

Moderate/Severe Congestive Heart Failure Exacerbation with Normal BNP Level

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Background

Measurement of B-type natriuretic peptide (BNP) level in new onset dyspnea is a class Ia recommendation to diagnose and exclude acute decompensated heart failure (ADHF) by AHA/ACC.

Case

56-year-old women with hypertension, presented with dyspnea and bilateral lower extremities edema for 2 weeks. She endorsed wheezes, orthopnea and cough. On exam, the patient was afebrile, tachycardic, tachypneic with hypoxia, positive jugular venous distension and decreased breath sounds bilaterally. Labs showed BNP of 67 pg/ml (normal < 100 pg/ml) and negative troponin with sinus tachycardia on EKG. CXR revealed moderate bilateral pleural effusion and pulmonary congestion (Figure 1). Echocardiography demonstrated ejection fraction of 46%, mild global hypokinesis and severely dilated inferior vena cava (Figure 2).

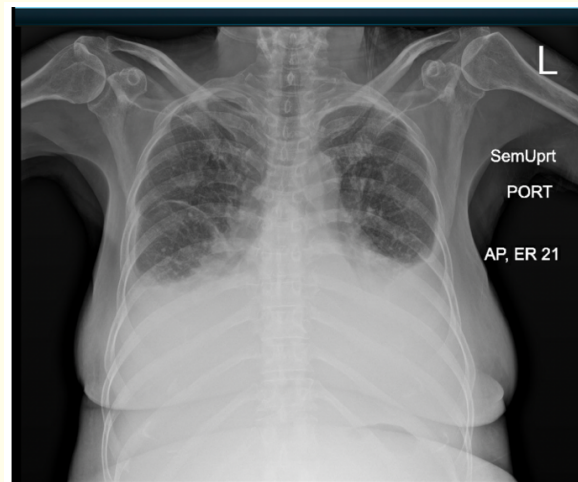


Figure 1

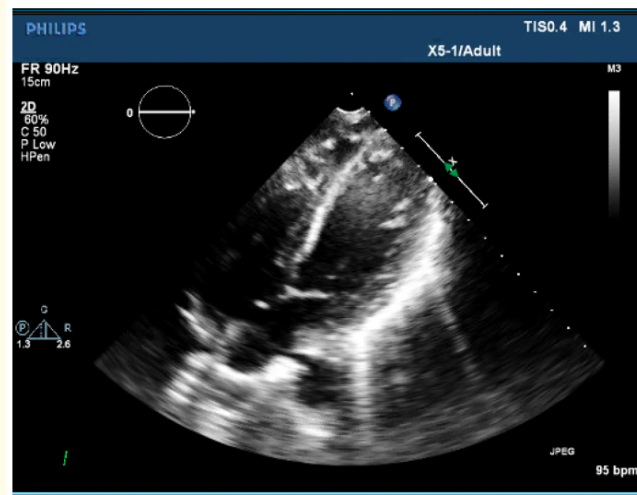


Figure 2

Decision-making: The patient diagnosed as ADHF given the clinical features, new echo changes and improvement of symptoms on diuretic therapy. Other non-cardiac causes of dyspnea were ruled out. BNP is a natriuretic hormone primarily released from the ventricular myocytes in response to myocardial stretch and stress. BNP level correlates linearly with left ventricle (LV) diastolic pressure and LV diastolic wall stress and inversely with LV wall thickness. Serum BNP cutoff value of 100 pg/dL has high sensitivity, specificity and negative predictive value (NPV) of 90, 76 and 89 respectively for heart failure (HF) exacerbation. Generally, lower BNP levels than expected can be seen in young, obese, male patients with reduced kidney function. In addition, Harada, *et al.* demonstrated lower BNP levels in concentric hypertrophy than eccentric hypertrophy in HF. However, none of these factors applies to our patient. Falsely low BNP has been reported e.g., 11% and 16% of ADHF patients may have falsely low BNP levels as shown by Gabriel, *et al.* and Mak, *et al* [1-7].

Conclusion

Despite the high NPV and sensitivity of BNP, it doesn't reach 100%. The NPV for BNP levels of 100 and 50 are 89% and 96% respectively. We should be cautious while using BNP for differential diagnosis of dyspnea and emphasize on the importance of using BNP as part of a holistic approach, not the cornerstone for diagnosis or excluding CHF exacerbation as a cause of dyspnea.

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