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THE CLINICAL SIGNIFICANCE OF SERUM LEVELS OF CK-MB AND CTN-I COMBINED WITH CORRECTED QT DISPERSION TO EVALUATE THE SEVERITY OF MYOCARDIAL INJURY AFTER ASPHYXIA IN NEONATES

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Objectives Hypoxic ischaemic myocardial injury is one of the serious complications of asphyxia in neonates, which may cause systolic dysfunction, arrhythmias, heart failure and even death. Early and accurate diagnosis may direct the appropriate treatments. The aim of this study was to investigate the significance of serum level of creatine kinase-MB (CK-MB) and cardiac troponin-I (cTnI) combined with corrected QT dispersion (QTcD) to evaluate the severity of post-asphyxial myocardial injury in neonates.

Methods We enrolled 52 neonates in asphyxia group (38 in mild asphyxia group and 14 in severe asphyxia group) and 30 neonates in control group. There were no significant differences among the three groups in terms of gestational age, birth weight, gender, and age. Serum levels of CK-MB and cTnI were detected by enzyme linked immunosorbent assay (ELISA) and immunodepression and QTcD were calculated by 12-lead electrocardiograms (ECG) at the 1st–3rd day after birth in asphyxia and control groups and 7th–10th day after birth in asphyxia group respectively. Data were statistically analysed using SPSS 13.0 software.

Results Before treatment, the serum levels of CK-MB were 201.0 ± 102.80 , 281.21 ± 163.78 and 22.0 ± 6.69 (U/L), cTnI were 1.13 ± 0.40 , 2.67 ± 0.60 and 0.30 ± 0.17 (ng/ml) and QTcD were 62.22 ± 30.37 , 76.24 ± 27.72 and 38.44 ± 21.76 (ms) in mild asphyxia, severe asphyxia and control group respectively ($p < 0.01$). The serum levels of CK-MB and cTnI and QTcD values in mild and severe asphyxia group were higher than those in control group. After treatment, the serum levels of CK-MB were 38.74 ± 18.08 and 52.93 ± 40.61 (U/L), cTnI were 0.37 ± 0.19 and 0.98 ± 0.22 (ng/ml) and QTcD were 41.82 ± 20.42 and 54.40 ± 31.43 (ms) in mild and severe asphyxia group respectively. Compared with those values before treatment, the CK-MB and cTnI levels and QTcD were all decreased in two asphyxia groups after treatment. Before or after the treatment, the differences of CK-MB levels and QTcD values between mild and severe asphyxia group were not significant ($p > 0.05$). But the cTnI levels were significantly different between two asphyxia groups before or after treatment ($p < 0.01$). The CK-MB level, cTnI level and QTcD value were negatively correlated with the Apgar score at the first minute after birth ($r = -0.742$, -0.943 and -0.58 respectively with $p < 0.01$). The sensitivity of CK-MB, cTnI and QTcD was 100%, 96.15% and 15.38% respectively, while the specificity was 66.67%, 86.67% and 93.33% respectively.

Conclusions Serum levels of CK-MB and cTnI and QTcD values were increased in neonates with asphyxia, which may indicate the myocardial injury. cTnI is a better index to evaluate the severity of myocardial injury after asphyxia than CK-MB and QTcD. CK-MB level has high sensitivity while QTcD value has high specificity. CK-MB and cTnI level combined with QTcD might increased the diagnostic accuracy of myocardial injury after asphyxia in neonates.