

Brain natriuretic propeptide in hemorrhagic fever with renal syndrome.

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The frequent cause of adverse outcomes in patients with hemorrhagic fever with renal syndrome (HFRS) is carrying a variety of treatments, transportation of the patient that's why modern methods of evaluation of organ and systems especially serum biomarkers are very important today.

Objective: To evaluate the diagnostic and prognostic value of NT-proBNP in HFRS.

Materials and methods: The concentration of N-terminal brain natriuretic peptide (NT-proBNP) in 88 patients with HFRS, depending on the form and period of the disease, haemodynamic status, level of serum sodium and kidney function was stated. The concentration of NT-proBNP in serum were determined by using enzyme immunoassay kit from Biomedica (Austria).

The results of the study: In the group of patients with mild HFRS in the initial period median studied index was comparable with the control value. In the oliguric period in this group was statistically significant ($p = 0.004$) exceeded the reference value of almost 2-fold. In the poliuric period the median figure was comparable with oliguric period and significantly higher than the reference value. Significant changes in the concentration of NT-proBNP was observed in moderate and severe forms of HFRS. The median in both groups was higher already in the initial period to 10 times than the reference value and 6 times in the index group with mild disease. In the oliguric period registered an even larger increase in the concentration of propeptide in both groups. In the poliuric shown a noticeable decline in comparison with oliguric period, however, median NT-proBNP concentrations in both groups exceeds not only the reference value, but also, compared to only mild disease. Despite the fact that the differences between the studied groups in concentration of pro-peptide are absent, normalization of this peptide in severe form of the disease occurs more slowly. The main organ which eliminated NT-proBNP is kidney. Renal function is significantly affected in moderate and especially severe forms of HFRS, and there recovery occurs over a longer time. This fact may be explained our result.

In the study of the correlation between the concentration of NT-proBNP and systolic blood pressure (APS) was found a negative correlation of medium strength in patients with moderate form of HFRS in the initial ($r = -0,632$; $p =$

0.001), and oliguric ($r = -0,499$; $p = 0.005$) periods and severe form in the initial period ($r = -0,459$; $p = 0.011$). In this regard, it can be assumed about the pathogenic role of elevated levels of NT-proBNP in the development of hypotension in HFRS.

In studying the correlation between NT-proBNP and the heart rate was found a positive association of medium strength in the initial period in patients with moderate ($r = 0,511$; $p = 0.004$) and severe ($r = 0,430$; $p = 0.018$) forms of the disease. No statistically significant relationship in the oliguric period, probably due to the fact that in this period is characterize by symptomatic slowing of heart rate.

In carrying out the correlation between NT-proBNP and serum creatinine revealed a positive correlation with moderate to severe forms of the disease in the initial ($r = 0,523$; $p = 0.003$ and $r = 0,568$; $p = 0.027$, respectively), and oliguric ($r = 0,637$; $p = 0.001$ and $r = 0,722$; $p = 0.002$, respectively) periods. Enhancing communication in oliguric period reflects the dependence of the index of kidney function. In poliuric period with severe HFRS is a direct relationship of medium strength ($r = 0,521$; $p = 0.047$).

Inverse correlation found in the study of the relationship between NT-proBNP and the natrium content in the blood serum. Bond strength in the initial period at moderate ($r = -0,633$; $p = 0.015$) and especially severe ($r = -0,746$; $p = 0.003$) forms of the disease demonstrates that reduced natrium levels stimulates the secretion of the propeptide. The weakening in the oliguric period with moderate ($r = -0,582$; $p = 0.069$) and severe ($r = -0,540$; $p = 0.038$) forms of HFRS coupled with the dependence of the level of creatinine indicates that the oliguric period of further increasing the concentration of NT -proBNP may be due to a violation of its excretion. In poliuric period were not found statistically significant correlations.

Conclusions:

1. The Increasing of NT-proBNP in moderate and severe forms of HFRS in initial period caused by the reducing the concentration of natrium, in oliguric period-renal impairment.
2. The correlation between the concentration of NT-proBNP and systolic blood pressure suggests a pathophysiological role of elevated levels of NT-proBNP in the development of hypotension during the initial period of HFRS.