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Cardiac stress biomarkers in neonates: role of the delivery mode

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Introduction:
Perinatal asphyxia is a common problem and is a significant cause of neonatal mortality and neurological as well as cardiological morbidity. Labour dystocia is the most common cause of perinatal asphyxia.
Several cardiac biomarkers such as cardiac troponin (cTn), CTnI, high sensitive-C-Reactive Protein (hs-CRP), copeptin and N-Terminal-pro-Brain Natriuretic Peptide (NT-pro-BNP) have been tested as possible indicators of perinatal asphyxia and neonatal morbidity. However, reference values in neonates are lacking.
The objective of our study was therefore to determine the reference value of of CTnT, CTnI, hs-CRP, copeptin, and NT-proBNP in healthy full term newborns and to test the hypothesis that the type of delivery would influence cord blood concentrations of each biomarker.

Patients and methods:
Cord blood samples were collected from 201 neonates delivered by uncomplicated vaginal route (n = 157), instrumental vaginal route (n = 18), scheduled caesarean section (n = 12), and urgent caesarean section (n = 14). Data on gestation, birth weight, sex, Apgar scores and respiratory status were recorded.

Results:
Using the 99th percentile, the upper reference limit in healthy newborns was 49,59 ng/l for CTnT, 11,28 µg/l for CTnI, 1624,84 ng/l for NT-proBNP, 1301,40 pmol/l for Copeptin and 39,9 mg/l for hs-CRP. Neonates born after complicated delivery had significantly higher values of CTnT (P=0.001), CTnI (P=0.000) and Copeptin (P=0,008) than those born after normal delivery. hsCRP and NT-pro-BNP were not different between groups.
Neonates born by scheduled caesarian section showed significantly lower Copeptin concentrations than the other subgroups (P=0.01, respectively).
In a multiple regression model where Troponin T concentration was the dependent variable, the delivery mode was the statistically significant independent variable.

Conclusion:
In this study, we established reference values of cord blood concentrations of cardiac stress biomarkers in healthy newborns. We showed that cardiac-related birth stress is dependent on delivery mode.