CASE REPORT

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New surgical strategy for acute type A aortic dissection: hybrid procedure

Tratamento híbrido com endoprótese não recoberta nas dissecções agudas da aorta tipo A

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Abstract

The new surgical strategy to treat patients with acute type A aortic dissection, the hybrid procedure with an uncovered aortic stent, allows surgeons to treat the aortic arch and the proximal descending aorta, besides the ascending segment, without extension of cerebral or systemic ischemia.

Descriptors: **Aneurysm, dissecting, surgery. Aorta, surgery. Stents.**

Resumo

O tratamento da dissecção aguda da aorta tipo A de Stanford, com a utilização de um novo dispositivo (stent de aorta não recoberto) em associação à interposição de tubo supracoronariano para a substituição da aorta ascendente e hemiarco permitem que o arco aórtico e porção da aorta descendente sejam tratados, sem acrescentar complexidade ao procedimento operatório, nem prolongar o tempo de isquemia cerebral ou sistêmica.

Descritores: **Aneurisma dissecante, cirurgia. Aorta, cirurgia. Contenedores.**

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INTRODUCTION

Acute Stanford type A aortic dissection is a disease which carries an immediate high mortality rate, surgical treatment should be immediate and late survival is not free of complications (especially as a result of the increased persistence of the patent false lumen in the aortic arch segments, abdominal and descending aorta).

The necessity of surgical treatment just after the diagnosis aims at preventing of its fatal complications, such as cardiac tamponade secondary to aortic rupture, acute myocardial infarction, symptomatic aortic regurgitation, neurological complications, among others. Surgical treatment poses a dramatic impact on mortality.

The procedure traditionally proposed is the interposition of the supracoronary tube graft whose in-hospital mortality is varied, ranging from 10% to 30% [1]. It is interesting to note that surgical correction is limited in the great majority of the cases to the ascending aorta. The aortic arch and the thoracoabdominal aorta are the most often affected structures and they remain with their lumen delaminated, which results in risk of up to 40% of significant dilations in these segments in a 5-year follow-up period. Ergin et al. [2] demonstrated a better survival in patients who had a completely thrombosed false lumen after correction of the ascending aorta.

The approach of both aortic arch and descending aorta as an extension of the conventional procedure proposed by some groups makes the procedure much more complex, thus, not being accepted as a conduct to be followed by the majority of the groups, despite the well-known benefit it would bring to the patients if it could be performed with no risk to the patient.

Recovered stent graft endovascular therapeutic is an alternative to conventional replacement of both aortic arch and descending aorta; however, the stent requires a construction of an extra-anatomical graft for the vessels of the base of heart as demonstrated by Sorokin et al. [3]. Studies to support the lifespan of this operation still need to be presented.

Knowing that casual dissections of the coronary arteries during percutaneous procedures for dilatation of obstructive lesions are treated with uncovered stent grafts, why do not do so with the dissected aortas? Based on this principle, animal models of acute aortic dissection were also treated with uncovered stents grafts and it was observed that with the compression of the false lumen with the re-approximation of the delaminated aorta layers by the dilatation of an internal support device (aortic uncovered stent), the healing of the aorta occurred [4]. This strategy consisted in the occlusion of the vessel delamination through extrinsic compression of the aorta layers, promoting support to the healing and consequent prevention to the aorta dilation without occluding its branches.

From these presuppositions, it is possible to envisage a more complete therapeutic to treat Stanford type A aortic dissections, in which the ascending aorta portion is replaced by the conventional technique and the proximal portion of the descending aorta and the aortic arch are treated with uncovered stent graft. Thus, the remnant of the aorta receives healing support, simultaneously maintaining patents its branches. As a consequence, a new perspective of a hybrid treatment arises with the replacement of the ascending aorta and uncovered stent placement in both aortic arch and descending aorta.

This study aims at to describe the experience with this device which allows, by means of a conventional approach, the treatment of the extensive aorta segment without increasing the procedure complexity.

CASE REPORT

A 37-year-old male patient was admitted to the hospital emergency service with a clinical presentation of a high-intensity shooting thoracic pain, beginning 4 hours ago, with a wandering character. On physical examination, the patient presented hemodynamic stability with no signs of peripheral or central ischemia, neither aortic regurgitation. Transesophageal echocardiography showed acute Stanford type A aortic dissection. The diagnosis was corroborated by angiotomography (Figures 1A and 1B) and the patient was referred to surgery.

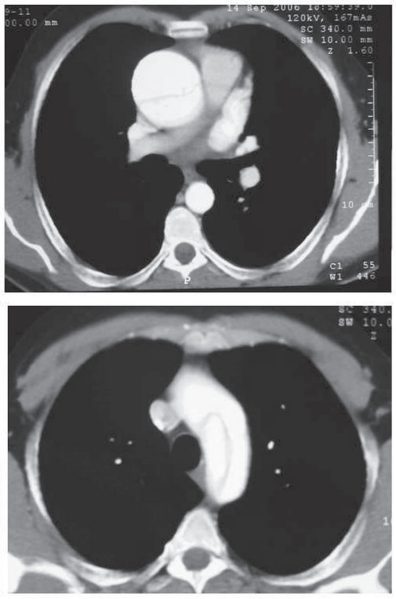
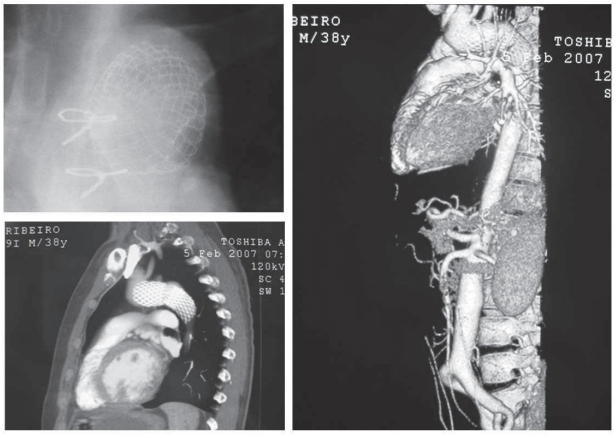


Fig. 1 – Aorta angiotomography showing the vessel delamination, characterizing the dissection as a Stanford type A aortic dissection. A – Dissected ascending aorta with a large dilatation. B – Delaminated aortic arch with a small increase in the diameter

Surgery was performed with cardiopulmonary bypass (CPB), arterial line insertion through Dacron tube placed in the right subclavian artery [5] and single vena cava. The myocardial protection was performed with an intermittent anterograde cardioplegic solution and brain protection with a selective brain perfusion at 25°C. Uncovered aortic stent placement (Djumbodis stent; Saint Côme Chirurgie, Marseille, France), which were 90 mm in length, was performed in the aortic arch/descending aorta (transversal diameter is variable, adjustable to the aorta diameter, balloon dilator expansion-dependent, which reaches a maximum diameter of 45 mm) and interposition of the valved conduit in the ascending aorta by compromising the coronary ostia. Postoperative period was uneventful and the patient was discharged at day 12 postoperatively.

Thoracic radiography (Figure 2A) and angiotomography scan performed 6 months after the surgery (Figures 2B and 2C) show the stent integrity and the absence of patent false lumen in the remaining thoracoabdominal aorta.

A



B C

Fig. 2 – Prosthesis control images performed in the late postoperative period. A – Simple radiography of the thorax showing a different metal meshwork of the stent used. B – Thoracic aorta angiotomography using iodized contrast within the stent. C – Image of the operated aorta characterized by the absence of residual delamination throughout its extension

DISCUSSION

Notwithstanding, the possibility to extend the procedure to the aortic arch and descending aorta, without making it more complex is exciting. By means of this new available device, one can widen the treated aortic segment and eventually providing to the patient with a survival with less morbidity than that provided by the conventional therapy. Theorizations like this one, however, need to be proved from a follow-up of a series of treated patients and in comparison to the outcomes achieved with those ones undergoing conventional treatment.

Uncovered aortic stent graft is a recent therapeutic proposal already used by some European groups. Up to the present time, there are no studies with expressive figures of operated patients neither their behavior during the follow-up period. Even so, the reports are thrilling and allow the widening of therapeutic options for a group of patients at a high-risk of immediate and late complications [6].

REFERENCES

1. Borst HG, Heinemann MK, Stone CD. Surgical treatment of aortic dissection. New York:Churchill Livingstone;1996. p.357.

2. Ergin MA, Phillips RA, Galla JD, Lansman SL, Mendelson DS, Quintana CS, et al. Significance of distal false lume after type A dissection repair. Ann Thorac Surg. 1994;57(4):820-4.

3. Sorokin VA, Chong CF, Lee CN, Wong PS, Tan L, Robless PA. Combined open and endovascular repair of acute type A aortic dissection. Ann Thorac Surg. 2007;83(2):666-8.

4. Marty-Ané C, Serres-Cousiné O, Laborde JC, Laborde JC, Costes V, Alauzen M, et al. Use of endovascular stents for acute aortic dissection: an experimental study. Ann Vasc Surg. 1994;8(5):434-42.

5. Dias RR, Silva IA, Fiorelli AI, Stolf NAG. Proteção cerebral: sítios de canulação arterial e vias de perfusão do cérebro. Rev Bras Cir Cardiovasc. 2007;22(2):235-40.

6. Léobon B, Roux D, Saccani S, Mugniot A, Muscari F, Glock Y, et al. Type A aortic dissection: new surgical strategy using intra-operative stenting. J Thorac Cardiovasc Surg. 2006;131(2):482-3.