Letters to the Editor must not exceed 400 words in length and must be limited to three authors and five references. They should not have tables or figures and should relate solely to an article published in Circulation within the preceding 12 weeks. Authors of letters selected for publication will receive prepublication proofs, and authors of the article cited in the letter will be invited to reply. Replies must be signed by all authors listed in the original publication. Please submit three typewritten, double-spaced copies of the letter to Herbert L. Fred, MD, % the Circulation Editorial Office. Letters will not be returned.

Use of Natriuretic Peptides in Guiding Treatment Decisions for Acute Pulmonary Embolism

To the Editor:

In the study by Kucher et al, the authors concluded that a low type B natriuretic peptide (BNP) level identifies patients at low risk for adverse events and that they may be candidates for outpatient care. However, clinicians need to consider the time interval between the pulmonary embolism event and BNP, or pro-BNP, measurement when interpreting these results. BNP levels may not correlate well with other cardiovascular or clinical measures in patients with illness of acute onset because of a delay in BNP mRNA upregulation.

In a recent study, we measured BNP levels daily in 25 patients presenting to an emergency department with an acute pulmonary embolism of <24 hours' duration (Smithline H, Brevard R, Jiang L, et al. Serial measurements of brain natriuretic peptide in hemodynamically stable patients with pulmonary embolus: a pilot study; paper presented at the 7th Annual New England Regional Society of Academic Emergency Medicine Conference, Shrewsbury, Mass, May 2002). Pulmonary embolism was diagnosed in patients with a high pretest probability and either (1) a high-probability ventilation/perfusion scan or (2) an indeterminate ventilation/perfusion scan with a leg Doppler ultrasound positive for a deep venous thrombosis. We found that for a third of the patients, BNP levels increased for 3 days before starting to fall despite adequate anticoagulation. We caution against using natriuretic peptides to guide treatment decisions for acute pulmonary embolism until studies addressing longitudinal changes in natriuretic peptide levels have been done.

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Response

We agree with Dr Smithline that NT-pro–brain natriuretic peptide (proBNP) or brain natriuretic peptide (BNP) should not be used in isolation to guide treatment decisions in patients with acute pulmonary embolism (PE). This is particularly true for patients with elevation of proBNP or BNP levels. Because of the low positive predictive value for adverse outcomes, these patients will require further risk stratification with echocardiography to confirm the presence of right ventricular dysfunction. However, 3 studies have now consistently shown that normal BNP and proBNP levels obtained at the time of admission predict a benign clinical course. The negative predictive values for an uneventful clinical outcome were 97% for proBNP <500 pg/mL and 97% for BNP <50 pg/mL in our studies and 99% for BNP levels <21.7 pmol/L in another study of 110 patients with acute PE. Whether PE patients with low biomarker levels may benefit from an abbreviated hospital length of stay or care on a completely outpatient basis has to be confirmed in a prospective outcome study incorporating these biomarkers into the management strategy.

As stated by Smithline, plasma BNP elevation can be observed with a delay of several hours after the onset of myocardial shear stress. We described 3 patients with low BNP levels on admission who had massive PE with adverse clinical outcome and a symptom duration <8 hours. Thus, we recommend caution in interpreting a low BNP level in highly symptomatic PE patients with a symptom duration of <8 hours.

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