Hemiarch vs Extended Arch Repair for Acute Type A Dissection: Results from a Multicenter National Database

Objective: To compare perioperative outcomes of patients with Acute Type A Dissection (ATAD) undergoing hemiarch (HA) vs extended arch (EA) repair.

Methods: A national multicenter aortic surgery database was searched for all patients undergoing surgery for ATAD from 2002-2021. After excluding chronic or type B dissections, 947 patients from 9 centers remained. EA was defined as: total arch repair with or without elephant trunk (frozen or conventional), hemiarch with antegrade TEVAR, or AMDS uncovered dissection stent. HA was defined as open distal ascending aortic repair. Primary outcomes were early mortality, permanent neurologic deficit (ND: any clinical neurologic deficit persisting until discharge including stroke and spinal cord injury), CT resolution of malperfusion, and a composite (STS-COMP: death, stroke, re-exploration for bleeding, renal failure, deep sternal infection, or > 40 hours ventilated). Multivariable mixed-effect logistic regression models accounting for center were performed to identify independent predictors of primary outcomes.

Results: Mean age was 66±18 years and 38% (284/947) were women. HA was more frequent (75%, n=710) than EA (25%, n=237). EA techniques included: AMDS (13%, 31/237), antegrade TEVAR (9%, 21/237), and elephant trunk (conventional: 38%, 89/237, frozen: 22%, 53/237); the remainder had EA by other techniques. Hypertension, connective tissue disorder, presentation with malperfusion, and prior aortic intervention were more common in the EA group, while coronary disease and NYHA III/IV was more common in the HA group. EA patients had longer median duration of cardiopulmonary bypass [216 mins [165, 269] vs 193 mins [147, 246] p<0.001] and hypothermic circulatory arrest [36 mins [23,56] vs 24 mins [17,33] p<0.001]. In-hospital mortality was similar between groups [EA 21% (n=50), HA 19% (n=133), p =0.43] as was ND [EA 18% (n=42), HA 18% (n=126) 0.99], whereas STS-COMP was lower after HA repair [EA 57% (n=134), HA 47% (n=343) p=0.03] (Table 1). Extended arch strategy was not an independent predictor of mortality [OR: 1.15 (95%CI: 0.84, 1.56), p=0.39] or ND [OR: 1.01 (95%CI: 0.52, 1.94) p=0.98], but was associated with greater risk of adverse events: STS-COMP [OR: 1.53 (95%CI: 1.19, 1.97), p=0.001]. Among 214 individuals presenting with malperfusion with available postoperative CT images, malperfusion resolved more frequently after EA [EA 70% (n=48/69), HA 50% (n=71/145) p=0.015], however on multivariable analysis, arch repair strategy was not associated with improved resolution of malperfusion [OR: 1.60 (95%CI: 0.82, 3.12), p=0.16].

Conclusions: EA repair was not associated with mortality or neurological deficit but was associated with more adverse events after ATAD. EA may be performed with similar results to HA in ATAD patients requiring more aggressive distal aortic repair, but may positively influence resolution of distal malperfusion.

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