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B-Type Natriuretic Peptide to Rule out Heart Failure: Different Cutoffs for Different Patients?

Adjusting BNP thresholds for clinical covariates improved the test's ability to differentiate between cardiac and noncardiac causes of dyspnea.

B-type natriuretic peptide levels are frequently used to distinguish cardiac from noncardiac etiologies of dyspnea. However, patient characteristics other than heart failure can affect BNP levels. To determine how, investigators at a single Veterans Affairs Medical Center performed a retrospective analysis of BNP assays obtained from 335 men presenting to the emergency department with dyspnea in 2007. Four physicians who were blinded to BNP results reviewed charts to adjudicate diagnoses.

Age, body-mass index, atrial fibrillation, and creatinine level were independently associated with altered BNP levels. The authors determined the BNP cutoff values that produced a sensitivity of 91% (the sensitivity in the entire cohort of the conventional threshold of 100 pg/mL) in these subgroups:

- 184 pg/mL in patients aged ≥75
- 150 pg/mL in patients with AF
- 449 pg/mL in patients with creatinine levels of ≥2mg/dL
- 25 pg/mL in patients with BMIs ≥35 kg/m^2

Using these BNP cutoff values significantly improved diagnostic performance in all subgroups except patients with high BMIs.

To address the fact that individual patients can have more than one clinical covariate, the authors developed a regression model to calculate cutoffs based on patients' specific characteristics. Compared with unadjusted BNP levels, the adjusted model improved both the area under the receiver operating characteristic curve (*P*=0.03) and the net reclassification index (*P*=0.05).

Comment: These investigators identified age, BMI, AF, and renal function as the most important patient characteristics to take into account when using BNP threshold levels to diagnose or rule out heart failure as the cause of dyspnea. Their regression model is promising but needs to be validated in a larger cohort before it can be incorporated into clinical practice.

— *Joel M. Gore, MD*

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