

Myocardial performance during and after therapeutic hypothermia for perinatal asphyxia in term neonates

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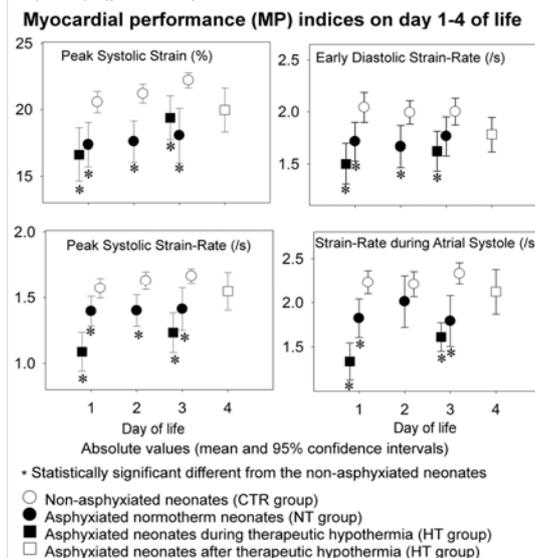
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Introduction: Therapeutic hypothermia (HT) reduces brain damage after perinatal asphyxia. The effect of HT on the myocardial performance (MP) is poorly investigated. Strain-Rate (SR) and Strain by tissue Doppler (TD) are sensitive indices for MP after perinatal asphyxia. Higher absolute Strain and SR values reflect better MP. This study assess Strain and SR by TD as markers for MP in cooled term neonates as compared to historical control groups of asphyxiated term neonates treated with normothermia (NT) and non-asphyxiated term neonates (CTR).

Methods: Twenty asphyxiated neonates (HT) cooled to core temperature 33.5°C for three days were examined during hypothermia on day 1 and 3 and after rewarming on day 4. Twenty NT and 48 CTR examined on day 1, 2 and 3 were used as controls.

The MP was assessed as Longitudinal Peak Systolic Strain, Peak Systolic SR, Early Diastolic SR and SR during Atrial Systole

Results: The HT group were more severely asphyxiated than the NT group; the pH of the neonate was 7.07 (7.01, 7.14) (mean (95%CI)) vs. 7.20 (7.10, 7.31), the Base Excess -16.2 mmol/L (-18.4, -14.1) vs. -10.6 (-14.8, -6.3), the 5-min Apgar-score 4 (2, 5) (median (quartiles)) vs. 5 (4, 6) and the 10-min Apgar-score 5 (3, 6) vs. 7 (6, 8) ($p < 0.05$).



The MP was similar on day 1-3 within each of the groups, except for an increase in the Peak Systolic Strain in the CTR group ($p < 0.05$).

The MP was similar in the NT and HT groups during cooling on day 1-3, and lower than in the CTR group ($p < 0.05$).

After rewarming, the MP improved on day 4 in the HT group, approaching the MP in the CTR group on day 3.

Conclusions: Although the HT group was more severely asphyxiated than the NT group, the myocardial performance was equally depressed in both groups as compared to age matched controls. The myocardial performance in the hypothermic treated neonates improved after rewarming on day 4, approaching the levels in the non-asphyxiated neonates on day 3. Therapeutic hypothermia did not decrease the myocardial performance during treatment and might have had a positive impact after treatment.