

## Is BNP testing useful for detecting diastolic dysfunction?

### *Diyastolik disfonksiyonun değerlendirilmesinde BNP testi yararlı mıdır?*

B-type natriuretic peptide (BNP) is widely used as a marker for various cardiovascular diseases. Especially in heart failure, it is used for diagnosis, risk stratification or prognosis, and treatment monitoring (1). In the setting of acute coronary syndrome and stable coronary artery diseases, BNP has been reported to be an extremely powerful prognostic indicator (2). Recent reports have also demonstrated that left ventricular (LV) diastolic function contributes to plasma BNP levels and thus the latter are useful in the diagnosis of diastolic heart failure (3).

B-type natriuretic peptide is synthesized as a prohormone (proBNP) that consists of 108 amino acids. Upon release into the circulation, it is cleaved by the serine proteinase furin into the biologically active 32-amino acid BNP, which is the C-terminal fragment, and the inactive 76-amino acid N-terminal (NT) proBNP. Both molecules are synthesized constitutively and can be detected in the blood. Although the main stimulus for increased BNP and NT-proBNP is myocardial wall stress, several other factors also contribute to their regulation (4). Myocardial ischemia and endocrine modulation by other neurohormones and cytokines are also important. Clinically, it has been consistently shown that they are related to sex, with higher values in females; age, with higher values in the elderly; and obesity, with lower values in overweight and obese subjects. In patients with renal insufficiency, the levels of both values are increased and variable in most asymptomatic patients. Most studies to date have demonstrated that BNP and NT-proBNP are equally useful as diagnostic and prognostic markers in the clinical setting.

In this issue of the Anatolian Journal of Cardiology, Karaca et al. (5) provide evidence for the clinical utility of plasma BNP measurements in the diagnosis of asymptomatic diastolic dysfunction. In 30 asymptomatic patients with hypertension, the authors documented isolated diastolic dysfunction (without systolic dysfunction) by echocardiography. The BNP levels in these patients were significantly higher than in those 20 normotensive healthy controls without systolic or diastolic dysfunction. The area under the receiver-operating characteristic curve for the use of BNP to detect diastolic dysfunction was 0.969, which indicates that a test of BNP test was clinically useful in this setting. They also showed a good correlation between plasma BNP levels and LV mass index. These findings are consistent with previous reports by Lubien et al. and Wei T et al (6,7) and suggest that BNP test may be accepted as fast and reliable one for the diagnosis of asymptomatic diastolic dysfunction. However, we should note that several factors may have affected the results and conclusion of the present study. Aging and the prevalence of hypertension may be

crucial. The presence of diastolic dysfunction is closely associated with senescence and the presence of hypertension and coronary artery diseases (CAD). In the present study, the cases consisted of hypertensive subjects without CAD and the controls were normotensive healthy subjects. The cases were also significantly older. Although BNP levels are affected by age and the presence of hypertension, it remains uncertain whether these associations might depend on diastolic dysfunction (8, 9). Additional investigations are warranted whether there is a direct relationship between BNP and diastolic dysfunction. Thus, it is important to note that the ability of BNP testing to detect diastolic dysfunction might be less when more heterogeneous patient cohorts would be examined.

Abnormalities of diastolic function may play a major role in patients with heart failure (HF). Recent studies have repeatedly demonstrated that 40% to 50% of individuals with HF have normal ejection fraction, and diastolic dysfunction is the presumed cause of symptoms (diastolic heart failure; DHF). Moreover, the prognosis of patients suffering from DHF is as ominous as that of patients suffering from systolic heart failure. Diastolic dysfunction without symptoms (preclinical diastolic dysfunction) is common and is independently predictive of the future development of heart failure and cardiac death (10, 11). Therefore, early recognition, i.e. screening strategies, is needed. In this respect, the measurement of plasma BNP may be useful, as shown in the present study. However, studies vary in terms of the sensitivity and specificity of using BNP to detect diastolic dysfunction (6,7). Some reports have recommended BNP testing mainly for excluding the possibility of DHF and that it should be used with other non-invasive investigations such as Doppler echocardiography for diagnostic purposes (12). Further evaluations are warranted.

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