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Does Endovascular Duration Impact Clinical Outcomes in Aortic Arch Repair? The RELAY™ Branched International Stance

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Background: The high mortality and morbidity rates in surgical aortic arch repair are a barrier to therapy for a considerable proportion of patients with aortic arch aneurysm or dissection. There is hence a demand for the development and adoption of a minimally invasive alternative to aortic arch repair, such as thoracic endovascular aortic repair (TEVAR). Procedural duration is a key factor in the pathogenesis of complications in surgical aortic arch repair.

Objectives: Herein, we evaluate whether endovascular duration impacts neurological outcomes, target vessel patency, and reintervention rates in aortic arch TEVAR with RELAY™ Branched

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(Terumo Aortic, Inchinnan, UK), which is specifically developed for on-label use within the aortic arch.

Methods: Prospective data was collected between January 2019 and January 2022 on the clinical outcomes of TEVAR for aortic arch dissection and aneurysm with RELAY™ single-, double-, and triple branched endoprostheses from centers across Europe. They were then retrospectively analyzed with descriptive and distributive analysis. Follow-up data on the incidence of disabling stroke (DS), target vessel patency, and reintervention from 30 days and 6-, 12-, and 24 months postoperative was included in the analysis.

Results:147 (99.3%) of all 148 cases were successful. Over the 24-month follow-up period, in total 6 (4.1%) patients suffered DS, 24 (16.3%) required reintervention, and target vessel patency was exhibited in 118 (80.2%) patients. The modal endovascular duration was 100–150 min (in 64.6%, n = 95 cases). Analysis revealed that endovascular duration was associated with a lower likelihood of reintervention at 30 days, 6-, and 12 months (P = 0.011, P = 0.019, P = 0.037), a greater likelihood of target vessel patency at 6- and 24 months (P = 0.032, P = 0.035). No relationship between endovascular duration and DS was revealed.

Conclusion: The data demonstrates that RELAY™ Branched is associated with promising clinical outcomes for on-label aortic arch TEVAR. The underlying mechanism linking endovascular duration and reintervention rates, or target vessel patency is likely multifactorial and complex. Given that TEVAR is carried out under general anesthetic only, it is unlikely that prolonged procedural duration has any major effect over neurological outcomes for arch TEVAR.

Keywords: Thoracic aortic aneurysm, aneurysm, RELAY™, TEVAR, branched RELAY, custom-made device technology.

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