DECLARATION OF CONFLICT OF INTEREST
Diagnostic accuracy of NT-proBNP compared to ECG in detecting left ventricular hypertrophy of hypertensive origin

H J Andrade Gomes, P Morillas, J Quiles, J Castillo, J Roldán, I Mateo, P Agudo, B Miralles, M Masiá, V Bertomeu.

Hospital Universitario San Juan, Alicante, Spain.
Diagnostic accuracy of NT-proBNP compared to ECG in detecting LVH of hypertensive origin

**Background**

- Arterial Hypertension (AH) is the most prevalent cardiovascular (CV) risk factor, affecting 26% of the adult population (1,000,000,000 people worldwide).\(^1\)

- In the last 10 years, the diagnosis and management of AH have been focused on quantification of total CV risk, maximizing cost-efficiency of the therapeutic approach:
  - BP levels
  - Other risk factors (smoking, diabetes, hypercholesterolemia, etc)
  - Subclinical organ damage
  - Established CV or renal disease

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\(^1\) Campanini, WHO, 2002.
The presence of left ventricular hypertrophy (LVH) increases the risk of cardiovascular events, thus the 2007 Guidelines\(^2\) recommend the evaluation of this organ damage into the laboratory investigations.

Despite its low sensitivity, the electrocardiogram (ECG) is the most used method for diagnosis of LVH due to low accessibility of the echocardiogram.

Diagnostic accuracy of NT-proBNP compared to ECG in detecting LVH of hypertensive origin

B-type natriuretic peptides:

BNP/NT-proBNP: good markers of heart dysfunction

ESC Congress, Paris 2011

Adapted from Dzau V, and Braunwald E, Am Heart J 1991;121:1244–1253
Determine the capability of NT-proBNP to diagnose LVH in “stable hypertensive outpatients” compared to ECG.
Outpatients from our Arterial Hypertension Unit:

- **ECG** (Sokolow-Lyon and Cornell criteria)
- **Echocardiogram** (septum thickness and left ventricular mass index)
- **Biochemical blood test**, including **NT-proBNP** values
- **24h-ABPM**

**Excluded:**
- Atrial fibrillation
- Left ventricular systolic dysfunction (EF < 50%)
- Significant valve diseases
**Diagnostic accuracy of NT-proBNP compared to ECG in detecting LVH of hypertensive origin**

## Results

Baseline characteristics:

<table>
<thead>
<tr>
<th></th>
<th>All patients (n= 336)</th>
<th>LVH n=94 (28%)</th>
<th>No LVI n=246 (72%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years)</strong></td>
<td>56,1 ±13</td>
<td>59,9 ± 12,5</td>
<td>54,5 ± 13,1</td>
<td>0,001</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>127 (37,8%)</td>
<td>31 (33%)</td>
<td>96 (39,7%)</td>
<td>0,256</td>
</tr>
<tr>
<td><strong>Diabetes mellitus</strong></td>
<td>66 (19,6%)</td>
<td>27 (28,7%)</td>
<td>39 (16,1%)</td>
<td>&lt; 0,01</td>
</tr>
<tr>
<td><strong>Current smokers</strong></td>
<td>84 (25,1%)</td>
<td>24 (25,4%)</td>
<td>24,9%</td>
<td>0,568</td>
</tr>
<tr>
<td><strong>Prior MI/UA</strong></td>
<td>17 (5,1%)</td>
<td>7 (7,4%)</td>
<td>10 (4,1%)</td>
<td>0,166</td>
</tr>
<tr>
<td><strong>Prior stroke</strong></td>
<td>17 (5,1%)</td>
<td>9 (9,6%)</td>
<td>8 (3,3%)</td>
<td>0,019</td>
</tr>
<tr>
<td><strong>Glomerular filtration rate (ml/min/1,73m²)</strong></td>
<td>85 ± 21</td>
<td>79 ± 22</td>
<td>87 ± 21</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td><strong>SBP mean in ABPM (mmHg)</strong></td>
<td>130 ± 15</td>
<td>131± 17</td>
<td>130 ± 15</td>
<td>0,616</td>
</tr>
<tr>
<td><strong>DBP mean in ABPM (mmHg)</strong></td>
<td>77± 11</td>
<td>78± 11</td>
<td>77± 11</td>
<td>0,275</td>
</tr>
<tr>
<td><strong>LVH by ECG</strong></td>
<td>38 (11,2%)</td>
<td>24 (25,5%)</td>
<td>14 (5,8%)</td>
<td>&lt; 0,01</td>
</tr>
<tr>
<td><strong>NT-proBNP (pg/dl)</strong></td>
<td>147 ± 258,6</td>
<td>295,7 ± 441,6</td>
<td>92,9 ± 126,7</td>
<td>&lt; 0,01</td>
</tr>
</tbody>
</table>
Results

• There was a significant correlation between NT-proBNP levels and LVMi (r=0.41, p<0.001).

• Area under the ROC curve of 0.75 [CI 95% 0.70-0.80].

• Using a cutoff point of 74.2 pg/dl:
  Sensitivity 76.6%
  Negative predictive value 87.8%
Comparative study using Mc Nemar test for paired data

### Results

#### Diagnostic accuracy of NT-proBNP compared to ECG in detecting LVH of hypertensive origin

<table>
<thead>
<tr>
<th></th>
<th>Electrocardiogram</th>
<th>NT-proBNP (&gt;74,2 pg/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>CI 95%</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>25,5</td>
<td>17,1-35,6</td>
</tr>
<tr>
<td>Specificity</td>
<td>94,2</td>
<td>90,5-96,8</td>
</tr>
<tr>
<td>Positive predictive value</td>
<td>63,2</td>
<td>46-78,2</td>
</tr>
<tr>
<td>Negative predictive value</td>
<td>76,5</td>
<td>71,3-81,2</td>
</tr>
</tbody>
</table>

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Patients with LVH have higher NT-proBNP levels.

Plasmatic levels of NT-proBNP can be useful in screening of LVH in hypertensive patients, improving significantly the capability of ECG, selecting a group of patients who would not need the performance of imaging studies.