B-type natriuretic peptide: a review of its diagnostic, prognostic, and therapeutic monitoring value in heart failure for primary care physicians

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CRD summary
This review aimed to assess the value of B-type natriuretic peptide (BNP) measurements for managing patients with congestive heart failure. The authors concluded that BNP determinations are useful in a limited number of clinical scenarios. However, since the review was poorly reported and suffered from methodological weaknesses, the conclusions should be interpreted with caution.

Authors' objectives
To assess the potential value of B-type natriuretic peptide (BNP) measurements for managing patients with congestive heart failure.

Searching
MEDLINE (from 1966 to present), CINAHL (from 1986 to present) and EBM Reviews (including the Cochrane Library, Cochrane Controlled Trials Register and DARE) were searched; the search terms were listed.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials and well-designed cohort studies were eligible for inclusion.

Specific interventions included in the review
Studies of BNP measurements were included in the review. The BNP value used to define a positive result ranged from 76 to 94 pg/mL.

Reference standard test against which the new test was compared
Studies that included a reference standard, such as echocardiography, to diagnose heart failure were eligible for inclusion.

Participants included in the review
Studies that included a spectrum of patients with heart failure (i.e. New York Heart Association heart failure class I, II, III and IV) were eligible for inclusion.

Outcomes assessed in the review
The studies had to report outcome data such as the sensitivity and specificity, or receiver operating characteristic (ROC) curve data, to be eligible for inclusion.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The results of a quality assessment were reported, but no mention of it was made in the 'Methods' section of the review. Only a limited number of items were assessed: independent blind comparison with reference standard; patient spectrum; application of reference standard regardless of the diagnostic test results; and test validated in second independent group of patients.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Methods of synthesis
How were the studies combined?
A narrative synthesis of the studies was undertaken.

How were differences between studies investigated?
Some differences between the studies were discussed.

Results of the review
The authors reported the results of four diagnostic accuracy studies (n=2,279) in the tables and main section of results, while two further diagnostic accuracy studies were referred to in the text of the 'Results' section. It is therefore unclear exactly how many studies met the inclusion criteria.

Three studies that used a cut-point of 76 to 80 pg/mL BNP to diagnose congestive heart failure reported sensitivities ranging from 93 to 98%, with corresponding specificities ranging from 74 to 92%. One study used a cut-point of 94 pg/mL BNP to differentiate dyspnoea caused by heart failure from pulmonary causes and found a sensitivity of 86% and a specificity of 98%. One study reported that the mean BNP levels increased with increased New York Heart Association class.

Authors' conclusions
For diagnostic purposes, BNP determinations are useful in a limited number of clinical scenarios. In symptomatic patients with no history of left ventricular dysfunction or heart failure, a BNP level of more than 80 pg/mL is both sensitive and specific for an acute exacerbation of heart failure.

CRD commentary
The review addressed a clearly defined objective. The inclusion criteria, although defined, were somewhat ambiguous. The authors stated that 'well-designed cohort studies' were eligible for inclusion but did not define what was meant by 'well-designed'. The search conducted is likely to have missed relevant studies as it was restricted by using the term 'diagnosis'. No attempts were made to locate unpublished studies and it was unclear whether any language restrictions were applied. The authors did not report any details of the review process, so it was not possible to assess whether appropriate steps were taken to avoid bias and error.

It was unclear how many studies were actually included in the review: only four were mentioned in the tables, but a number of additional studies were mentioned in the 'Results' section. It would have been helpful had the results from the included studies been plotted in ROC curve space as a number of different BNP thresholds were used to diagnose heart failure in the included studies. Given the problems with the review (highlighted above), the authors' results and conclusions should be interpreted with caution.

Implications of the review for practice and research
Practice: The authors reported detailed recommendations for the clinical use of BNP in their paper. These were only partially supported by the evidence presented. The authors further stated that no laboratory test should be considered a replacement for a thorough history and physical examination.

Research: The authors stated that further studies are needed to modify their initial clinical guidelines for the use of BNP.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.