

**Myocardial Deformation and Rotational Mechanics in infants with Down Syndrome in the Early Neonatal Period**

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**Introduction:** The impact of Down syndrome on myocardial performance measured using deformation imaging and pulmonary hypertension (PH) in the neonatal period requires exploration. We aimed to assess PH and measure left (LV) and right (RV) ventricular function using deformation imaging in neonates with DS (without structural heart disease) over 5 days of age.

**Methods:** Echocardiograms were performed on Days 1, 2 and 5 to measure LV and RV dimensions, LV basal longitudinal strain (LV BLS) and systolic strain rate (LV SR), RV free wall basal longitudinal strain (RV BLS) and systolic SR (RV SR), and LV rotational mechanics. PH was assessed by examining ductal (PDA's) shunting and tricuspid regurgitation (to estimate RV systolic pressure, RVSp). Values were compared with healthy controls.

**Results:** 17 infants with DS with a mean  $\pm$  SD gestation & birthweight of  $38.4 \pm 2.1$  weeks and  $3.1 \pm 0.5$  Kg respectively were compared with 16 controls ( $38.3 \pm 2.0$  weeks &  $3.3 \pm 0.5$  Kg). On Day 1, infants with DS had a higher proportion of bidirectional PDAs (100% vs. 20%,  $p < 0.01$ ), a higher RVSp (35 vs. 18 mmHg,  $p = 0.03$ ). Infants with DS had lower RV BLS and RV SR over the three time points. Infants with DS had impaired LV basal rotation on Day 1, 2 and 5 resulting in significantly lower LV twist.

**Conclusion:** Infants with DS demonstrate elevated pulmonary pressures during the early neonatal period translating into lower RV function measured using deformation imaging. They also demonstrate impaired twist driven by reduced basal rotation. The clinical implications warrant further study.