Multi-center Comparison of the Response Biomedical Corporation RAMP® NT-proBNP Assay against the Roche Diagnostics GmbH Elecsys® proBNP Assay

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Abstract

Background: NT-proBNP measurements aid in the evaluation of individuals with suspected heart failure (HF) and may facilitate risk stratification in patients with acute coronary syndromes (ACS), pulmonary embolism (PE) or coronary artery disease (CAD). Point-of-care (POC) assays can provide immediate results for these patients.

Methods: In a multi-center study, we evaluated the analytical precision, sensitivity and specificity of the Response Biomedical Corporation RAMP NT-proBNP POC assay, using EDTA whole blood samples, and compared results with three pre-market samples from each subject were obtained from the Roche Diagnostics proBNP central laboratory assay using heparin plasma. EDTA and heparin samples from each subject were obtained from a single blood draw.

Results: Intra- and total assay precision analysis results are presented in the following table:

<table>
<thead>
<tr>
<th>Category</th>
<th>RAMP</th>
<th>Elecsys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intra-assay CV</td>
<td>9.4%</td>
<td>6.4%</td>
</tr>
<tr>
<td>Total assay CV</td>
<td>10.3%</td>
<td>9.8%</td>
</tr>
</tbody>
</table>

In the table below for the RAMP NT-proBNP assay:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional Sensitivity</td>
<td>10% CV at 123 ng/L</td>
</tr>
<tr>
<td>Lower Limit of Detection</td>
<td>18 ng/L</td>
</tr>
</tbody>
</table>

Conclusions: Using EDTA whole blood, the POC RAMP NT-proBNP Assay provides comparable results to the FDA-cleared Roche Elecsys central laboratory platform.

Analytical Characteristics

Methods and Materials

• All four sites used IRB approved protocols.
• EDTA and heparinized whole blood samples were collected from a single draw in 606 subjects (335 reference and 271 with predominantly stable HF).
• Results from the EDTA whole blood samples measured using the RAMP NT-proBNP assay were compared to the results from heparin plasma samples measured using the Roche Elecsys proBNP central laboratory assay.

Subject Demographics

**Healthy Reference** n=127, mean age=44.8yrs (18-83), 41% male, 59% female.

**Non Healthy Reference** (Non-CHF): n=208, mean age=50.8yrs (24-100), 51% male, 49% female.

Comorbidities: Diabetes 23.1%, Hypertension 35.5%, Pulmonary 8.2%, Other 33.2%

**HF** n=271, mean age=63.9yrs (19-95), 63% male, 37% female.

Comorbidities: Diabetes 32.1%, Hypertension 36.9%, Pulmonary 5.2%, Other 25.8%

Clinical Comparisons

Median NT-proBNP levels on both RAMP and Elecsys assays according to severity of heart disease are shown below:

**Method Comparison**

RAMP versus Roche Elecsys for samples with NT-proBNP of 5-35,000 ng/L on Elecsys (n=540) and for a subset of samples with NT-proBNP <1000 ng/L on Elecsys (n=336).

Passing Bablok analysis showed excellent correlation and slope for all samples (R=0.98, slope 1.01) and for a subset of samples with NT-proBNP concentrations of <1000 ng/L by Elecsys (R=0.94, slope 1.07).

RAMP NT-proBNP Assay: CE self-certified. Licensed by Health Canada (country of origin approval). Test not yet cleared for sales in the US (FDA)

Conclusions

Response Biomedical’s point-of-care 15 minute RAMP NT-proBNP assay provides comparable results to those measured on the FDA cleared Roche proBNP assay run on the Roche Elecsys central laboratory platform.

References

*Results presented at the 46th Annual Meeting of the American Society of Hypertension, May 9-11, 2012, San Francisco, CA.

Method Comparison

In patients grouped by NYHA classification (blinded to RAMP NT-proBNP results), RAMP provided equivalent results to the Roche Elecsys proBNP test (p>0.05, Mann-Whitney U-Test).

Concordance between the two methods using cut offs of 125 ng/L for subjects <75 years and 450 ng/L for subjects ≥75 years (as per the Roche Elecsys proBNP package insert).

The RAMP assay demonstrated equal clinical performance to the Roche Elecsys in differentiating normal and non-healthy non-heart failure patients from those with acute heart failure.