Single Serum NT-proBNP Level at First Heart Failure Clinic Visit is the Strongest Predictor for Two Years Mortality;

A Call for Policy Change

Roni Brin , Barak Zafrir, Nabia Salman, Hagar Paz, Dina Merhavi, Offer Amir

Heart Failure Unit, Cardiology Department
Lin and Lady Davis Carmel Medical Centers, Haifa, Israel

No conflict of interests

Background

- Natriuretic Peptides (NP) are peptides secreted by the myocardium in response to excessive stretching of the myocytes

- NP are responsible for maintaining the fluid homeostasis and systemic vascular tone

- **Natriuretic Peptides in HF: Diagnostic Value**

Utility of B-natriuretic peptide in the evaluation of left ventricular diastolic function and diastolic heart failure.

Niraj Parekh, Alan S Maisel

Department of Cardiology, Veterans Affairs Hospital, University of California at San Diego, San Diego, CA, USA.

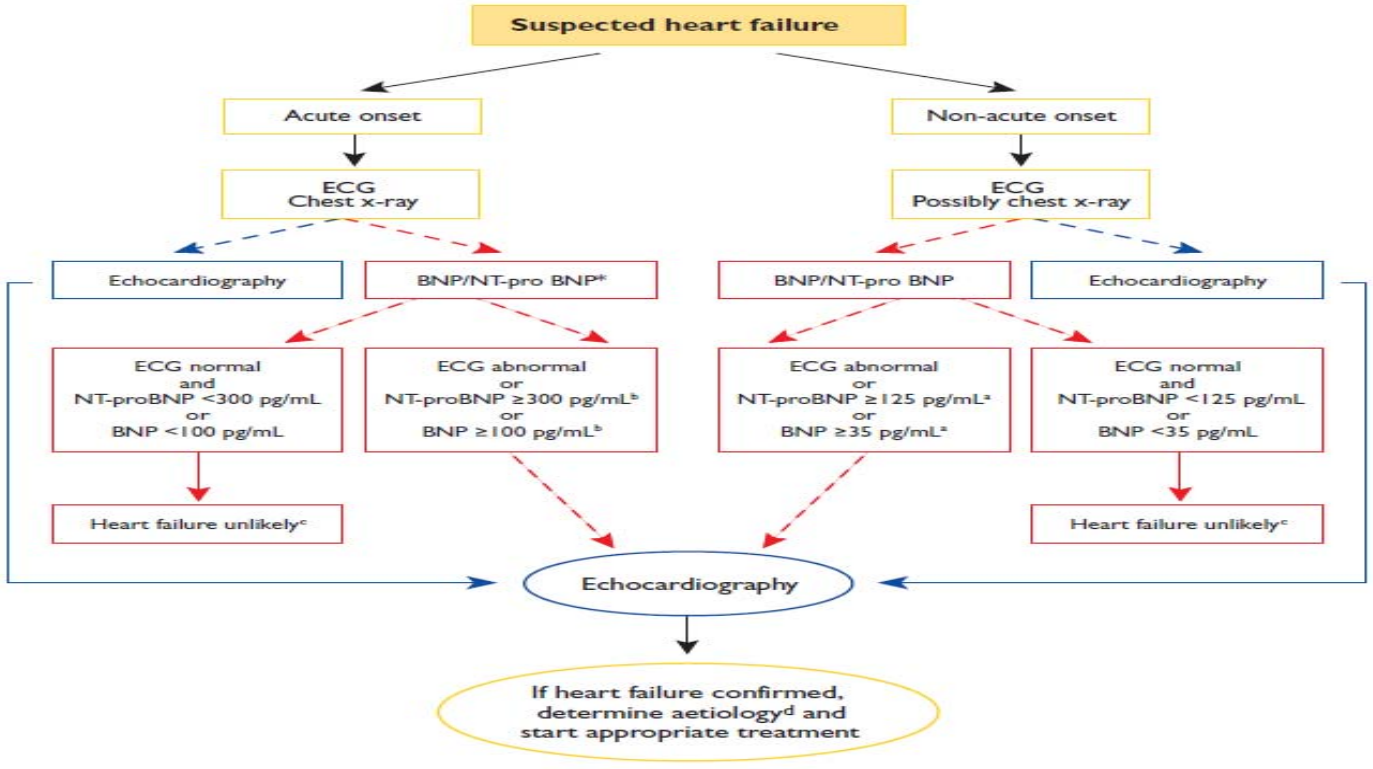
N Engl J Med. 2002 Jul 18;347(3):161-7.

Rapid measurement of B-type natriuretic peptide in the emergency diagnosis of heart failure.

Maisel AS, Krishnaswamy P, Nowak RM, McCord J, Hollander JE, Duc P, Omland T, Storrow AB, Abraham WT, Wu AH, Clopton P, Steg PG, Westheim A, Knudsen CW, Perez A, Kazanegra R, Herrmann HC, McCullough PA; Breathing Not Properly Multinational Study Investigators.

University of California, San Diego, Veterans Affairs Medical Center, San Diego 92161, USA. amaisel@ucsd.edu

Current guidelines suggest to measure NT-proBNP for <u>diagnostic</u> purposes



*In the acute setting, MR-proANP may also be used (cut-off point 120 pmol/L, i.e. <120 pmol/L = heart failure unlikely).
BNP = B-type natriuretic peptide; ECG = electrocardiogram; HF = heart failure; MR-proANP = mid-regional pro atrial natriuretic peptide; NT-proBNP = N-terminal pro B-type natriuretic peptide.
[a]Exclusion cut-off points for natriuretic peptides are chosen to minimize the false-negative rate while reducing unnecessary referrals for echocardiography.
[b]Other causes of elevated natriuretic peptide levels in the acute setting are an acute coronary syndrome, atrial or ventricular arrhythmias, pulmonary embolism, and severe chronic obstructive pulmonary disease with elevated right heart pressures, renal failure, and sepsis. Other causes of an elevated natriuretic level in the non-acute setting are: old age (>75 years), atrial arrhythmias, left ventricular hypertrophy, chronic obstructive pulmonary disease, and chronic kidney disease.
[c]Treatment may reduce natriuretic peptide concentration, and natriuretic peptide concentrations may not be markedly elevated in patients with HF-PEF.
[d]See Section 3.5 and Web Table 3.

Figure 1 Diagnostic flowchart for patients with suspected heart failure—showing alternative 'echocardiography first' (blue) or 'natriuretic peptide first' (red) approaches.

NP& Mortality prediction in HF

- No current recommendation for NT-proBNP measurement for mortality prediction in guidelines

J Am Coll Cardiol. 2013 Apr 9;61(14):1498-506. doi: 10.1016/j.jacc.2012.12.044.

B-type natriuretic Peptide and prognosis in heart failure patients with preserved and reduced ejection fraction.

van Veldhuisen DJ, Linssen GC, Jaarsma T, van Gilst WH, Hoes AW, Tijssen JG, Paulus WJ, Voors AA, Hillege HL.

Department of Cardiology, University Medical Center, University of Groningen, Groningen, the Netherlands. Electronic address: d.j.van.veldhuisen@umcg.nl.

Potential pitfalls in the interpretation of NT-proBNP for risk prediction

- BMI
- Hemoglobin
- Gender
- AF
- Chronic Renal Failure
- LV Function

The aim of the study

- The aim of the current study was to evaluate the prognostic predictive value of a single NP test (NT-proBNP), taken at first clinic visit, for prediction of death, comparing to other known prognostic parameters

Methods

- The study included 291 successive HF patients referred to our HF clinic
- Mean age 64±13 years
- 212 (73%) pts were males
- Mean LVEF 35±16%
- Average follow-up period was 24 ± 16 months
- Average serum NT-proBNP level taken at the first out-patient clinic visit was 3612±7821 pg/ml

We evaluated the association between patients' mortality and the following parameters:

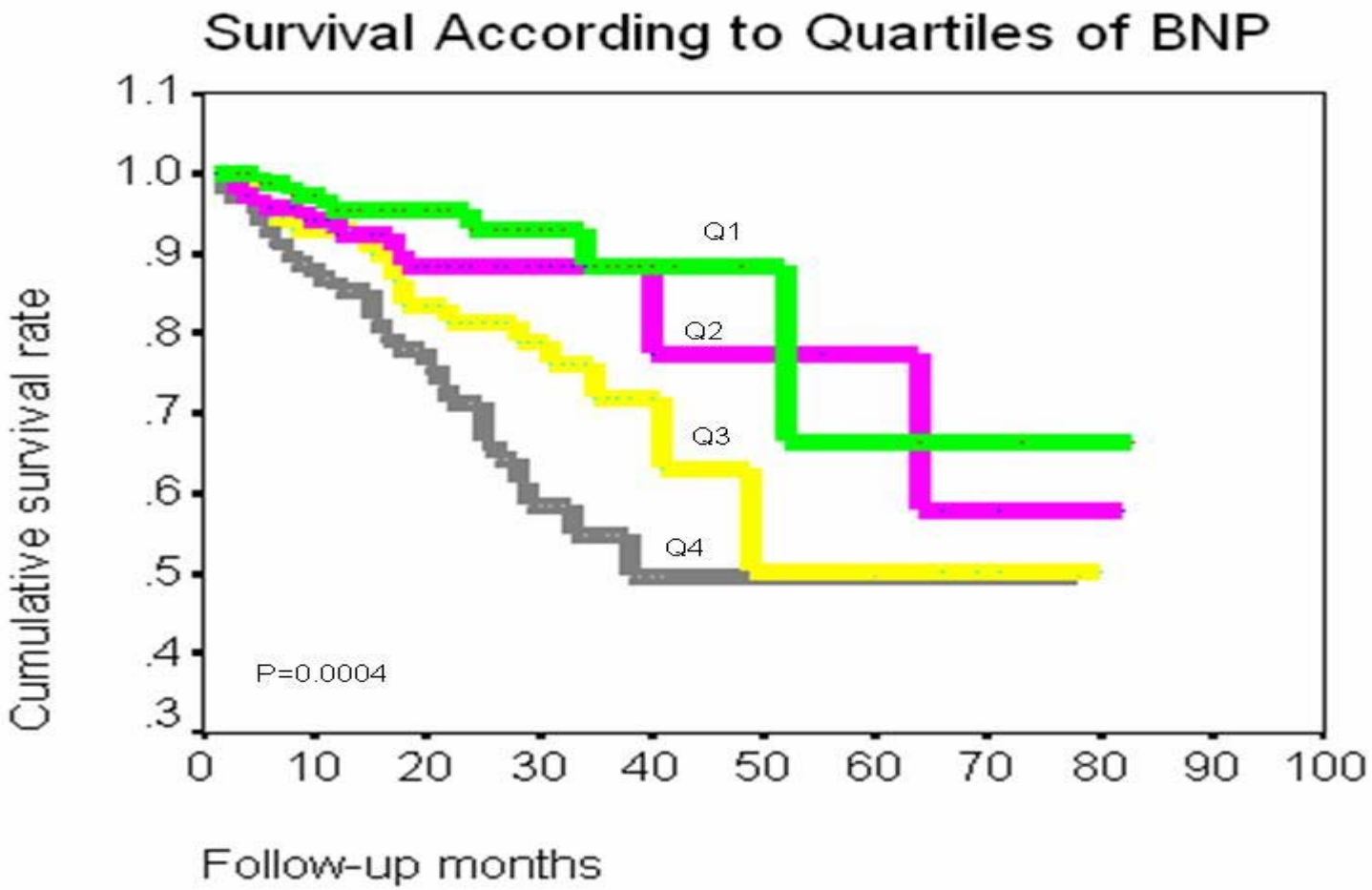
- Age
- Gender
- BMI
- NYHA class
- Ischemic etiology
- LVEF
- Hemoglobin level
- Creatinine clearance
- AF
- MR severity
- NT-proBNP levels

NP and Mortality

- Median single NT-proBNP test taken at the first clinic visit was strongly associated with mortality { HR =2.24, 95% CI 1.15-4.38), p= 0.01}

- 41(28%) HF patients with NT-proBNP above median died comparing to 15(10%) patients with NT-proBNP below median (p<0.001)

- Upper quartile was **the strongest predictor for mortality in HF patients**[H.R=2.54(95% CI 1.44-4.47),p=0.001]



	Q1	Q2	Q3	Q4
NT-proBNP	≤594 pg/ml	594-1620 pg/ml	1620-3613 pg/ml	>3613 pg/ml

Conclusions

- NT-proBNP upper quartile level taken at the first out-patient HF clinic visit, was the strongest predictor for mortality even after an average follow-up period of two years
- This data reconfirms the necessity of NT-proBNP measurements in HF centers, currently underused in Israel
- The practical implementation of it requires allocating the financial resources for NT-proBNP kits cost, at least in HF centers.