

# Aortic vs. Axillary Cannulation for Aortic Arch Surgery

**Objective:** Central aortic cannulation for aortic arch surgery has become more popular among aortic surgeons over the last decade, however, evidence comparing it to axillary artery cannulation remains equivocal. This study compares postoperative outcomes of patients who underwent axillary artery and central aortic cannulation for cardiopulmonary bypass during aortic arch surgery.

**Methods:** A retrospective review of all patients who underwent aortic arch surgery at our institution between 2005 and 2020 was performed. Patients who underwent previous aortic surgery and patients who were cannulated at a site other than the axillary artery or aorta were excluded. The primary outcome of interest was failure to achieve uneventful recovery, defined as having experienced at least one of the following complications: in-hospital mortality, stroke, bleeding requiring re-operation, prolonged ventilation, renal failure, mediastinitis, superficial surgical site infection, and pacemaker or ICD implantation. Nearest neighbor propensity score matching was used to account for baseline differences across the groups. Outcomes were compared using the Chi-Squared Test.

**Results:** Among the 724 patients (axillary: 457 vs. aorta: 267) who met inclusion and exclusion criteria, 420 patients (axillary: 210 vs. aorta: 210) remained after propensity score matching. Within the matched cohort, 32.4% of patients (133/410) underwent urgent or emergent surgery; aneurysm was the most common surgical indication at 69.3% of patients (284/410) followed by dissection at 26.6% of patients (109/410); the aortic root was replaced in 52.9% of patients (217/410); and the extent of aortic replacement was defined as hemi-arch in 59.0% of patients (242/410). Propensity score matching resulted in comparable groups. There was no significant difference in the composite outcome of failure to achieve uneventful recovery across groups in the unmatched (axillary: 33.3% [152/457] vs. aorta: 32.3% [86/267];  $p = 0.269$ ) or matched (axillary: 31.9% [67/210] vs. aorta: 31.9% [67/210];  $p = 0.492$ ) cohorts. There was also no significant difference in each of the individual outcomes included in failure to achieve uneventful recovery across groups in both the unmatched and matched cohorts. Stroke occurred in 16 patients in the axillary group and in 12 patients in the aorta group ( $p = 0.557$ ). Twelve patients died in-hospital in the axillary group whereas 8 patients died in-hospital in the aorta group ( $p = 0.492$ ). The most common postoperative complication in both cohorts was prolonged ventilation, which in the matched cohort occurred in 33 patients in the axillary group and 38 patients in the aorta group ( $p = 0.603$ ).

**Conclusions:** Central aortic cannulation does not appear to be inferior to axillary arterial cannulation in aortic arch surgery.

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Kerry Filtz (1), Michael Simpson (1), Samantha Nemeth (1), Yaagnik Kosuri (1), Paul Kurlansky (1), Virendra Patel (1), Hiroo Takayama (1), (1) New York Presbyterian/Columbia, New York, NY

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## Postoperative Outcomes of Matched Cohort

	Axillary (N = 210) <sup>1</sup>	Aorta (N = 210) <sup>1</sup>	P-Value <sup>2</sup>
Stroke	16 (7.6)	12 (5.7)	0.557
TIA	7 (3.3)	2 (1.0)	0.175
Reoperation for Bleeding	10 (4.8)	17 (8.1)	0.233
Surgical Site Infection	9 (4.3)	2 (1.0)	0.062
Mediastinitis	4 (1.9)	1 (0.5)	0.372
Renal Failure	21 (10.0)	21 (10.0)	1
Prolonged Ventilation	33 (15.7)	38 (18.1)	0.603
Pacemaker or ICD	11 (5.2)	11 (5.2)	1
Postoperative LOS	7.0 [5.0-11.8]	8.0 [5.3-13.0]	0.137
In-Hospital Mortality	12 (5.7)	8 (3.8)	0.492
Failure to Achieve Uneventful Recovery	67 (31.9)	67 (31.9)	1

<sup>1</sup> n(%); median [IQR]

<sup>2</sup> P-value < 0.0045 indicates significance