Cardiac biomarkers in newborns with congenital heart defects

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Introduction
BNP is released from the ventricular myocardium in response to stretching of the ventricular wall1. Troponin I, myoglobin and CK-MB are biomarkers of cardiomyocyte injury widely used in the management of adult patients. The role of these biomarkers in neonates is still not established2,3. The purpose of this study was to evaluate the diagnostic and prognostic value of cardiac biomarkers in newborns with congenital heart disease (CHD).

Materials and Methods
Cohort consecutive study of 54 newborns, 34 with prenatal diagnosis of CHD admitted at the Neonatal Intensive Care Unit and a control group (n=20) of healthy newborns delivered in the same tertiary hospital. Plasma levels of cardiac biomarkers (BNP, troponin I, myoglobin and CK-MB) were evaluated and echocardiogram performed within the first 24 hours of life. Patients were followed during the first 28 days of life (neonatal period) and accordingly with the outcome categorized as surgical or conservative-treatment group.

Results and Discussion
Median BNP was higher in patients with CHD than in controls (43.3 vs. 19.8 pg/mL; p=0.001). From the 24 patients with CHD with a surgical indication, 10 underwent cardiac surgery during neonatal period. BNP was higher in patients that had cardiac surgery during the neonatal period (73.7 pg/mL) than in those discharged home without surgery (25.6 pg/mL; p=0.016). A BNP cut-off point of 35.85 pg/mL predicted neonatal surgery (sensitivity 90.0% and specificity 64.3%). Median (P25-75) levels of CK-MB were higher in patients that had cardiac surgery in the neonatal period [7.35 (4.90-13.40) ng/mL] than in patients who were discharged home without surgery [4.2 (2.60-5.90) ng/mL; p= 0.032]. Troponin I and myoglobin levels were not significantly different between conservative treatment and surgical group. BNP and CK-MB levels correlated with the tissue Doppler image (TDI) peak early diastolic velocity of the mitral annulus/late diastolic velocity of the mitral annulus ratio (rho= -0.543, p=0.007; rho=-0.480, p=0.018, respectively).

Conclusions
Newborns with CHD presented higher BNP levels than healthy newborns. BNP and CK-MB levels in the first hours of life have prognostic value for neonatal cardiac surgery and may be indicators of diastolic cardiac function.