In-clinic, Quantitative NT-proBNP testing

A new quantitative POC analyzer allows fast, onsite measurement of NT-proBNP, minimizing preanalytical error and reducing variability.

Kendal E. Harr | Sonya G. Gordon | Ryan D. Baumwart | Ross Feldgreber | Matthew R. Spiro
Vet Clin Pathol. 2022;00:1–10. (DOI: 10.1111/vcp.13101)

B-type natriuretic peptide (BNP) is a 32-amino acid cardiac natriuretic peptide hormone that is secreted into the circulation by cardiac myocytes and fibroblasts in response to myocardial stress or stretch of the heart's walls due to increased volume and pressure, and its production is therefore significantly upregulated in cardiac failure.

BNP is secreted as a prohormone, proBNP, and then cleaved into the biologically active hormone, BNP, and the non active amino-terminus, NT-proBNP (76 amino acids); therefore, the concentration of either can be used to assess the magnitude of myocardial wall stress or stretch (Figure 1). However, the N-terminal pro-brain natriuretic peptide (NT-proBNP) is more stable and has a longer half-life than both the prohormone and BNP, making it a useable diagnostic analyte. **A new quantitative POC analyzer allows fast, onsite measurement of NT-proBNP, minimizing preanalytical error and reducing variability.**
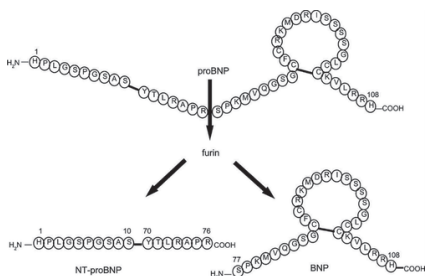

Figure 1. Production of NT-proBNP and BNP

This study aimed to analytically validate an NT-proBNP assay (Vcheck) according to American Society of Veterinary Clinical Pathology (ASVCP) and Clinical Laboratory Improvement Amendments (CLIA) specifications.

Precision and LOQ

Imprecision varied across concentrations with the lowest CV at the highest concentration as expected (Table 1). Imprecision was considered acceptable with a coefficient of variation ranging from 9% at 4000 pmol/L to 20% at 600 pmol/L. The precision performance of Vcheck was verified, and performance was deemed acceptable for an immunoassay.

Table 1. The precision of the Vcheck NT-proBNP assay across concentrations

Target conc. (pmol/L)	CV (%)
600	20
1,900	12
4,000	9

Accuracy

A comparison of the Vcheck assay with the Cardiopet NT-proBNP assay revealed an excellent correlation with minimal bias when preanalytical factors were controlled. The linear equation was y=0.9x+37 (R^2=0.9) with 95% Cis and a slope of 0.75-1.05 and an intercept of -150 to 224 (Figure 2).
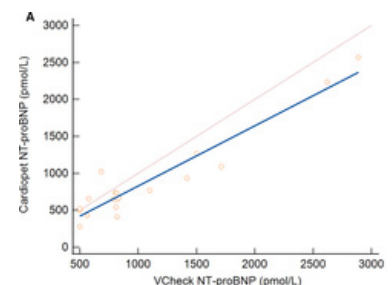

Figure 2. Comparison of the Vcheck and Cardiopet NT-proBNP assays

"Results of this study demonstrate that the Vcheck NT-proBNP assay is a valid point-of-care cardiac biomarker using canine serum."

When 61 samples were treated in a real-world, in-clinic setting (shipped with couriers and analyzed as recommended by the manufacturer), the R^2 falls to 0.8 and it generated a significantly different linear equation, y=0.7x-52

Precise Diagnostics for Improved Care,
Vcheck analyzer

* In-House immunoassay for Quantitative Results

* Up to 26+ Biomarkers Available

For the Full Study
A complete list of reference citations along with more information about the authors can be viewed in the study document via QR code.

Inflammatory
CRP, SAA

Coagulantion
D-dimer

Ab Titer
Canine, Feline

Pancreatitis
cPL, fPL

Tumor
TK1*, AFP*

Hormone
T4, TSH, Cor, Prog

Cardiac
NT-proBNP, Troponin I

* Biomarkers
under development

Preanalytical error

Significant degradation of NT-proBNP occurred when current methods were used at refrigerated and room temperatures, which could change diagnostic and prognostic decision-making. An approximate 20% loss from the original mean concentration was documented in a 14-hour time period when 10 samples were stored at 4°C, with samples ranging from 16% to 33% loss during this time period. When ten samples were then purposefully left at room temperature (20°C) overnight, in the next day measurement, it was revealed that all samples had lost at least 50% of their concentration.

Analytical specificity

Spiking 10 samples across the linear range of the assay with 35 mg/dL hemoglobin and 1000 mg/dL Intralipid did not reveal a statistically significant difference using paired t-tests for reported values beyond the known total error ($P>0.05$).

Reference intervals

Age-partitioned reference intervals (95%) have upper reference limits of 750 pmol/L and 1280 pmol/L for 36 juvenile (0-18 months) and 125 adult dogs (19 months to geriatric age), respectively.

THE VCHECK NT-PROBNP ASSAY PROVIDES ANALYTICALLY ACCEPTABLE RESULTS.

ONSITE TESTING CAN MINIMIZE VARIABILITY RELATED TO PREANALYTICAL ERROR AND PROVIDE CLINICALLY USEFUL CONTEMPORANEOUS RESULTS.

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You can insert the information you want here,
such as promotions or events concerning Vcheck!