

Secondary Interventions After Total Arch Replacement With Frozen Elephant Trunk

Clara Bosco, MD¹; Krishay Sridalla, BA¹; Calvin Chao, MD¹; Beth Whippo, MSN¹; Heather Byrd²; Seokyoung An²; Abigail Baldrige²; Christopher Mehta, MD³; Neel Mansukhani, MD¹

¹Division of Vascular Surgery; ²Bluhm Cardiovascular Institute Clinical Trials Unit; ³Division of Cardiac Surgery

Background

- Total aortic arch replacement with frozen elephant trunk (FET) is a hybrid procedure that combines aortic arch replacement with stent grafting of the descending thoracic aorta
- Insight into patient-related factors, indications, and timing of distal re-intervention after FET is limited.

Research Objectives

The primary objective was to evaluate outcomes following FET implantation and identify factors associated with and timing of distal aortic re-intervention.

Methods

- Data drawn from a prospectively maintained aortic database, with additional variables collected through retrospective review of the electronic health record.
- We included adult patients (≥18 years) who underwent a total arch replacement with FET procedure between 2014 and 2025. Patients who underwent a classic elephant trunk procedure were excluded.

Results

- Of 146 patients, 32 underwent aortic re-intervention, primarily endovascular.
- Hyperlipidemia or prior aortic intervention were associated with re-intervention.
- The cumulative incidence of re-intervention at 12 and 36 months was 19.2% and 33.0%, respectively.

Figure 1: Annual volume of frozen elephant trunk procedures and aortic reinterventions

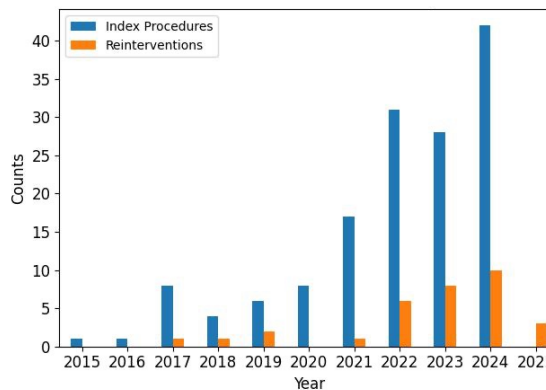


Figure 2: Cumulative incidence of aortic re-intervention accounting for competing risks (death) following FET

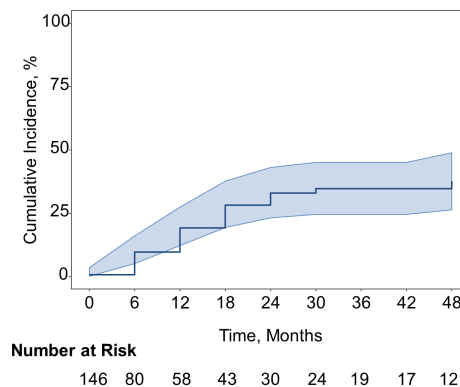
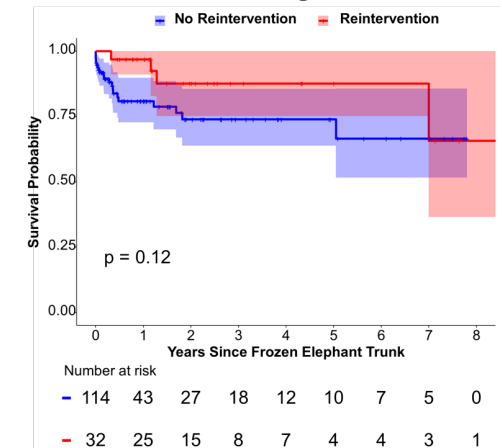


Figure 3: Kaplan-Meier analysis of OS in patients with aortic re-intervention compared with patients without aortic re-intervention following FET



Limitations

- Modest sample size
- Limited follow-up time

Conclusions

- Most reinterventions were endovascular and did not affect overall mortality.
- Patients with greater comorbidity burden and prior aortic interventions had increased re-intervention risk.
- These findings highlight FET as a platform for staged aortic repair and emphasize the importance of longitudinal surveillance and multidisciplinary longitudinal decision-making.