

Hybrid Total Arch Repair in Patients with Moderately Dilated Ascending Aorta

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Objectives

Hybrid procedure including aortic endovascular grafting and arch vessels debranching is regarded as a promising alternative approach for the treatment of aortic arch aneurysm. Patients with dilated ascending aorta, however, may be poor candidates for hybrid arch procedure because the size of ascending aorta is crucial for secure proximal landing of stent-graft. In an effort to overcome the proximal landing zone problem in patients with moderately dilated ascending aorta, proximal open fixation technique has been adopted.

Methods

Between March 2008 and May 2010, 22 patients underwent hybrid operation for the treatment of aortic arch aneurysm. Of them, four received a proximal open fixation technique and they formed the subject of this study (Table). Cardiopulmonary bypass was instituted through right axillary artery cannulation and arch vessel debranching was done using a trifurcated or bifurcated artificial graft. Under selective antegrade cerebral perfusion, stent-graft was inserted antegradely after transverse aortotomy at mid-ascending aorta level, and then proximal site of the stent-graft was fixed at aortotomy repair site. Debranched arch-vessel-graft was anastomosed to proximal ascending aorta (Figure).

Results

The median duration (range) of cardiopulmonary bypass, aortic cross-clamp, and antegrade selective cerebral perfusion was 199 minutes (190–209), 37 minutes (30–43), and 38 minutes (36–49), respectively. Primary technical success was achieved in all patients. There were no early mortality and one quadriplegia. During a median follow-up duration of 4.6 months (1.7–15.6), there was one late death due to respiratory failure. When evaluated with computed tomography postoperatively (median 3.9 months), there were no endoleak, graft migration, graft

thrombosis or aneurysm dilatation in all patients.

Conclusion

Hybrid arch procedure involving proximal open fixation technique seems to be a useful method in patients with aortic arch aneurysm and moderately dilated ascending aorta.

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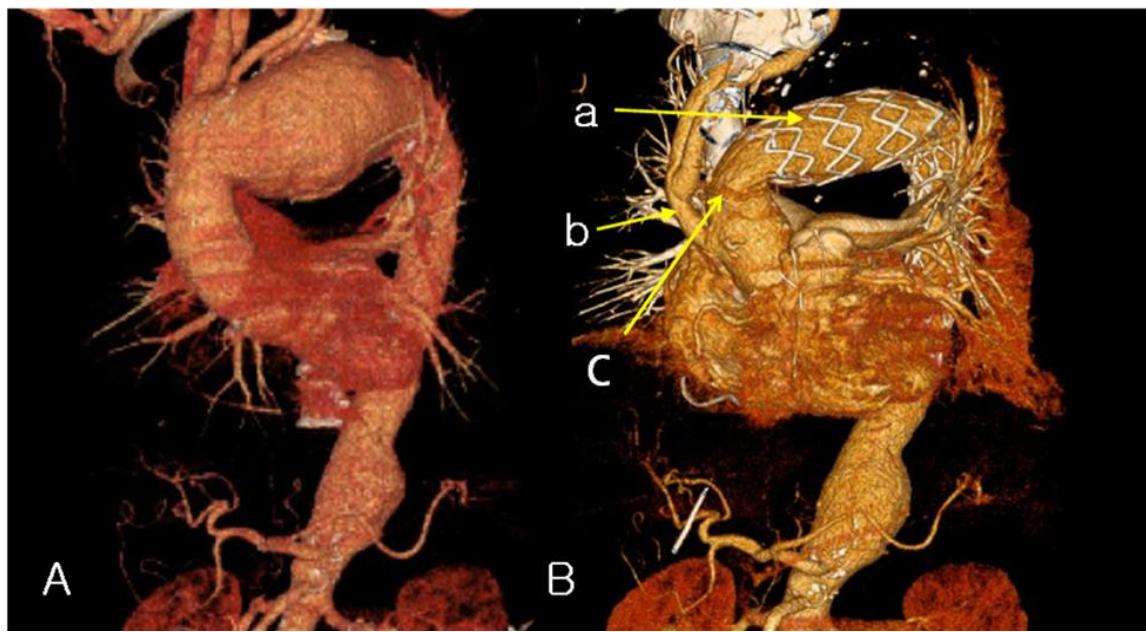


Figure. Pre- (A) and post-procedural CT findings of a 67-year male patient, diagnosed as aortic arch aneurysm who underwent hybrid aortic surgery. An endovascular stent-graft is placed from the beginning of arch to descending thoracic aorta (B-a). Arch vessels are debranched from the arch, and then innominate and left common carotid arteries are bypassed to the proximal ascending aorta using a Y-graft (B-b). Open fixation site of stent proximal landing (B-c).

Table. Patients' profiles

| Patient No. | Diagnosis | Co-morbidity | Maximal Aorta diameter (mm) | Asc. Aorta diameter (mm) | operation | Early events |
|-------------|----------------------|--------------|-----------------------------|--------------------------|--|--------------|
| 1 (67/Male) | Arch aneurysm | AAA | 90 | 48 | RIA & LCCA debranch and bypass + stent | |
| 2 (66/Male) | Asc. + Arch aneurysm | | 70 | 42 | RIA & LCCA debranch ans bypass + stent | Quadriplegia |
| 3 (73/Male) | Arch+ Desc. aneurysm | | 60 | 42 | All arch vessel debranch and bypass +stent | |
| 4 (65/Male) | Arch aneurysm | AAA, HCMP | 67 | 43 | All arch vessel debranch and bypass +stent | |

Abbreviations: AAA, abdominal aortic aneurysm; Asc., ascending; Desc., descending; RIA, right innominate artery; LCCA, left common carotid artery; HCMP, hypertrophic cardiomyopathy.