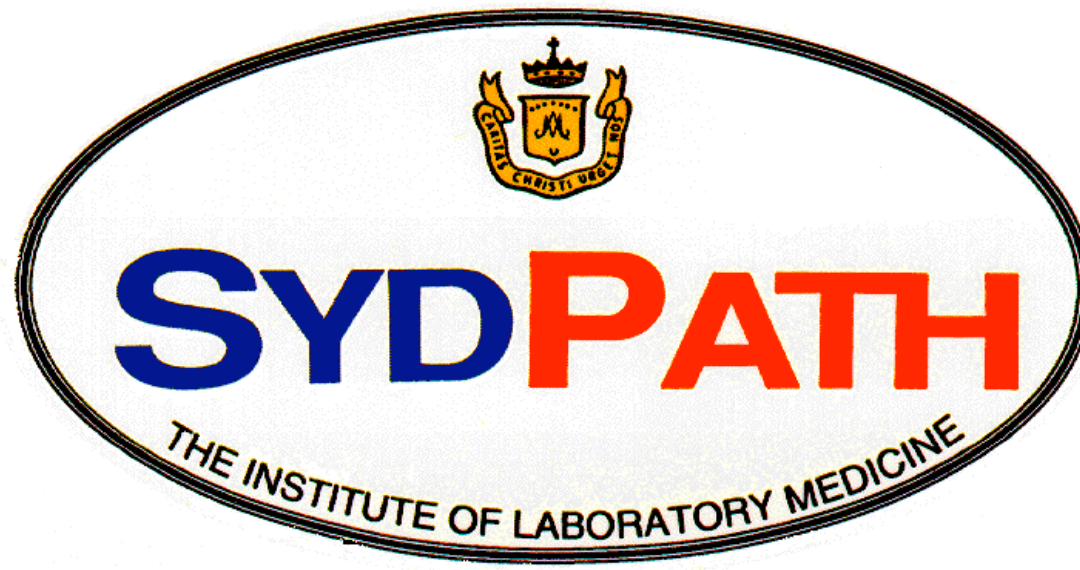




# INFLUENCE OF proBNP TESTING ON CLINICAL ASSESSMENT BY HEART FAILURE SPECIALISTS



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## Introduction and Aim

- ❖ ProBNP concentrations are known to correlate well with changes in cardiac function and to provide strong prognostic information.
- ❖ What is less certain is whether results of proBNP tests add to the clinical acumen of experienced doctors, or merely confirm their clinical assessment.
- ❖ Unless proBNP results change clinical assessment or management, there will be little benefit for the cost of providing the testing.
- ❖ We investigated whether the provision of a routine proBNP testing service will change the assessment and management of patients by heart failure specialists.

## Methods

- ❖ A weekly service for proBNP testing was provided to four hospital-based heart failure specialists (CH, AK, EK, PM) for a period of 13 months.
- ❖ The influence of the testing was assessed with pre- and post-test questionnaires (see below).
- ❖ The pre-test questionnaire was used as a request form and recorded the reason for the request and pre-test clinical assessment.
- ❖ The post-test questionnaire was used to provide the result and assess the influence of the test result on patient assessment and management and the level confidence in the decision.
- ❖ proBNP was measured with a Roche Elecsys 2010 analyser.
- ❖ The protocol was approved by the St Vincent’s Hospital Human Research Ethics Committee.
- ❖ **NOTE:** The numbers of samples presented in this poster are higher than appeared in the abstract as the study has been ongoing since abstract submission.

## Pre- and Post-Test Questionnaires

## Results and Comments

- ❖ 215 proBNP results were provided for 126 patients.  
***Comment:** Fewer than 20 samples per month were requested by these clinicians suggesting very targeted testing.*
- ❖ 134 patients had a single proBNP test, 46 had 2 tests, 23 had 3 tests and 19 patients had 3 or more tests.  
***Comment:** A single tests was all that was required in many cases, although monitoring progress in patients was also common.*
- ❖ Valid pre- and post-test questionnaires were received for approximately 70% of the sample samples.  
***Comment:** The information acquired is a reasonable representative sample of all requests.*
- ❖ The breakdown of the reason for the testing is shown in table 1. The patients in the “other” category were tested for assessment of pulmonary hypertension or myocarditis.  
***Comment:** The majority of requests were for assessing severity of known heart failure. This included a large number where proBNP was used to guide therapy.*
- ❖ The effect of the proBNP testing on key indicators is shown in table 2, for all results as well broken down into the first sample from a patient or later samples.  
***Comment:** ProBNP testing changed diagnosis, assessment or management in a large proportion of patients. Management was more likely to be changed after an initial test than after subsequent tests. When management changes were made on the basis of the proBNP results, the most common was increase in heart failure therapy in response to biochemical evidence of severity, next was reduction in therapy and three patients were considered for either heart or lung transplantation.*
- ❖ The effect of clinical confidence in clinical decisions which were unchanged by the proBNP test is shown in table 3.  
***Comment:** ProBNP testing increased confidence in clinical decisions in the majority of cases.*

| Table 1 - Reason for testing   | Number | %   |
|--|--------|-----|
| Assessment of the cause of shortness of breath                           | 17     | 11% |
| Assessing severity of known heart failure                                | 102    | 69% |
| Assessing contribution of heart failure to symptoms in a complex patient | 24     | 16% |
| Other  | 5      | 3%  |
| No trial form received   | 67     | 31% |
| (n)  | 215    |     |

| TABLE 2 - Effect of testing                       | All requests | 1st sample | later samples |
|---|--------------|------------|---------------|
| Did not support pre-test diagnosis/assessment     | 22%          | 24%        | 20%           |
| Changed or modified pre-test diagnosis/assessment | 25%          | 30%        | 19%           |
| Raised further diagnostic possibilities           | 5%           | 6%         | 4%            |
| Made a change in the management plan              | 25%          | 35%        | 11%           |

| TABLE 3 - Change in confidence after testing | All requests | 1st sample | later samples |
|--|--------------|------------|---------------|
| Less confident                               | 6%           | 9%         | 4%            |
| No change in confidence                      | 16%          | 13%        | 19%           |
| Slightly more confident                      | 64%          | 57%        | 70%           |
| significantly more confident                 | 14%          | 21%        | 7%            |
| n  | 113          | 56         | 57            |

## Other Findings

- ❖ Over 80% of the results were above the age and sex related intervals suggesting that decision points other than population reference intervals are required.
- ❖ Strong relationships were seen between proBNP results and age and renal function indicating that these factors must be taken into account. Serum creatinine should be measured with all requests.
- ❖ Of those patients with a clinical diagnosis of heart failure (request group 2), the median, lower and upper quartiles were 1716, 552 and 2574 ng/L, consistent with published data for heart failure prognosis (Gardner RS. European Heart Journal. 2003;24:1735-1743).

## Discussion

- ❖ The study allowed gathering of data for consideration of introduction of a routine proBNP service and allowed accumulation of experience from the different requesting physicians.
- ❖ The results of this study may not be transferable to other locations due to the nature of the patient population at St Vincent’s Hospital and the specific experiences of the heart failure specialists.
- ❖ The study design may be useful prior to introduction of other new pathology tests

## Conclusions

- ❖ When used by heart failure specialists, proBNP testing changed patient assessment and management in a significant proportion of cases.
- ❖ When there was no change in patient management there was generally a greater confidence in the initial management plan.
- ❖ This study does not address patient outcomes but indicates that proBNP testing provides additional information which is considered important by heart failure specialists

## Acknowledgement

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### proBNP TESTING AUDIT – POST-TEST QUESTIONNAIRE

Patient Details

Name:..... DoB: .....

MRN: ..... Sex: .....

Requesting Doctor:

Name:.....

Internal postal address / fax number for post-testing questionnaire: .....

Collection Details:

Date: ..... Time: .....

Result (ng/L):

.....

In response to the BNP result obtained on this patient have you:

1. Supported your pre-test diagnosis / assessment? Y / N

2. Changed or modified your pre-test diagnosis / assessment? Y / N

3. Raised further diagnostic possibilities? Y / N

4. Made a change in the management plan Y / N

if YES to question 4, in what way have you changed your plan?

.....

.....

if NO to question 4, do you feel any change in your confidence in your pre-test management plan?

Please tick appropriate box.

Less confident☐ No change☐ Slightly more confident☐ Significantly more confident☐

PLEASE COMPLETE AND RETURN TO:

Dr Graham Jones, Department of Chemical Pathology.

Via internal mail or Fax ext 2489

INTERPRETATION of proBNP RESULTS

Population Reference Intervals (ng/L)

|               |      |        |
|---------------|------|--------|
|               | Male | Female |
| 18 - 50 years | <70  | <120   |
| 50 - 65 years | <180 | <270   |
| 65 - 74 years | <230 | <350   |
| 75 + years    | <650 | <850   |

Expected values of proBNP in classes of heart failure

|          |                         |        |                          |
|----------|-------------------------|--------|--------------------------|
| Class    | 5 <sup>th</sup> centile | Median | 95 <sup>th</sup> Centile |
| NYHA I   | 30                      | 350    | 3,500                    |
| NYHA II  | 100                     | 950    | 6,500                    |
| NYHA III | 130                     | 1,600  | 10,000                   |
| NYHA IV  | 150                     | 1,700  | 12,000                   |

### proBNP TRIAL REQUEST FORM – HEART FAILURE SPECIALISTS

Patient Details

MRN: ..... Requesting Doctor: Page/Ext: .....

Name:..... Sex: ..... Name:.....

Address: ..... Signature:.....

.....DoB: ..... Fax / location for result: .....

Collection Details:

Date: ..... Time: ..... Collector: .....

• Collect one **Purple Top** (EDTA) blood tube and deliver to laboratory within 2 hours of collection.

REQUEST FOR PLASMA proBNP MEASUREMENT

Choose one indication and answer the associated questions:

SPRO – Enter Request for TPB

Centrifuge, store plasma in Endo rack in SPRO freeze.

1. Assessment of Cause of Shortness of breath☐

Inclusion criteria: symptomatic shortness of breath with cause uncertain.

Exclusions: current AMI, dialysis-dependent renal failure (do not test)

Questions: 1. patient has history of heart failure: Y / N

2. NYHA Classification: I II III IV

3. Pre-test probability of heart failure on clinical grounds.

Very low low intermediate likely almost certain

Assessment based on current history and examination plus:

Current CXR Y / N

Current echocardiograph Y / N

Previous echocardiograph Y / N

A proBNP measurement is likely to help me manage this patient as follows :.....

2. Assessing severity of known heart failure ☐

Inclusion criteria: known heart failure with diagnosis by specialist or echocardiograph.

Exclusions: current AMI, dialysis-dependent renal failure (do not test), Heart failure diagnosis uncertain (see 1 above)

Questions: 1. Duration of heart failure: .....

2. NYHA Classification: I II III IV

A proBNP measurement is likely to help me manage this patient as follows :.....

3. Assessing contribution of heart failure to symptoms in a complex patient.☐

Inclusion criteria: Possibility of heart failure, other concurrent conditions, eg pneumonia, valvular lesion, arrhythmia, heart transplant etc.

Exclusions: dialysis –dependent renal failure

Questions: 1. NYHA Classification: I II III IV

2. Pre-test probability of severity of heart failure on clinical grounds.

Very mild or absent Mild Moderate Severe extremely severe

This patient may have diastolic heart failure Yes / No

A BNP measurement is likely to help me manage this patient as follows :.....

4. Other indication☐

Please indicate reason for testing, pre-test likelihood of heart failure and decisions likely to be based on the BNP result.

.....

.....

.....

• proBNP testing will only be performed using this request form and subject to completion of the form.

• Results for plasma proBNP measurements will be made available fax / paper report and via routine methods.

• Requesters will be asked to complete a post-test questionnaire regarding the effect of the proBNP result on the clinical decision-making and management of the patient. Failure to complete and return the questionnaire may jeopardise future proBNP testing.