The accuracy of plasma natriuretic peptide levels for diagnosis of cardiac dysfunction and chronic heart failure in community-dwelling elderly: a systematic review

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CRD summary
This review concluded that there was limited evidence to support use of plasma natriuretic peptide measurement for diagnosis of cardiac dysfunction or heart failure in people aged 75 years or over in the general population. Given the paucity of available evidence, the cautious conclusions drawn by the authors seem appropriate.

Authors’ objectives
To evaluate the accuracy of plasma natriuretic peptide measurement as a screening tool to detect cardiac dysfunction and chronic heart failure in elderly people.

Searching
PubMed and EMBASE were searched from 1985 to May 2008 without language restrictions; search terms were not reported, but were stated as being available from the authors. Bibliographies of relevant articles and reviews were searched.

Study selection
Population-based studies that recruited and reported results for people aged 75 years and over and where plasma natriuretic peptide was compared to any reference standard used to detect cardiac dysfunction and/or chronic heart failure were eligible for inclusion. Studies in specific patient populations (such as chronic respiratory diseases, diabetes) were excluded. The included studies evaluated either brain natriuretic peptide (BNP) or N terminal proBNP (NT-proBNP); cutoffs ranged from more than 73pg/mL to 1,024pg/mL. The proportion of males ranged from approximately 50% to 100%. Prevalence of the target condition ranged from 4.7% to 21%. Most participants had ejection fractions of 40% or less or advanced diastolic dysfunction with normal ejection fraction.

One reviewer selected studies and a second assessed all studies categorised as included or unclear and a randomly selected sample of those excluded; disagreements were resolved by discussion or referral to a third reviewer.

Assessment of study quality
Two reviewers independently assessed study quality using a modification of the 14-point QUADAS tool; the assessment used 11 of the original criteria and five additional criteria.

Data extraction
Two reviewers independently extracted or calculated sensitivity, specificity and positive and negative likelihood ratios. Post-test probabilities for cardiac dysfunction and heart failure were calculated. Where results for more than one cutoff were reported, those that yielded the greatest sum of sensitivity and specificity were extracted.

Methods of synthesis
Studies were combined in a narrative synthesis. Differences between studies were discussed in the text and study details were presented in tables.

Results of the review
Five studies met the inclusion criteria (n=at least 1,083). Four studies recruited symptomatic and asymptomatic people and one recruited only people who were symptomatic. All studies used an appropriate reference standard, avoided verification, incorporation and clinical review biases. Four studies reported blinding of the interpreters of the index test. Four studies reported recruiting an appropriate patient population and appropriate index test methodology. Two studies avoided progression bias, reported uninterpretable results, explained withdrawals, withheld treatment until the assessments were complete and reported observer variation. None of the studies reported blinding of the interpreters of the reference standard.
Sensitivity ranged from 75% to 89%. Specificity ranged from 79% to 93%. Positive likelihood ratio ranged from 4.1 to 11.1 and negative likelihood ratio from 0.13 to 0.29. Where calculable, post-test probability of a positive test ranged from 21% to 59.7% and post-test probability of a negative test from 0.64% to 5.7%.

Authors' conclusions
There was limited evidence that supported use of plasma natriuretic peptide measurement for diagnosis of cardiac dysfunction or heart failure in people aged 75 years or over in the general population.

CRD commentary
The authors addressed a clear research question supported by appropriate inclusion criteria. The search was limited and publication bias could not be ruled out. The review process was generally conducted in duplicate, although some studies were screened by only one reviewer. Study quality was assessed using appropriate criteria and the results presented for each criterion for each study. The decision to combine studies in a narrative synthesis seemed appropriate, although insufficient study details were presented to make a full assessment of clinical heterogeneity. Given the paucity of available evidence, the cautious conclusions drawn by the authors seem appropriate.

Implications of the review for practice and research
Practice: The authors did not state implications for practice.

Research: The authors stated that future research into the diagnostic accuracy of natriuretic protein levels in the elderly was important.

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