

## Change in left ventricular vortex flow before and after surgery for coarctation of the aorta in an infant shown with plane wave imaging and flow speckle tracking

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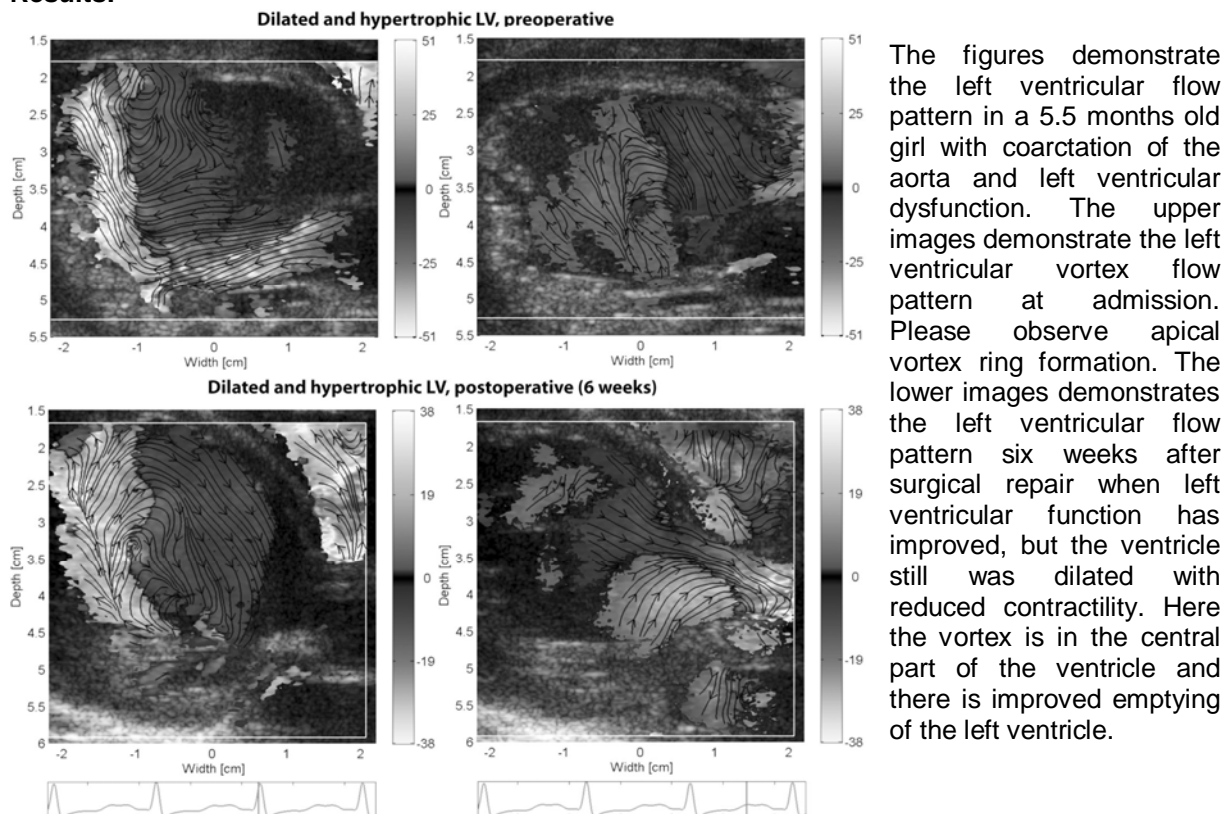
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**Introduction:** There has been emerging interest in the relationship between the left ventricular blood flow pattern and left ventricular function. Vortex flow in the left ventricle using magnetic resonance phase-velocity mapping and contrast echocardiography using vector particle image velocimetry has been described, and Doppler ventricular flow pattern may predict left ventricular thrombus after acute myocardial infarction. However, MR is resource demanding, contrast imaging is invasive and old Doppler-techniques are limited in several ways. A new ultrasound flow technique well suited for follow up in children is described. A case with an infant with reduced left ventricular function is presented, where changes in vortex flow before and after surgery for coarctation of the aorta is demonstrated.

**Methods:** We used a high image acquisition rate setup based on transmitting plane wave (unfocused) emissions and by using parallel receive processing to generate several image lines simultaneously. Using pattern-matching techniques, the movement of blood speckle was quantified in 2-D images. The 2-D velocity information can be visualized as arrows or streamlines overlaid colour-Doppler images that help to highlight areas of complex flow patterns such as vortex formation. Using plane wave imaging we are currently limited to using linear array transducers (here we used a 9L linear transducer). As the need for angle-correction is removed an increased accuracy in quantitative measurements may also be obtained.

### Results:



**Conclusions:** This case report demonstrates that abnormal left ventricular function may be reflected in the left ventricular flow patterns which we can accurately describe using this non invasive ultrasound flow tracking technique.