Abstract:

Plasma levels of B-type natriuretic peptide (BNP) are a strong and independent predictor of prognosis in patients with advanced heart failure (CHF). However, the importance of this biomarker has been documented only in CHF of common causes such as dilated or ischemic cardiomyopathy.

We hypothesized that BNP can serve as a strong predictor of end-stage CHF in group of patients with advanced CHF due to congenital heart disease (CHD) with the right ventricle in systemic position (SRV). The second hypothesis was that BNP monitoring in patients with implanted left ventricular assist device (LVAD) Heart Mate II could detect serious complications which negatively affect prognosis.

We performed a retrospective analysis in 28 consecutive patients with severe systolic dysfunction of the SRV (ejection fraction 23 ± 6%) evaluated as heart transplant (HTx) candidates between May 2007 and October 2014. During a median follow-up of 29 months (interquartile range, 9-50), 14 pts reached primary endpoints of the study (death, urgent HTx, and LVAD implantation). We have considered these events equivalent to end-stage CHF. Using ROC analysis, we identified the first measured value of BNP as the strongest predictor of prognosis with the area under the curve (AUC) of 1.00, followed by the New York Heart Association functional class class III or IV (AUC 0.98), decompensated CHF in the last year (AUC 0.96), and systolic dysfunction of the subpulmonal ventricle (AUC 0.96). BNP levels ≥ 618ng / l were associated with adverse prognosis.

We also performed a prospective cohort study in 136 consecutive out-patients who underwent implantation of LVAD between February 2008 and November 2015. We aimed to evaluate the impact of BNP on detection of serious complications. During the follow-up (median of 298 days), 6 (%) patients died, 21 (15%) experienced severe adverse event requiring hospitalisation, and 38 (28%) had less serious complications. A total of 77 patients had an uneventful course. BNP levels were assessed before LVAD placement and then post-implant every 2 months during clinical check-ups. The dynamics of BNP changes and its highest value at the time of clinical event /or the the highest value in individuals with event-free follow-up (BNP max) showed a good predictive value in the detection of complications. The performance of BNP max improved from the detection of infection to diagnosis of CHF and culminated in individuals with pump thrombosis (AUC 0.68 vs. 0.75 vs. 0.93).

The results of these studies confirmed our hypotheses. However, BNP values can be interpreted only in the context of clinical status and other prognostic indicators, and solely for similarly defined specific groups of patients.