

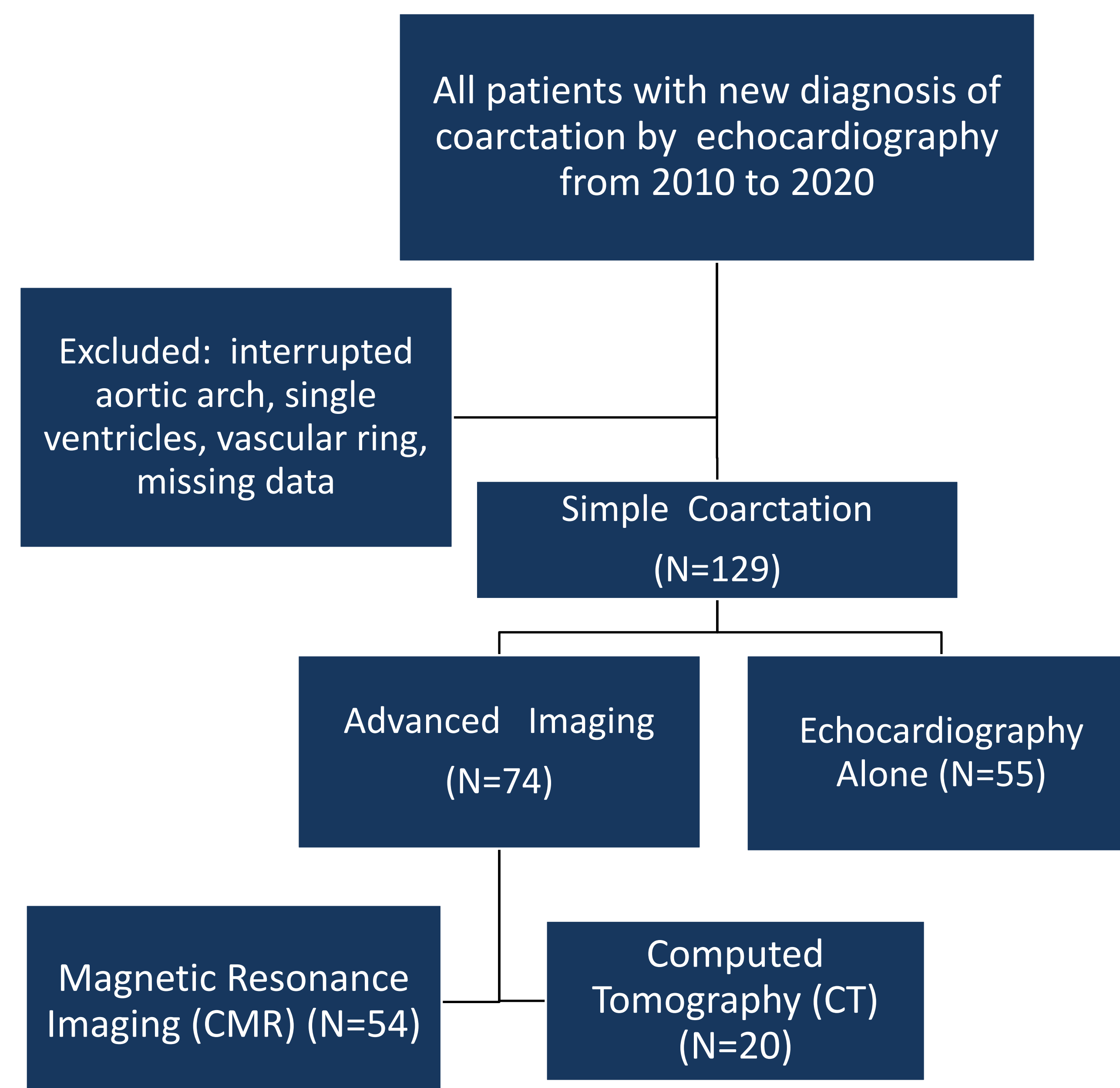
## Background

- Coarctation of the aorta (CoA) is primarily diagnosed using transthoracic echocardiography (TTE).
- Advanced cross-sectional imaging, including computed tomography (CT) and cardiac magnetic resonance (CMR), is often used for pre-operative planning.
- CT/CMR carry additional risks related to anesthesia, intubation, radiation, and intravenous contrast.
- We aimed to determine the diagnostic accuracy of TTE compared to advanced imaging for pre-intervention assessment of CoA.

## Study Design

- Our echocardiography database was reviewed to identify patients with new diagnosis of CoA from 2010 to 2020.
- CoA associated with other significant arch anomalies, such as hypoplastic left heart, vascular ring, and interrupted aortic arch, were excluded.
- Patients with simple CoA were included.
- Medical records were reviewed to identify those with additional pre-intervention advanced imaging.
- Two sets of measurements were made on the TTE and CT/CMR from independent observers.
- Imaging findings related to the aortic arch were compared on each patient using standard tests of significance including Fisher's Exact test, paired t-test, and accuracy of TTE was compared to CT/CMR.
- Study data was collected and managed using REDCap electronic data capture tools (University of Arizona).

## Methods



Baseline Characteristics (N=74)	
Characteristic	Number (%)
<b>Sex</b>	
Male	50 (67.6%)
<b>Age at Diagnosis</b>	
Prenatal Diagnosis	21 (28.4%)
Postnatal (before 1 year of age)	47 (63.5%)
Postnatal (after 1 year of age)	27 (36.5%)
<b>Coarctation Type by Echo (TTE)</b>	
Discrete	33 (44.6%)
Long Segment	41 (55.4%)

## Results

### Diagnostic Accuracy of Echocardiography in Comparison to CT/CMR in Pre-Operative Assessment of Coarctation

	Number	Agreement
<b>Discrete vs Long Segment</b>	73/74	99%
<b>Aortic Arch Sidedness</b>	71/74	96%
<b>Aortic Arch Branching</b>	71/74	96%

- Average time from TTE to advanced imaging was 11 days.
- For one patient, CoA was suspected by TTE, and excluded by advanced imaging.
- For one patient, the long segment CoA seen on TTE was considered discrete CoA by CT. TTE also did not determine the arch sidedness on the same patient.
- For two patients, arch sidedness was not well seen by TTE.
- An abnormal subclavian artery origin was missed for one patient on TTE, and branching was not well defined for two patients on TTE.

### Correlation Between Aortic Measurements (mm) by Echocardiogram and Advanced Imaging \*

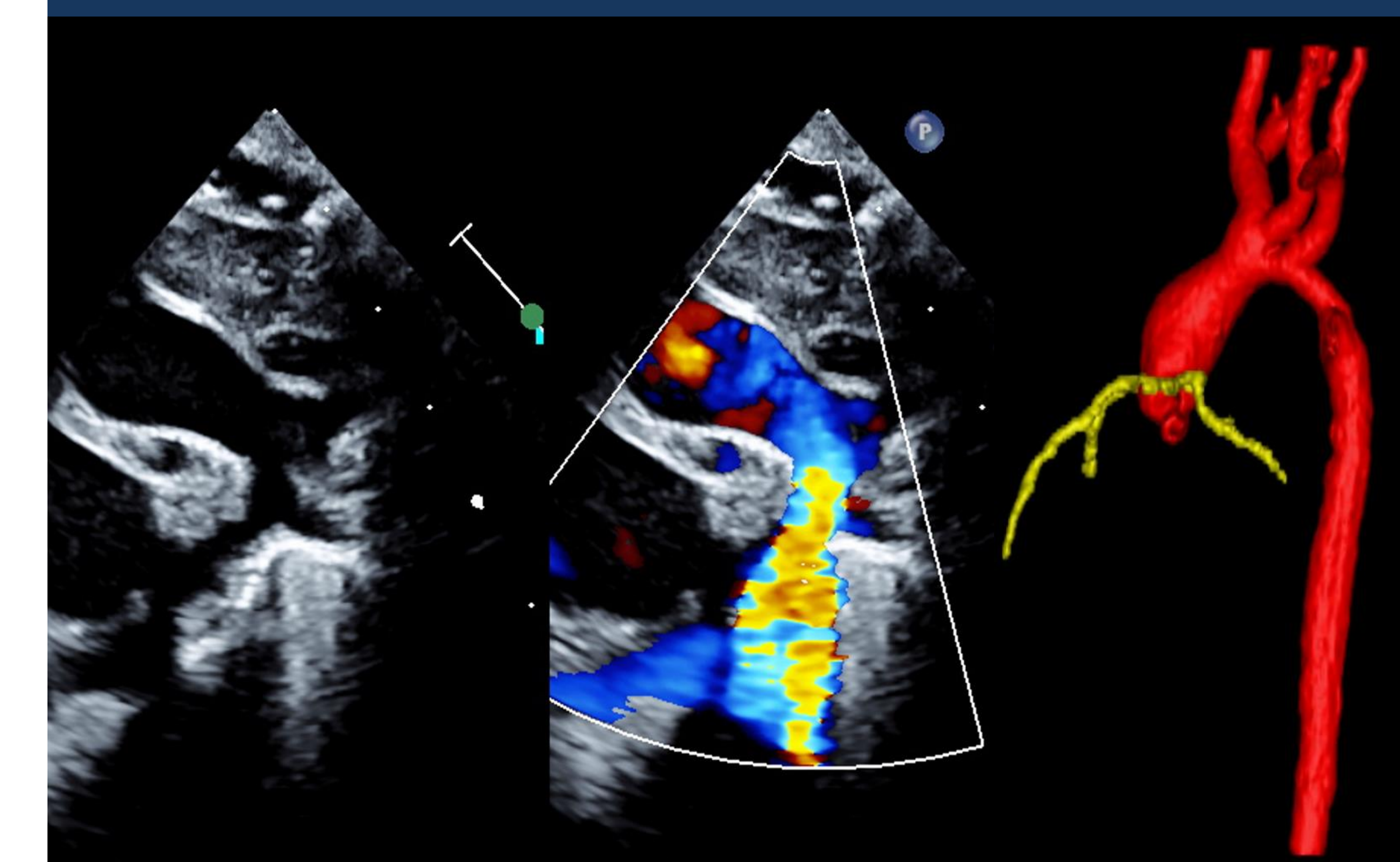
	TTE	CT/MRI	
	Mean (SEM)	Mean (SEM)	p-value
<b>Ascending Aorta (mm)</b>	15.7 (1.0)	15.0 (1.1)	0.1
<b>Proximal Transverse Arch (mm)</b>	10.7 (0.8)	10.6 (0.7)	0.8
<b>Site of Coarctation (mm)</b>	4.9 (0.3)	5.8 (0.5)	<b>0.02</b>

The site of CoA measured smaller by TTE vs CT/CMR by about 0.9mm (p=0.02). This difference may not be clinically significant while deciding on surgical approach.

\* Paired t test

## Conclusions

### Coarctation seen on TTE vs CT



- The noninvasive modality of TTE is highly accurate for preoperative assessment of simple coarctation and anatomic definitions in most pediatric patients.
- Advanced imaging, with its associated risks, is not routinely necessary and may be reserved for special circumstances.

## References

- Ganigara, M., Doshi, A., Naimi, I., Mahadevaiah, G. P., Buddhé, S., & Chikkabyrappa, S. M. (2019). Preoperative Physiology, Imaging, and Management of Coarctation of Aorta in Children. *Seminars in Cardiothoracic and Vascular Anesthesia*, 23(4). <https://doi.org/10.1177/1089253219873004>
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