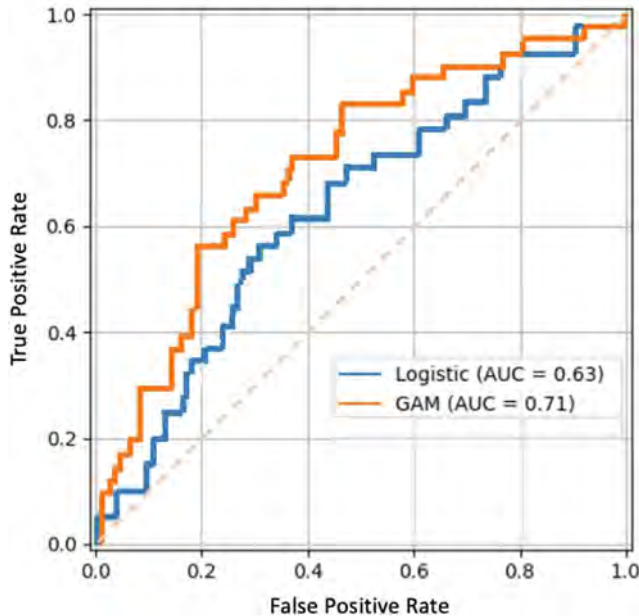
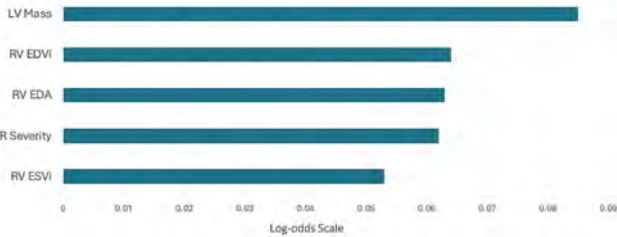


using baseline echocardiogram features from the PHN SVR data set. Machine learning can provide additive value in the analysis of publicly available tabular data.

ROC Curve: GAM vs Logistic



Strength of Influence on Model Prediction



P10-04

Improving Image Quality through Use of Ultrasound Enhancing Agents in Pediatric Echocardiography

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Background: Transthoracic echocardiography (TTE) is used for diagnosing congenital and acquired heart disease in children. Although pediatric patients have favorable acoustic windows, certain populations present imaging limitations that impair diagnostic accuracy. Ultrasound enhancing agents (UEAs) improve endocardial border delineation in adult patients, yet pediatric adoption remains limited. We evaluated the effect of UEA use on bi-ventricular image quality using standardized scoring methods. We hypothesized that UEA use in pediatric echocardiography is clinically feasible and safe in children with congenital and acquired heart disease. **Methods:** We performed a single center retrospective review of all echocardiograms utilizing UEAs at Ann & Robert H. Lurie Children's Hospital of Chicago between June 1, 2021, and May 31, 2024. Demographic and clinical data were collected. A physician with advanced imaging training independently reviewed all studies. LV image quality scored using the American Society of Echocardiography 16-segment EBD model, and RV image quality using a 4-segment scoring system. Composite EBD scores were compared between non-contrast 2D and UEA imaging using paired t-tests. **Results:** A total of 103 UEA echocardiograms were performed in 82 patients (mean age 17 +/- 7.7 years; range 6 days-43 years) Indications included endocardial border delineation (89%), RV functional assessment (23%), vascular evaluation (13%), and thrombus assessment (10%). LV EBD improved from a mean of 9.5 to 14.6 segments with UEA (58.5% to 91.2% visualized, p<0.001). RV EBD improved from 2.6 to 3.7 segments (65.7% to 92.5% visualized, p<0.001). Improvements were consistent across diagnostic subgroups. One serious (1.2%) and two non-serious (2.2%) adverse events occurred. **Conclusions:** UEA administration significantly improved LV and RV visualization in pediatric patients, including those with congenital heart disease and advanced cardiac pathology. UEA was feasible and demonstrated a favorable safety profile, supporting its role as an imaging innovation to enhance diagnostic confidence and expand clinical applications beyond the FDA-approved indications. Barriers to broader pediatric adoption include

safety perceptions, vascular access concerns, and the need for targeted education of patients, physicians, nurses and sonographers.

P10-05

Utility of Follow-Up Surveillance Echocardiograms in Uncomplicated Surgical Closure of a Perimembranous Ventricular Septal Defect

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Background: Ventricular septal defects (VSD) are the most common form of congenital heart disease (CHD), making up about 40-50% of all CHD. Current North American guidelines recommend long-term surveillance transthoracic echocardiograms (TTE) following surgical closure of a perimembranous VSD (pVSD); however, the duration of surveillance TTEs is not explicitly stated. The goal of this study was to determine the utility of follow-up TTEs after uncomplicated surgical closure of a pVSD. **Methods:** A single-site retrospective analysis was conducted on patients who had a pVSD surgical closure between 1/1/2000 and 12/31/2024. Patients were excluded if they were diagnosed with other CHD, had no data within 1-year post-repair, or had persistent complications at 1-year post-repair. Serial TTEs were reviewed. A Kaplan Meier curve was used to illustrate the 5-year complication-free survival. **Results:** A total of 117 patients met inclusion criteria. Median age at pVSD closure was 6-months (IQR; 4, 13). A 97% 5-year complication-free survival was observed (Figure 1). Four patients were found to have complications >1-year post-repair: 1 non-obstructive subaortic ridge, 1 mild pulmonary vein stenosis (mean gradient 2 - 3 mmHg), 1 pinhole residual pVSD, and 1 ventricular ectopy with left ventricular dysfunction. The patient with ventricular ectopy required medical intervention while other complications resolved or remained stable (Table 1). Of the 113 complication-free patients, 197 TTEs were performed >1-year post-repair with no change in clinical management. **Conclusion:** Beyond 1-year post-repair, the occurrence of new complications in patients who underwent uncomplicated surgical closure of a pVSD was rare. Unless new clinical concerns arise, the utility of routine TTEs >1-year post-repair should be reassessed. Larger multicenter studies would be beneficial in determining the utility of routine surveillance TTEs as well as the duration of recommended follow-up.

Figure 1: Time to Complication

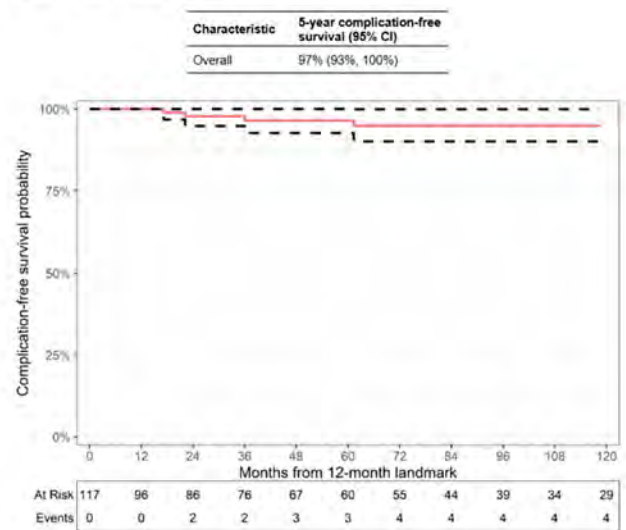


Table 1: Complications Occurring after 1-year Post-Repair

Complications	Patient 1	Patient 2	Patient 3	Patient 4
Time since surgery	48-months	29-months	73-months	34-months
TTE finding	Non-obstructive subaortic ridge	Mild pulmonary vein stenosis	Pinhole residual VSD	Ventricular ectopy with dysfunction
Symptomatic	No	No	No	Yes
Last Clinic Visit				
# TTEs post-repair	2	1	3	3
Last TTE post-repair	85-months	29-months	161-months	80-months
TTE finding	Subaortic ridge still present	Stable RLPV gradient	Resolution of the residual VSD	Persistent dysfunction and ectopy
Change in management	No	No	No	Medication and RVOT ablation
Outcome	Follows with Cardiology	Follows with Cardiology	Discharged from Cardiology	Lost to follow-up

P10-06

Serial Pre-Operative Echocardiography of Aortic and Mitral Valve Growth and Post-Operative Outcomes in the Borderline Left Heart

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Background: Selection of single-ventricle (SV) versus biventricular (BiV) surgery in infants with borderline left heart anatomy is often based on early echocardiographic valve dimensions in addition to other factors. However, longitudinal valve growth patterns prior