiple unfavourable characteristics by means of several "tricks" in the development of prostheses. Literature related to the Anaconda™ (Vascutek, Terumo, Inchinnan, Scotland) device is still limited and does

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not specifically identify patients with high anatomical risk, who usually account for a small percentage of the total patient population.[10,11] An analysis of patients with a minimal extension of 15 mm in the proximal neck included 787 patients, and a series of 100 patients showed equivalent results for patients with ideal and hostile anatomies.

The most modern devices have allowed for the treatment of anatomically diverse patients with success and complication rates that are equivalent to those of well-selected cases. However, patients with hostile anatomy have a greater need for auxiliary procedures (intra- or postoperative), especially for the resolution of Type I endoleaks detected in the index procedure.[7,12] These auxiliary procedures increase costs and morbidity rates. Furthermore, enlargement of the aneurysmatic sac is very often observed as a later development.[7] In an analysis of a large database of images of endovascular treatment for abdominal aorta aneurysms, comprising over 10,000 patients treated between 1999 and 2008, the frequency of patients with major angulations and conical necks progressed throughout the years. The rates of diameter increase in the abdominal aorta aneurysm were significantly higher after 3 years of follow-up in patients treated under a liberal anatomical criterion, when compared with those who met a restricted anatomical criterion. A proximal neck diameter > 32 mm (hazard ratio [HR] 2.07, 95% confidence interval [95% CI] 1.46-2.92) and aortic angle > 60 degrees (HR 1.96, CI 95% 1.63–2.37) predicted a subsequent increase in the diameter.[7] Although the image reviews in this retrospective and limited analysis do not reflect the rates usually reported for diameter increase of the aneurysmatic sac (40% versus approximately 10% in a period of three to five years) or the clinical significance of this finding, they represent a good example of the differences in results arising from liberal patient selection.

The good results that were previously obtained in the treatment of patients with moderate to severe angles in their aortic neck are most likely a result of highly experienced teams and the use of a specific device.[7,13] It is important to stress that the excellent mortality/morbidity data associated with endovascular treatment compared with open surgery apply to patients with adequate anatomy, and the chance of late events related to inadequate selection is significantly higher among patients with a hostile anatomy than among ideal cases.[14] Extrapolating this comparison to the larger group of patients who present hostile anatomy is inadequate, even though the initial results are encouraging.

The generalisation of these data is also difficult in patients with multiple clinical and anatomical risk factors. For this reason, many consider treatment individualisation to be a reasonable strategy. The introduction of fenestrated and ramified devices has advanced the possibility of anatomical treatment for nearly every patient, regardless of anatomy. Careful consideration of the cost-effectiveness of this very expensive procedure, especially in the public health system, deserves additional attention.

It is important to note that the treatment of complex cases demands training and experience that cannot easily be obtained with a low number of cases. These patients must be treated in major reference centres, ideally with the possibility of providing different types of prostheses and complementing the treatment using a percutaneous route when needed, as described by Metzger et al.[8] It is also necessary to inform patients of the higher frequency of late leaks and the importance of constant supervision. Acceptable thresholds of success and complications when wider anatomical indication criteria are applied have yet to be defined.

CONFLICTS OF INTEREST

The author declares no conflicts of interest.

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