

Heterogeneity of ventricular repolarization in newborns with intrauterine growth restriction

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Introduction: Intrauterine growth restriction (IUGR) is associated with structural and functional cardiac alterations, but the possible electrophysiological consequences of these disturbances remain unknown. The aim of this study was to explore the distribution of ventricular repolarization and its relation to myocardial mechanics in newborns with IUGR. **Methods:** Conventional and tissue Doppler echocardiographic data, and electrocardiographic parameters used to describe the distribution of ventricular repolarization (dispersion of QT [QTd] and JT [JTd]), were obtained on the second (D2) and fifth (D5) postnatal day and compared between 25 IUGR newborns and 25 matched-for-gestational age controls.

Results: IUGR was associated with relative intraventricular septum hypertrophy, lower relative wall thickness (left ventricular posterior wall thickness to left ventricular end-diastolic diameter), increased left ventricular (LV) E/E' ratio and higher LV myocardial performance index (MPI). On both study days, the IUGR infants presented higher QTd and JTd compared to controls (QTd-D2: 66 ± 20 ms vs. 36 ± 12 ms, $P < 0.001$; JTd-D2: 54 ± 13 ms vs. 34 ± 9 ms, $P < 0.001$; QTd-D5: 61 ± 14 ms vs. 27 ± 12 ms, $P < 0.001$; JTd-D5: 54 ± 13 ms vs. 27 ± 9 ms, $P < 0.001$). The association between QTd and LV E/E' (D2: regression coefficient beta 0.747, R2 0.585; D5: beta 0.843, R2 0.646) and QTd and MPI (D2: beta 0.680, R2 0.576; D5: beta 0.698, R2 0.650) was also significant ($P < 0.001$ for all analyses).

Conclusion: Our findings suggest that IUGR is also associated with changes in the electrical activity of the neonatal heart, a process which is closely related to the underlying alterations in ventricular mechanics and might predispose to adverse electrophysiological events.