

**Early myocardial modifications in preterm infants**

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**Background**

Preterm newborns undergo hemodynamic challenges in the postnatal period. The cardiovascular disarray plays a role in the pathophysiology of brain injury in very preterm infants. Speckle tracking echocardiography is a novel and feasible technique to assess cardiac function.

**Aims**

To investigate the evolution of myocardial performance in the early postnatal period in preterm infants using speckle tracking echocardiography.

**Material and Methods**

We prospectively performed cardiac ultrasound evaluation in preterm infants  $\leq 34$  weeks' gestation, during the first 96 hours of life. Echocardiographic assessment involved left ventricular ejection fraction, mitral E/A ratio, S' and E' velocities, E/E' ratio, TAPSE, left atrium-to-aorta ratio, ductal diameter and ductal shunt pattern.

Left ventricular longitudinal, circumferential and radial strain, apex-basal rotation and twist were measured from the apical 4 chamber and short axis views and Calculated by speckle tracking echocardiography.

A second echocardiographic examination was conducted at about 3 weeks of postnatal age.

**Results**

Thirty-nine preterm infants were evaluated over a 4-month period. The mean gestational age was  $30 \pm 2.7$  weeks with a mean birth weight of  $1318 \pm 485$  gr.

Deformation parameters were higher in infants with a hemodynamically significant PDA. Apical segments demonstrated higher longitudinal strain than basal and mid ones. In all gestational ages, endocardial longitudinal strain was higher than the epicardial one.

Epicardial longitudinal strain significantly increased during the first 3 weeks ( $-15.3 \pm 3.6$  vs  $-17.4 \pm 2.1$ ;  $p=0.028$ ), resulting in the change of basal rotation from counter-clockwise to clockwise and thus in the acquisition of twist ( $4.9 \pm 4.4^\circ$  vs  $8.4 \pm 4.8^\circ$ ,  $p<0.001$ ).

**Conclusions**

Echocardiographic assessment of myocardial deformation parameters is feasible in preterm infants.

Our data suggest that the maturational process of the myocardium might develop from fetal to postnatal period, spreading from endocardial to epicardial layer.