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Reference ranges of fetal cardiac biometry using HeartAssist™: a multicenter prospective study in the Korean population

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Objective

To establish comprehensive fetal cardiac reference ranges using an automated measurement system, across 18 major referral centers in South Korea.

Methods

A prospective multicenter study was conducted to establish normative data for fetal cardiac biometry. Normal singleton pregnancies between 16.0 and 36.6 weeks of gestation were recruited from October 2022 to February 2025. Standardized video clips of fetal hearts were obtained from study centers, and a **total of 34 cardiac parameters were measured using six standard views.** All measurements were performed using HeartAssist™ (Samsung Medison Co., Ltd, Seoul, Korea) and further adjusted manually by two specialists in fetal echocardiography.

Results

A total of 780 video clips were analyzed. Scatterplots for all parameters were generated by gestational age. The cardiac axis remained stable, averaging 36.8° throughout gestation. Other parameters showed a progressive increase with advancing gestation. The mean left-to-right ventricular width and length ratios were 0.96 and 1.11, respectively. Notably, the annular diameters of the aortic and pulmonary valves were consistently larger when closed than when open.

Conclusion

This study establishes multicenter-derived fetal cardiac biometry reference ranges using HeartAssist™, enhancing accuracy and efficiency in clinical assessment.

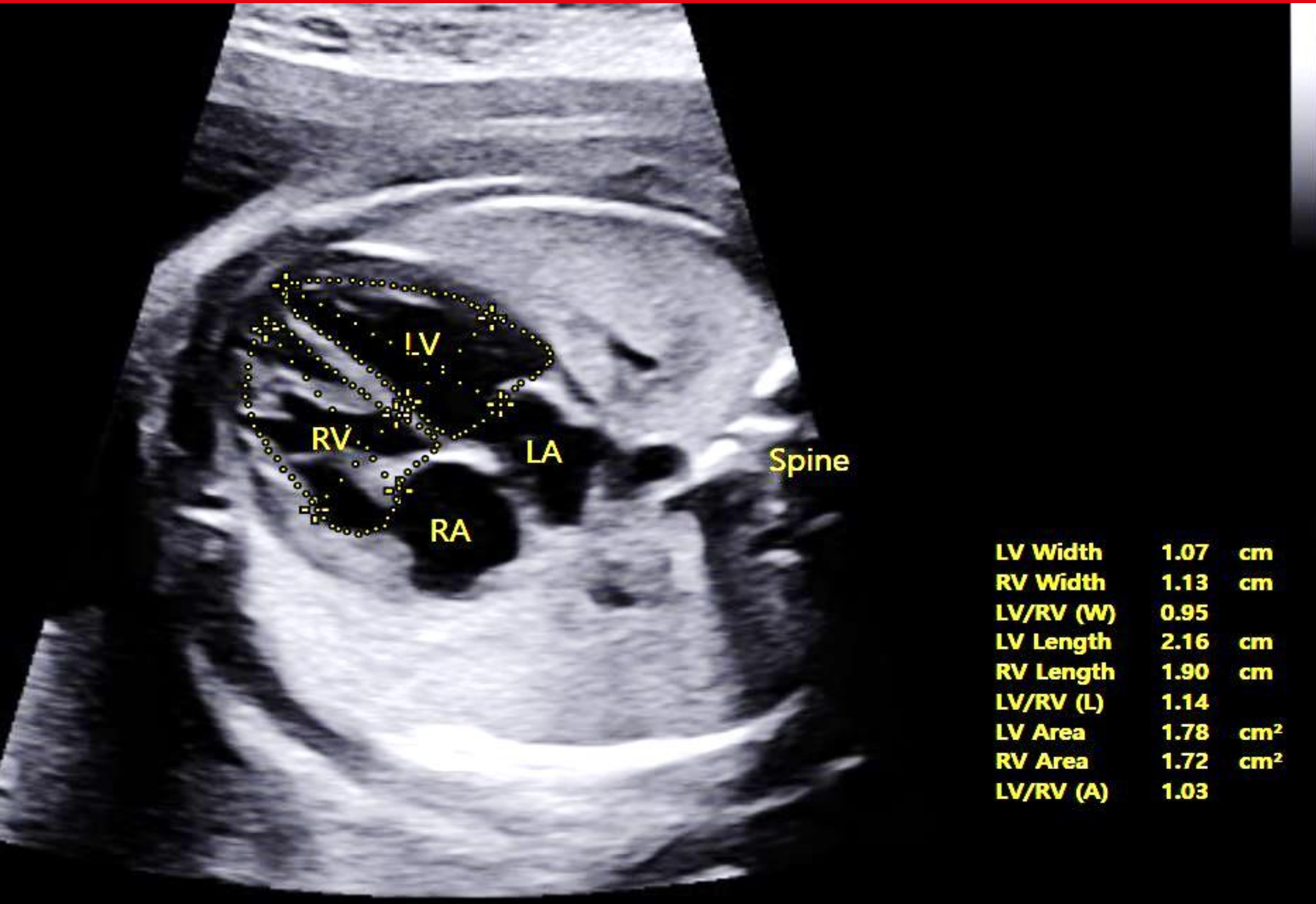


Figure 1. The results of automatic annotation and measurement at end-diastole in four-chamber view using HeartAssist™, at 29 weeks of gestation

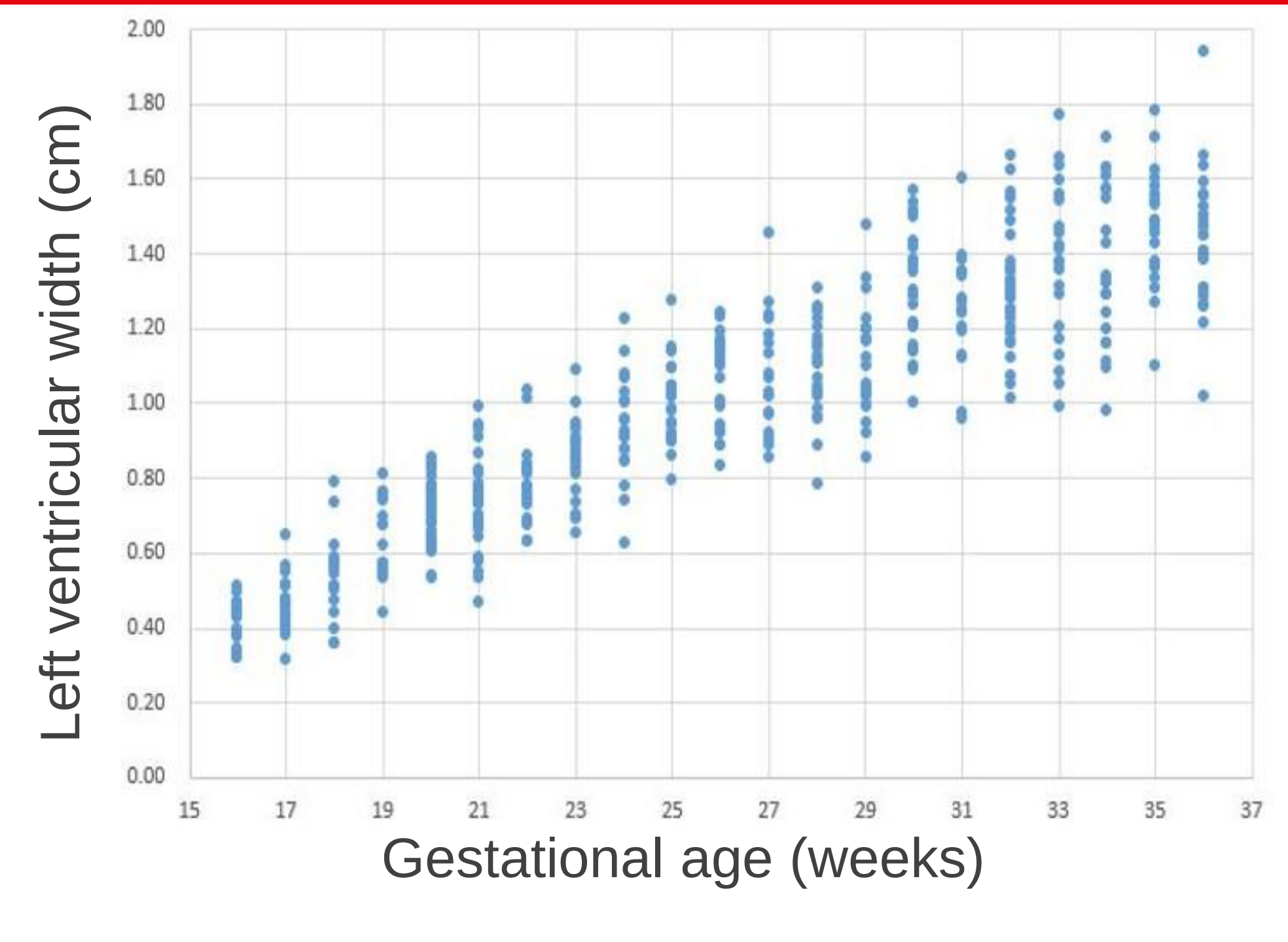


Figure 2. The left ventricular width plotted according to gestational age.

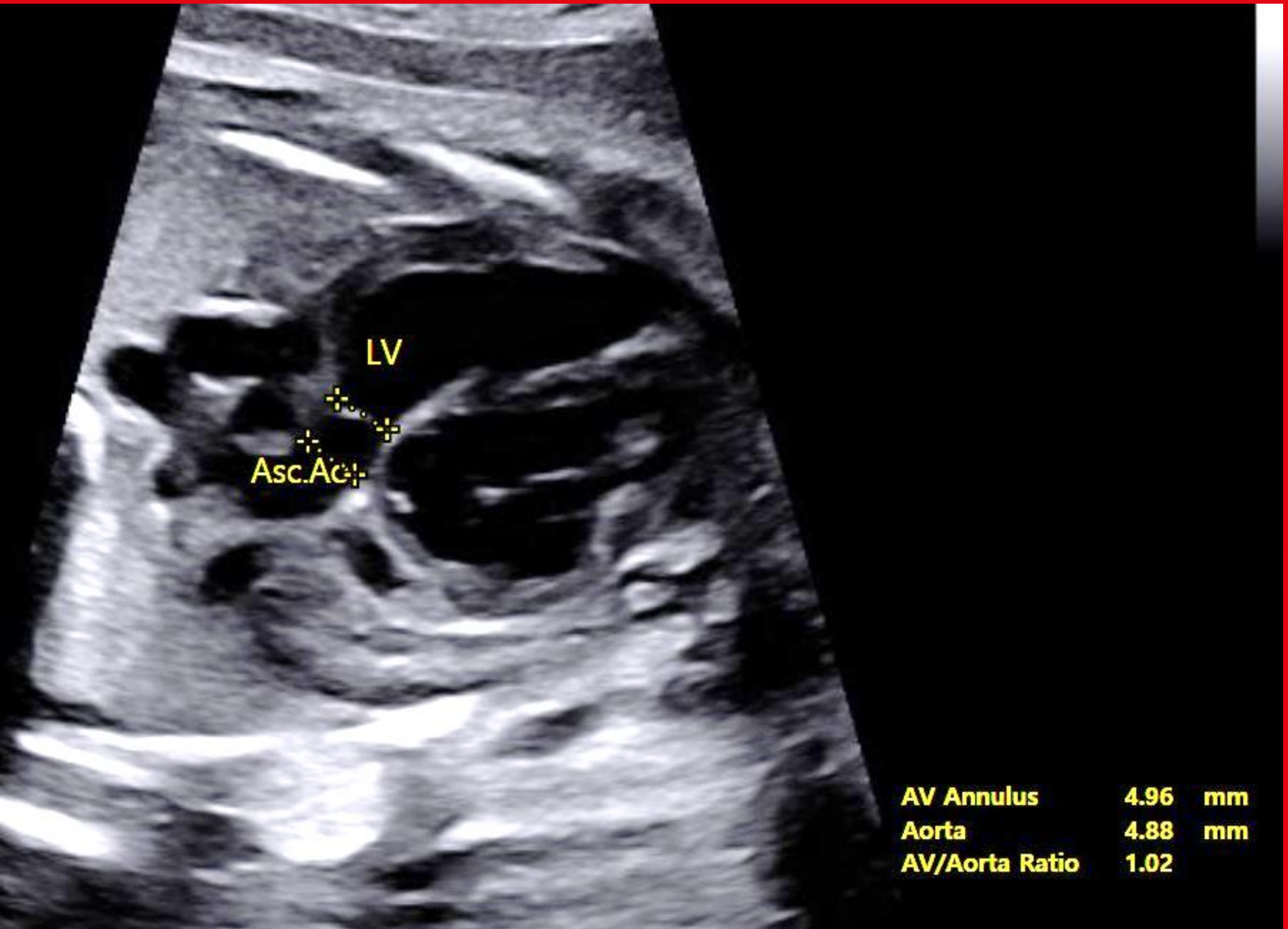


Figure 3. The results of automatic annotation and measurement at end-diastole in left ventricular outflow tract view using HeartAssist™, at 32 weeks of gestation

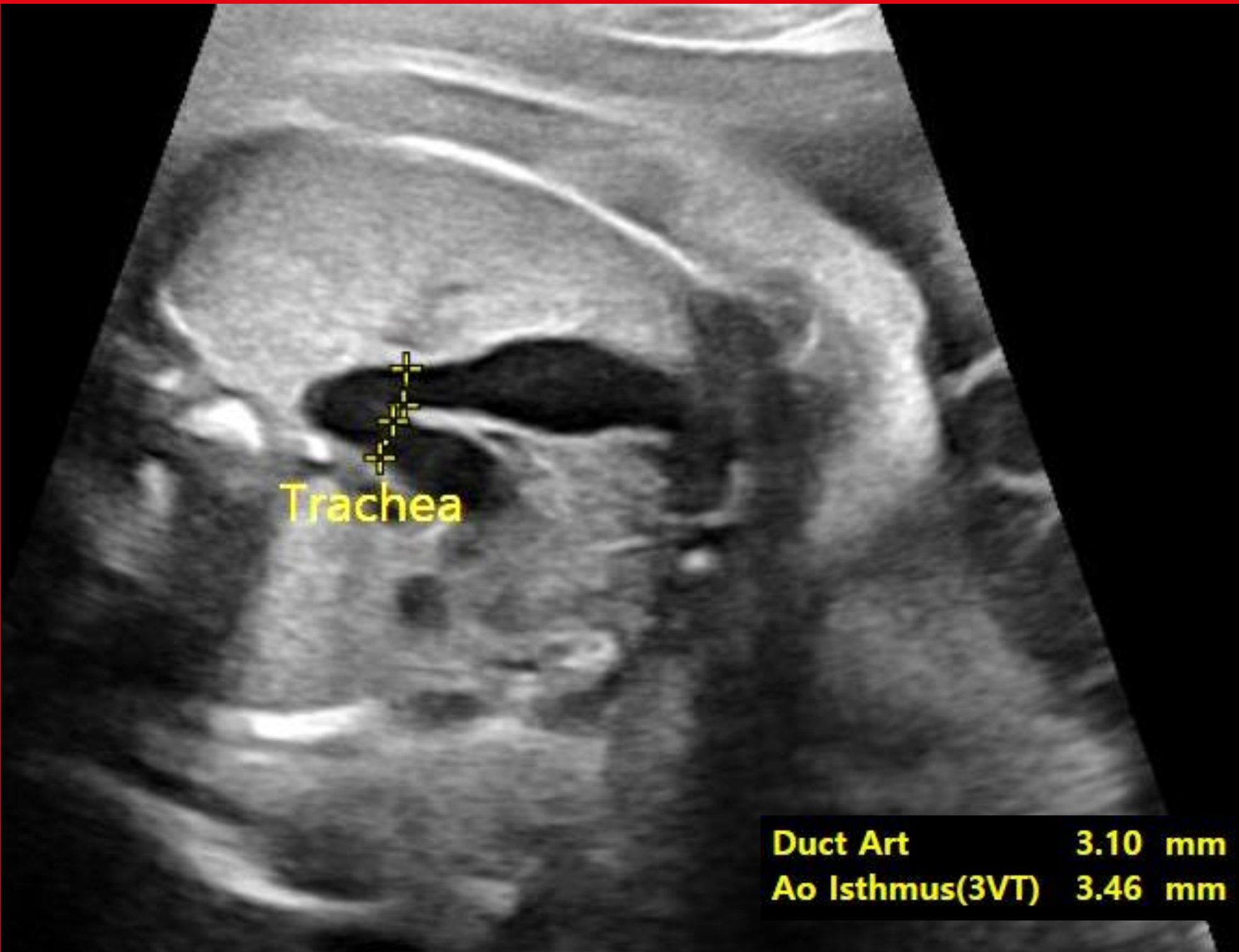


Figure 4. The results of automatic annotation and measurement three-vessels trachea view using HeartAssist™, at 32 weeks of gestation