EDITORIAL

Hybrid Surgeries Branched Endoprosthesis: Have We Knocked Down the Last Barrier in the Aortic Territory?

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I believe a good synthesis of what the title of this editorial intends to transmit is reflected in a comment recently made by Frank Criado, "Conquering Zone Zero: Expanding Endograft Repair in the Aortic Arch". (1) This refers specifically to the classification of the pathology of the aortic arch introduced by Ishimaru in 2002, in which he calls zone zero the territory involved by the whole arch from the brachiocephalic arterial trunk.

Undoubtedly, the thus far "inaccessible" territory by endovascular via was the arch and the ascending aorta. Even though Inoue and his collaborators showed the feasibility of the total replacement of the aortic arch with a branched stent graft in 1999, (2) the degree of complexity implied in carrying out such procedure, instead of bringing us closer seemed to move us away from the endovascular solution, that is, the conquest of that territory. About a decade ago, however, the group of Inoue had already shown the procedure was feasible.

Several groups continued working on this field, and I stand out Tim Chutter, from San Francisco, United States, who developed various designs to "branch" a stent graft for this area, (3) as also did Roy Greenberg, from Cleveland, United States.

Other techniques have tried to avoid the opening to the chest by performing a debranching at the cervical level only; for this purpose, a stent graft is deployed in "chimney", parallel to the aortic device and targeted to the brachiocephalic trunk (chimney or double-barrel technique). (4, 5)

However, all these pure endovascular techniques require a complex combination of access and use of materials that may cause more complications than benefits, at least regarding the technological development these techniques currently have.

The emergence of hybrid techniques has become an alternative solution, combined, surgical-endovascular, which has simplified the endovascular technique, although it does not require less surgical time, since it involves general anesthesia, sternotomy, various bypasses in the supra-aortic vessels starting from the ascending aorta, which is partially clamped, etc.

In 2006, Ted Dietrich published in The Journal of Endovascular Therapy *several variants which include partial ascending aorta replacements with extra-anatomic bypasses in the neck vessels, partial and total debranching, and even a technique with a transitory conduct to the ascending aorta for the inclusion of an aortic device via anterograde. In the same way, many authors have published various techniques to perform hybrid procedures on this area, all of them very creative and feasible.*

For these reasons, morbi-mortality in this procedure is noticeably lower than morbi-mortality in aortic arch replacement by the traditional surgical technique. Despite the use of endoaortic devices not designed for the ascending aorta, this is due particularly to the tip or nose of the device, which is considerably long and potentially harmful for the left ventricle.

Our group has used some manual techniques during the implant, in order to literally "shorten" that nose so that the aortic valve does not get injured or the nose is not inserted in the ventricle.

Whenever we perform this type of techniques on the aortic arch, we make use of resources to considerably reduce the pressure on the aortic outflow tract, either with adenosine or with high-frequency pacing, so as to be more precise when deploying the device.

It is estimably surprising to see the number of cases reported in Deluca et al work "Replacement of the Neck Vessels and Endovascular Exclusion of Dissections and Aneurisms of the Aortic Arch", which is presented in this issue (6) (ten cases) collected during one year, some of them being skewed according to the program inclusion criteria. Not many centers in our country have, in one year period, such number of cases of admitted patients with this pathology affecting the aortic arch and requiring those treatments.

Finally, I believe it is important to insist on emphasizing that nowadays the best viable alternative to find a solution to these pathologies is to be found in the hybrid treatments, and, for that purpose, it is necessary to have a work team with close communication among surgeons and interventional physicians.

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