

Aerodigestive Function Before and After Pediatric Vascular Ring Repair: A Longitudinal Analysis

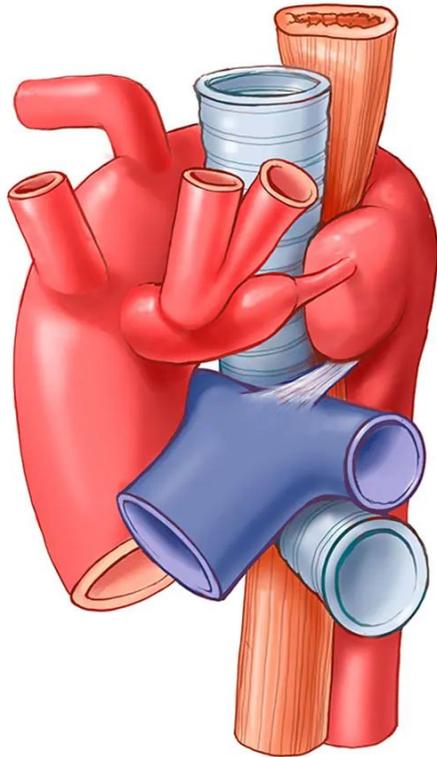
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Introduction



- Congenital aortic-arch anomalies that encircle the trachea and esophagus → direct aerodigestive compression
- Presentation- stridor, dysphagia/aspiration, dyspnea
- Anatomic repair effective, meaningful subset of children have persistent respiratory or swallowing symptoms afterward
- Optimal care multidisciplinary (ENT, Pulmonology, Cardiac Surgery, GI/SLP); in practice, pre-operative swallow evaluation (SLP/VFSS) is inconsistent
- Clinical need: better characterization of aerodigestive function before and after repair in contemporary pediatric cohorts



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Objective

- **Primary:** Quantify change in aerodigestive function before → after vascular ring repair
- **Secondary:** Describe utilization of pre-operative swallowing assessments in dysphagic patients (SLP consult, VFSS)
- **Exploratory:** Summarize findings across clinical subgroups (syndromic diagnosis, prematurity, intra-op malacia/compression on MLB, baseline feeding tube)



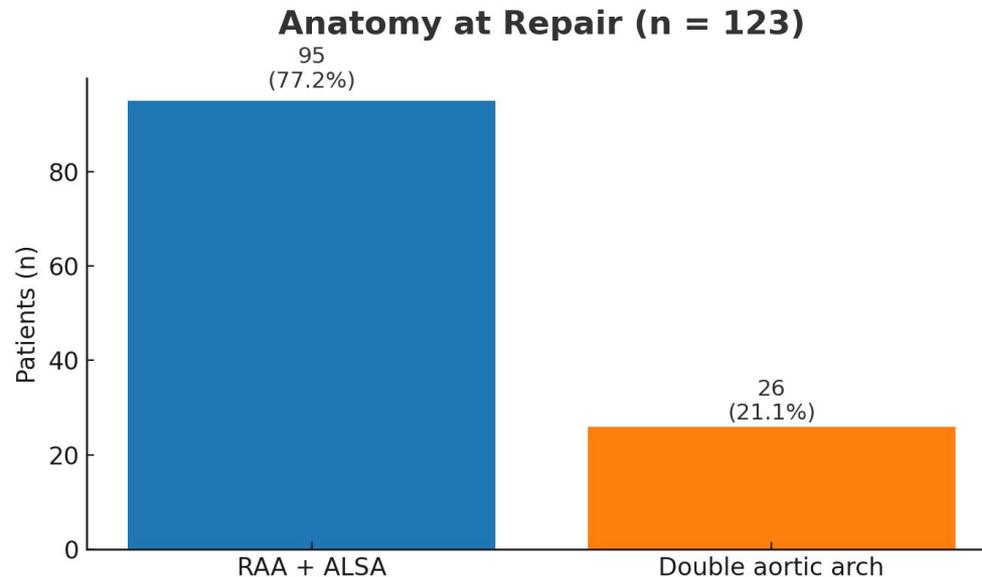
Methods

- **Design & timeframe:** Retrospective chart review Jan 2020–Mar 2025
- **Cohort:** 122 pediatric patients with vascular rings who underwent repair
- **Data collected:**
 - **Aerodigestive (pre & post):** respiratory symptoms (stridor/dyspnea), dysphagia/aspiration, diet level/feeding tube status
 - **Surgical:** indication, operative details, intra-op ENT MLB malacia/compression, length of stay
 - **Demographics & clinical factors:** syndromic diagnosis, prematurity



Results

- **Cohort & anatomy:** 123 repairs; **RAA + aberrant LSA** 95 (77.2%), **double aortic arch** 26 (21.1%); median age **0.75 years** (IQR 0.4–1.85); **syndromic** 21 (5 22q, 5 T21, 4 VACTERL, 7 other); **prematurity** 17 (13.8%)



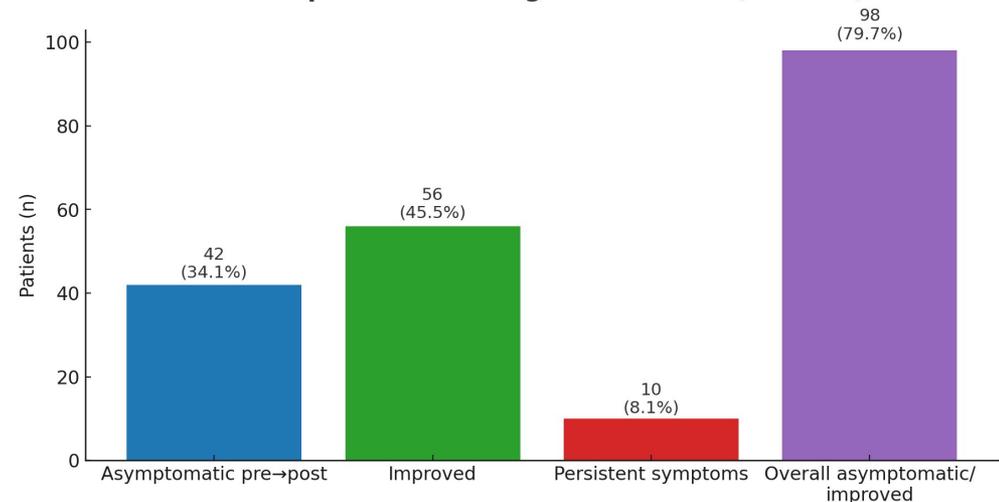
Note: 2 (1.6%) other/unspecified not shown



Results

- **Pre-operative symptoms:** stridor/dyspnea **41 (33.3%)**; dysphagia **59 (50.0%)**; aspiration **22 (17.9%)**
- **Post-operative aerodigestive status:**
 - **Asymptomatic pre- and post-op: 42 (36.8%)**
 - **Improved symptoms: 56 (49.1%)**
 - **Newly recognized aspiration post-op: 6 (5.3%)** (likely unassessed pre-op)
 - **Persistent symptoms: 10 (8.8%)**
 - **Overall asymptomatic or improved: 98/123 (79.7%).**

Post-operative Aerodigestive Status (n = 123)



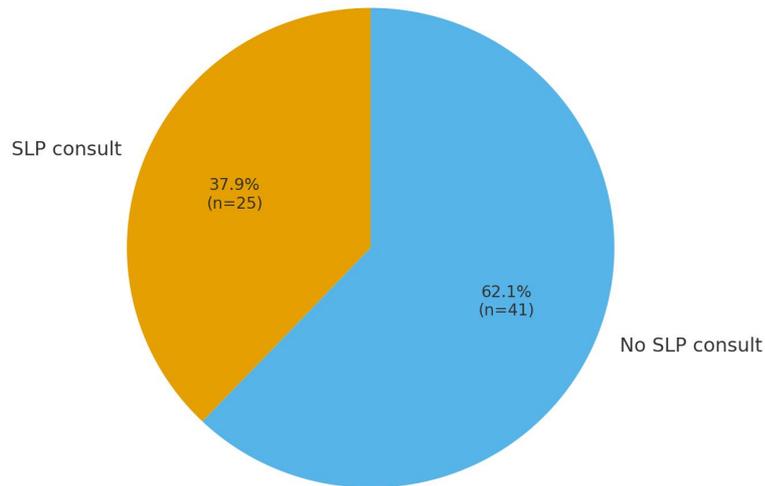
Newly recognized aspiration post-op: 6 (5.3%) — likely unassessed pre-op



Results

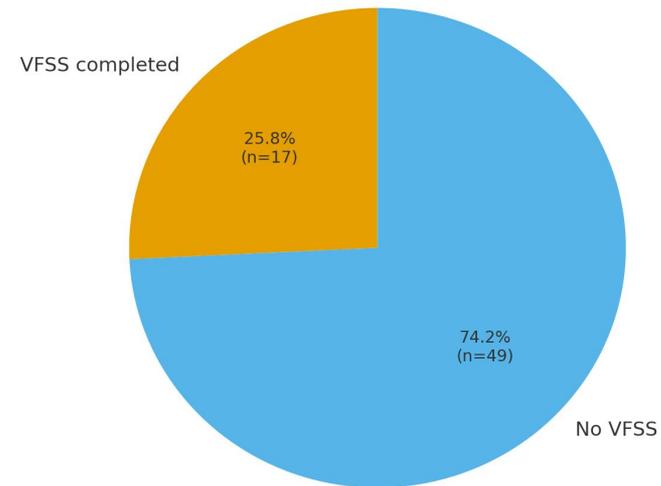
- **Feeding tube trajectory:** pre-op tube **13 (8.9%)** → **3** removed post-op; **1** advanced diet but remained tube-dependent
- **Pre-op swallow evaluation:** among those with dysphagia (n=66), **SLP consult 25 (44.6%)**; **Swallow study 17 (30.3%)** □ **less than 25% of all patients were evaluated by SLP**

Pre-op SLP Consult among Dysphagia (n = 66)



Percentages computed from counts (25/66).

Pre-op VFSS among Dysphagia (n = 66)



Percentages computed from counts (17/66).



Results

Exploratory — Clinical subgroups

- **Intra-op malacia/compression severity** showed no association with:
 - **Syndromic status** ($p = 0.82$)
 - **Prematurity** ($p = 0.35$)
 - **Baseline feeding tube** ($p = 0.13$)
- **Post-op symptom status** (asymptomatic/improved vs persistent) **did not differ significantly** across **syndromic vs non-syndromic, premature vs term, or baseline tube vs no tube** (all Fisher's tests non-significant)



Conclusion

- ~**80%** were asymptomatic or improved post-repair; **8.8%** had persistent symptoms; **5.3%** had newly recognized aspiration (likely underassessment pre-op)
- **Subgroups:** No significant difference by **syndrome, prematurity, or baseline feeding ube tube** in intra-op malacia/compression or post-op symptom status
- **Care gap:** Standardized pre-op swallowing evaluation and post-op follow-up (SLP/VFSS)



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Significance

- Reinforces **multidisciplinary pathways** (ENT, Pulmonology, Cardiac Surgery, GI, SLP)
- Identifies a **care gap**: among all children, **SLP ~20%** and among dysphagic children, **SLP 44.6%** and **VFSS 30.3%** pre-op → opportunity for protocolized assessment
- Suggests **quality metrics**: (1) SLP consult rate in all patients pre-op, (2) VFSS completion rate, (3) diet/feeding tube status at 3–6 months



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Limitations

- Retrospective single-center; incomplete pre-op SLP/VFSS data; limited standardized symptom scoring



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Future Directions

- Kommerell diverticulum
- Pulmonary artery sling
- Rady



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Thank you!