Screening using peptide level and collaborative care to help reduce risk of heart failure

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Among patients at risk of heart failure, collaborative care based on screening for certain levels of brain-type natriuretic peptide reduced the combined rates of left ventricular systolic dysfunction, diastolic dysfunction, and heart failure as well as emergency cardiovascular hospitalizations, according to a study in the July 3 issue of *JAMA*.

"The increasing prevalence of heart failure [HF] remains a major public health concern underlining the need for an effective prevention strategy. Present-day approaches, focusing mainly on risk factor intervention, have brought about some reduction in new-onset HF. However recent major reports in the United States and the European Union underline difficulties in achieving adequate risk factor control and show that present strategies will not be as effective as desired," according to background information in the article.

Refining risk prediction may be aided by the use of brain-type natriuretic peptide (BNP; a peptide secreted by the ventricles of the heart), which has been shown in large general populations to identify those at highest risk of cardiovascular events and, more specifically, of newly diagnosed HF. Studies have shown advantages of using this peptide in this regard over conventional risk indicators. This may reflect the fact that BNF is a response to established cardiovascular damage whereas other conventional risk indicators reflect the potential for cardiovascular insult (injury), the authors write.

Mark Ledwidge, Ph.D., of St. Vincent's Healthcare Group/St. Michael's Hospital, Dublin, and colleagues conducted a study to determine the efficacy of a screening program using BNP and collaborative care in an at-risk population in reducing newly diagnosed heart failure and prevalence of significant left ventricular (LV) systolic and/or diastolic dysfunction. The randomized trial included 1,374 participants with cardiovascular risk factors (average age, 65 years) recruited from 39 primary care practices in Ireland between January 2005 and December 2009 and followed up until December 2011 (average follow-up, 4.2 years). Patients were randomly assigned to receive usual primary care (control condition; n=677) or screening with BNP testing (n=697). Intervention-group participants with BNP levels of 50 pg/mL or higher underwent echocardiography and collaborative care between their primary care physician and specialist cardiovascular service, including optimal risk factor management with the most appropriate therapy coaching by a specialist nurse who emphasized individual risk status and the importance of adherence to medication and healthy lifestyle behaviors.

A total of 263 patients (41.6 percent) in the intervention group had at least 1 BNP reading of 50 pg/mL or higher. The researchers found that the primary end point of left ventricular dysfunction and HF was met in 59 (8.7 percent) of 677 control-group patients and 37 (5.3 percent) of 697 intervention-group patients. Asymptomatic left ventricular dysfunction was found in 6.6 percent of control-group patients and 4.3 percent of intervention-group patients. Heart failure occurred in 2.1 percent of control-group patients and 1.0 percent of intervention-group patients.

Seventy-one patients (10.5 percent) were admitted for major adverse cardiovascular events in the control group and 51 (7.3 percent) were admitted in the intervention group. The incidence rates of emergency hospitalization for major cardiovascular events were higher in the

control group vs. the intervention group. In the group with BNP levels of 50 pg/mL or higher, the incidence rates of emergency hospitalization for major adverse cardiovascular events were also higher in the control group vs. the intervention group.

"[This study] confirms BNP as a risk identifier for HF and cardiovascular events and provides unique data on the potential benefit of using levels of this peptide as a guide for care. The positive clinical effect of this intervention was associated with improved risk factor control, increased use of agents that modulate the renin-angiotensin-aldosterone system targeted at those with elevated BNP levels, and increased use of some cardiovascular diagnostics. These data suggest that a targeted strategy for HF prevention using BNP and collaborative care in a community population may be effective and that benefits extend beyond prevention of HF to an overall reduction in emergency cardiovascular admissions," the authors write. "The need for an effective prevention approach to HF is underlined by epidemiological trends, with HF prevalence expected to increase by 30 percent in the United States by 2030."

In an accompanying editorial, Adrian F. Hernandez, M.D., M.H.S., of the Duke University School of Medicine, Durham, N.C., writes that this study "raises several important issues for prevention of heart failure."

"First, the clinical measurement of BNP levels has largely focused on the diagnosis of heart failure in patients who present with dyspnea [difficult or labored breathing] rather than screening for heart failure. Although substantial evidence exists to support the prognostic value of BNP levels across a spectrum of cardiovascular disease and in population-based studies, there is less evidence to support measurement as a routine screening tool for asymptomatic left ventricular dysfunction. Second, it is often challenging to identify patients at risk of heart failure given that screening tests are highly dependent on the prevalence of the disorder

being targeted. Therefore, developing a test strategy to identify patients at risk of heart failure is difficult because of the heterogeneity of the population and the variable duration until clinical heart failure or systolic dysfunction develops."

"In addition, the costs of screening tests can become enormous depending on the volume of testing and the population being screened. Nevertheless, targeting patients at higher risk of heart failure may overcome these issues and, depending on prevalence, may prove to be cost-effective."

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