Title: Infrarenal Endovascular Aortic Repair (EVAR) in Patients with Hostile Neck Anatomy is Associated with Worse Outcomes

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Background: The current indications for infrarenal EVAR in patients with hostile neck anatomy (HNA) are on label for short aortic necks, with suprarenal fixation adopted to enhance device durability; however, long-term outcomes remain poorly defined.

Methods: The Vascular Implant Surveillance and Interventional Outcomes Network (VISION), a registry linking the Vascular Quality Initiative (VQI) data with Medicare claims, from 2015-2019 was used. The characteristics of patients with HNA were compared to those with favorable neck anatomy (FNA). HNA was defined as any or all of neck length <15 mm, diameter >28 mm, and angle ≥60 degrees.
Outcomes after elective EVAR were compared between patients with HNA versus FNA, as well as between suprarenal and infrarenal fixation within each group. Kaplan-Meier analyses and multivariable Cox regressions were used to assess 3-year outcomes including reintervention, rupture, all-cause mortality, and aneurysm-related mortality.

Results: 6,742 patients underwent elective EVAR (27% HNA). Compared with FNA, patients with HNA were older and were more likely to be females (Table.1). Kaplan-Meier analysis showed significantly higher 3-year all-cause mortality (25% vs. 19%; P<0.001), reintervention (12.5% vs. 9.5%; P=0.021), and rupture rates (1.3% vs. 0.7%; P=0.023) with HNA compared to FNA, while aneurysm-related mortality was not different (1.7% vs. 1.2%; P=0.21). Cox regression demonstrated that HNA was independently associated with all-cause mortality (HR=1.22[1.08-1.36]; P<0.001), but not reintervention (HR=1.06[0.89-1.27]; P=0.5), rupture (HR=1.02[0.64-1.63]; P=0.9), or aneurysm-related mortality (HR=0.91[0.57-1.46]; P=0.9).
In the HNA subgroup, 23.5% had suprarenal fixation and 76.5% had infrarenal fixation. Kaplan-Meier curve showed more ruptures (2.8% vs. 0.8%; P=0.012, HR=2.04[0.89-4.65]; P=0.09), and a higher trend of aneurysm-related mortality (2.2% vs. 1.5%; P=0.15, HR=2.36[0.99-5.59]; P=0.051) with suprarenal fixation. Rates of reintervention (12.2% vs. 12.6%; P=0.86, HR=1.16[0.82-1.64]) and all-cause mortality (24.5% vs. 25%; P=0.75, HR=0.97[0.77-1.22]) were not different by fixation type.
In the FNA subgroup, 20% had suprarenal fixation and 80% had infrarenal fixation. Kaplan-Meier showed no significant differences in 3-year rupture rates (0.7% vs. 0.7%: P=0.97), reintervention rates (9.3% vs. 9.6%; P=0.6), all-cause mortality (19.9% vs. 19.6%; P=0.91), and aneurysm-related mortality (1.7% vs. 1.0; P=0.26) with suprarenal compared to infrarenal fixation.

Conclusions: Patients undergoing elective EVAR with HNA have higher long-term all-cause mortality, reintervention, and rupture rates compared with FNA. In patients with HNA, suprarenal fixation did not improve 3-year outcomes and was associated with significantly higher rupture rates. Infrarenal EVAR in patients with HNA is not durable and a different sealing strategy should be considered to improve long-term outcomes.