NT-pro BNP: Audit to determine compliance with assay use as a "rule-out" marker for Heart Failure under current working guidelines

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Background

Heart Failure (HF)

•Defined as the inability of the heart to function as a haemodynamic pump to support a physiological circulation, due to any structural or functional disorder

•European Society of Cardiology Clinical Definition [1]

- **SYMPTOMS TYPICAL OF HEART FAILURE:**
  - Dyspnoea at rest/exercise, fatigue, ankle swelling
- **And**
- **SIGNS TYPICAL OF HEART FAILURE:**
  - Tachycardia, tachypnoea, pulmonary crepitation's, pleural effusion, raised JVP, peripheral oedema, hepatomegaly
- **And**
- **OBJECTIVE EVIDENCE OF STRUCTURAL OR FUNCTIONAL CARDIAC ABNORMALITY AT REST:**
  - Cardiomegaly, S3, Murmur, Echocardiographic evidence, Raised BNP/ANP

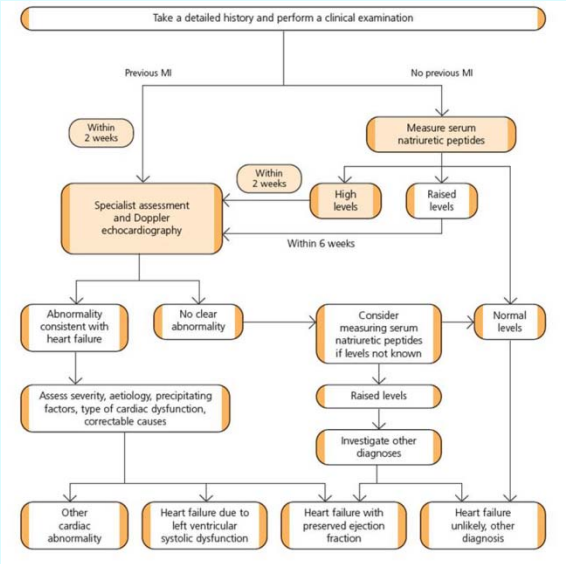
Brain-Type Natriuretic Peptide (BNP)

- hormone secreted by the ventricular myocardium during periods of increased ventricular stretch and wall tension
- Inhibit the renin-angiotensin system, endothelin secretion and sympathetic activity
- key role in mediation of vasoconstriction, natriuresis and overall volume status
- Once secreted it splits into the more stable biologically active NT-proBNP

NICE Standards[2]

- NICE currently recommend the use of NT-proBNP/BNP as a first line test in ruling out HF and thus obviating the need for specialist input or Doppler Echocardiography.
- The role of NT-proBNP in HF prognosis and monitoring is not clear.

Figure 1: Diagnosis of Heart Failure



Aim of Study

- The aim of this audit was to determine the proportions of requests for NT -pro BNP which were appropriately selected, interpreted and followed up as per the NICE Standards.

Patients and Methods

- 323 NT-proBNP assay requests were audited over a one month period, 149 and 174 by GP's and Hospital Clinicians respectively. 141(44%) proformas below were returned complete.

No.	Question
1.	At the time of request did the patient have a previous MI?
2.	At the time of request did the patient present with symptoms suggestive of heart failure?
3.	At the time of request had the patient been investigated for heart failure previously?
4.	At the time of request did the patient have a clinical diagnosis of heart failure?
5.	At the time of request did the patient fall into the following categories –ECG has major abnormality e.g. LBBB, LAHB, AF, Q Waves, LVF –Patients have dyspnoea where a non-cardiac diagnosis seems likely?
6.	Was the purpose of the test request to –Rule out HF, Provide prognostic information, Monitor treatment?
7.	Which of the following cut-offs did you apply in evaluating the NT-pro BNP result for this patient 150, 300, 400, 450, 900,1800, 2000pg/ml?
8.	How was the patient followed up since the NT-proBNP request?
9.	Has a final diagnosis been established?

Results

Table 1: Clinical History

Clinical Condition	Number of requests	% of total requests*
Previous MI	18	13%
Previous diagnosis of heart failure	57	40%
ECG evidence of Cardiac Muscle Dysfunction.	51	36%
patients were stated to have dyspnoea due to another likely cause.	34	24%

Table 2: Reason for request

Category	Number of requests	% of total requests*
Rule out Heart Failure	113	80%
Heart Failure Prognosis	22	16%
Monitoring Heart Failure.	17	12%

Table 3: Interpretation and follow up

Interpretation		Number of requests	% of total requests*
Managed appropriately on basis of NT -pro BNP result (ie HF ruled out or echocardiogram /cardiology referral made)		81	57%
Appropriateness of Echocardiogram request*	NT -pro BNP above cut off	37	72%
	NT-pro BNP below cut off	14	28%
Heart Failure rule out inappropriately (ie NT pro BNP above cut off)		14	10%

*% total >100 as multiple options selected in some responses

Conclusions

- The audit findings show that there is still not full compliance with NT-proBNP assays use as a rule-out biomarker solely. Many assays were sent despite contraindications which may delay specialist referral. Over half of the results were interpreted and followed up inappropriately pointing to a possible lack of understanding among non-specialists.

Corrective Action

- NT-pro BNP article in Pathology News
- Fixed comment on reports highlighting NICE guidelines
  - Advise referral/echo as per NICE guidance if >400pg/ml
- Audit presented at Physician meeting
- Re-Audit in 6 months

References

1. *ECS Guidelines for the diagnosis and treatment of acute and chronic heart failure 2008.* European Heart Journal (2008) 29, 2388–2442
2. Chronic heart failure - Management of chronic heart failure in adults in primary and secondary care. www.nice.org.uk/guidance/CG108