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Pre-extubational BNP helps calculating post-extubational risks in patients with heart failure. A study in newborns after switch operation.

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Introduction: Extubation of patients with heart failure may put them at risk for aggravation. Heart failure is associated with increased ventricular afterload. As brain natriuretic peptide (BNP) rises in the presence of increased afterload, it is supposed to rise after extubation. The aim of this study was to evaluate pre-extubational BNP as a predictor for post-extubational circulatory complications due to elevated afterload.

Methods: In 60 newborns after switch operation with left heart insufficiency, circulatory, respiratory, metabolic parameters and BNP were measured before and after extubation under conditions of minimal handling and unchanged treatment. They were compared for different pre-extubational BNP levels and BNP post-extubational dynamics. A BNP cut-off point was calculated for the prediction of post-extubational complications.

Results: BNP increased from pre-extubational 554.5 to post-extubational 1165 pg/ml. Clinical data remaining unchanged, pH and base excess as substrata for reduced cardiac output due to higher afterload decreased from 7.41 to 7.38 and from 1.5 to -0.05 mval/l, respectively ($p < 0.001$). Sensitivity for pre-extubational BNP as predictor of base excess decrease was 80.4%, its specificity 92.9%, with a cut-off point at 384 pg/ml. Absolute BNP increase was higher if pre-extubational BNP was higher ($r = 0.77$), relative increase was highest for pre-extubational BNP under the cut-off point. Base excess decreased significantly for BNP beyond the cut-off but not below.

Conclusions: BNP measured before extubation can help to screen patients at risk for important changes in left ventricular afterload and subsequent signs of heart insufficiency after extubation.