

Vcheck Canine NT-proBNP & cTnI

Scan the code
to see the paper



Diagnostic Performance of Vcheck NT-proBNP and Cardiac Troponin I Assays for Detection of Dilated Cardiomyopathy in Doberman Pinschers

Summary of Driessen H, Friederich J, Wess G. *Frontiers in Veterinary Science*. 2026;13:1895815.

INTRODUCTION

Dilated cardiomyopathy (DCM) is a common inherited cardiac disease in Doberman Pinschers and is characterized by a prolonged occult stage. During this period, affected dogs may remain clinically asymptomatic despite the presence of ventricular arrhythmias and/or structural cardiac abnormalities.

Echocardiography and 24-h Holter monitoring are important diagnostic tools for DCM screening but require specialized equipment and expertise. Cardiac biomarkers such as NT-proBNP and cardiac troponin I (cTnI) may therefore provide a practical adjunctive approach for identifying dogs that require further cardiac evaluation.

PURPOSE

The purpose of this study was to evaluate the diagnostic performance of NT-proBNP and cTnI measured using the Vcheck V200 for detecting different stages of DCM in Doberman Pinschers and to determine clinically applicable screening thresholds.

Vcheck cTnI results were also compared with those obtained using a laboratory-based high-sensitivity Lab cTnI assay.

METHODS

A total of 453 serum samples from 345 Doberman Pinschers were evaluated. Dogs underwent standardized cardiac assessment including echocardiography, ECG, and 24-h Holter monitoring.

Dogs were classified into five groups:

- Stage A: Healthy controls
- Last Normal (LN): Normal at sampling but developed DCM within 12 months
- Stage B1: Ventricular arrhythmias without structural cardiac abnormalities
- Stage B2: Structural cardiac abnormalities with or without arrhythmias, but no clinical signs
- Stage C: Overt clinical DCM

NT-proBNP and cTnI were measured using the Vcheck V200, and diagnostic performance was evaluated by ROC analysis.

	A	LN	B1	B2	C
Samples	83	80	85	143	62
Female (n)	43	38	48	56	25
Male (n)	40	42	37	87	37
Age (years), mean $\pm$ SD	4.16 $\pm$ 1.92	6.16 $\pm$ 2.34	7.33 $\pm$ 2.39	6.94 $\pm$ 2.47	7.19 $\pm$ 2.72
IVEDV/BSA, mean $\pm$ SD	71.60 $\pm$ 10.13	77.99 $\pm$ 13.21	72.46 $\pm$ 12.34	109.91 $\pm$ 22.32	134.52 $\pm$ 42.85
LVESV/BSA, mean $\pm$ SD	40.18 $\pm$ 7.68	43.05 $\pm$ 9.52	40.26 $\pm$ 9.00	69.22 $\pm$ 19.35	100.80 $\pm$ 35.21
LA/Ao, mean $\pm$ SD	1.30 $\pm$ 0.13	1.31 $\pm$ 0.11	1.31 $\pm$ 0.15	1.39 $\pm$ 0.21	1.99 $\pm$ 0.46
LVIDd, mean $\pm$ SD	4.00 $\pm$ 0.28	4.24 $\pm$ 0.37	4.13 $\pm$ 0.37	4.96 $\pm$ 0.56	5.76 $\pm$ 0.90
LVIDs, mean $\pm$ SD	3.07 $\pm$ 0.32	3.31 $\pm$ 0.37	3.19 $\pm$ 0.37	4.11 $\pm$ 0.60	5.02 $\pm$ 0.87

Table 1. Demographic and echocardiographic characteristics of Doberman Pinschers according to DCM stage.

RESULTS

Vcheck NT-proBNP and cTnI Concentrations Across DCM Stages

Both NT-proBNP and cTnI concentrations measured with the Vcheck V200 were significantly increased in dogs with DCM compared with healthy controls.

NT-proBNP showed its best performance in dogs with structural cardiac changes, consistent with its role as a marker of myocardial wall stress and ventricular remodeling. Vcheck cTnI also increased with disease progression and provided complementary information related to myocardial injury.

Diagnostic Performance for DCM Screening

For detection of DCM stages B1, B2, and C versus healthy Stage A dogs, the following screening thresholds were identified:

Vcheck NT-proBNP ≥ 580 pmol/L

- Sensitivity: 76.6%
- Specificity: 83.1%
- AUC: 0.845

Vcheck cTnI ≥ 0.21 ng/mL

- Sensitivity: 71.0%
- Specificity: 78.3%
- AUC: 0.809

The laboratory-based cTnI assay showed the highest overall diagnostic accuracy, with an AUC of 0.936 for the same

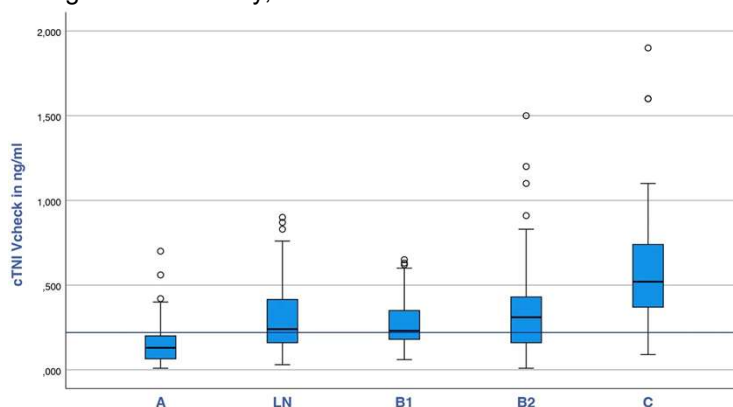


Figure 1. Vcheck cTnI concentrations across DCM stages. Blue lines indicate diagnostic cutoffs; dots indicate outliers.

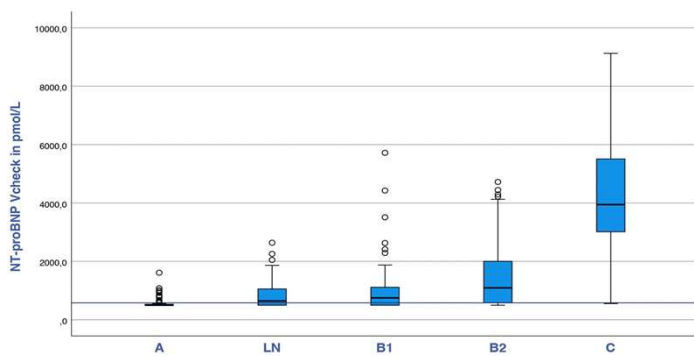


Figure 2. Vcheck NT-proBNP concentrations across DCM stages. Blue lines indicate diagnostic cutoffs; dots indicate outliers.

Diseased stages vs. healthy stage A	NT-proBNP (Vcheck) cutoff ≥ 580 pmol/L	cTnI (Vcheck) cutoff ≥ 0.21 ng/mL	cTnI (Lab) cutoff ≥ 0.11 ng/mL	AUC comparisons (DeLong test)
B1, B2, C	Sens 76.6% Spec 83.1% AUC 0.845	Sens 71.0% Spec 78.3% AUC 0.809	Sens 78.8% Spec 97.0% AUC 0.936	Lab vs. Vcheck cTnI: 0.127 ($p < 0.0001$) Lab vs. NT-proBNP: 0.091 ($p = 0.0002$) NT-proBNP vs. Vcheck cTnI: 0.036 (ns)
B1	Sens 62.4% Spec 82.5% AUC 0.747	Sens 64.7% Spec 78.3% AUC 0.761	Sens 60.3% Spec 97.6% AUC 0.867	Lab vs. Vcheck cTnI: 0.106 ($p < 0.05$) Lab vs. NT-proBNP: 0.120 ($p = 0.0182$) NT-proBNP vs. Vcheck cTnI: -0.014 (ns)
B2	Sens 75.5% Spec 83.1% AUC 0.839	Sens 65.0% Spec 78.3% AUC 0.783	Sens 80.0% Spec 96.4% AUC 0.952	Lab vs. Vcheck cTnI: 0.169 ($p < 0.0001$) Lab vs. NT-proBNP: 0.113 ($p = 0.0002$) NT-proBNP vs. Vcheck cTnI: 0.056 (ns)
LN	Sens 52.5% Spec 82.5% AUC 0.724	Sens 56.9% Spec 78.9% AUC 0.739	Sens 53.9% Spec 97.0% AUC 0.841	Lab vs. Vcheck cTnI: 0.102 ($p = 0.0468$) Lab vs. NT-proBNP: 0.117 ($p = 0.0268$) NT-proBNP vs. Vcheck cTnI: -0.015 (ns)
ALL	Sens 71.4% Spec 83.1% AUC 0.819	Sens 68.4% Spec 78.3% AUC 0.794	Sens 72.9% Spec 97.0% AUC 0.913	Lab vs. Vcheck cTnI: 0.119 ($p = 0.0001$) Lab vs. NT-proBNP: 0.094 ($p = 0.0002$) NT-proBNP vs. Vcheck cTnI: 0.025 (ns)

Table 2. Diagnostic performance of Vcheck NT-proBNP, Vcheck cTnI, and Lab cTnI according to DCM stage.

Diagnostic Performance According to Disease Stage

Vcheck NT-proBNP showed better diagnostic performance in dogs with structural cardiac changes (Stage B2; AUC 0.839) than in dogs with isolated ventricular arrhythmias (Stage B1; AUC 0.747).

Vcheck cTnI showed AUCs of 0.783 for Stage B2 and 0.761 for Stage B1.

In the Last Normal group, consisting of dogs that were clinically normal at sampling but developed DCM within 12 months, the AUCs were:

- Vcheck NT-proBNP: 0.724
- Vcheck cTnI: 0.739
- Lab cTnI: 0.841

These findings indicate that very early DCM remains more difficult to detect using point-of-care biomarkers alone.

Combined Use of Vcheck NT-proBNP and cTnI

Combining Vcheck NT-proBNP and cTnI improved diagnostic sensitivity for detecting dogs with DCM (Stages B1, B2, and C) compared with healthy controls.

The combined model achieved:

- Sensitivity: 90.3%
- Specificity: 55.4%
- AUC: 0.886

The combined approach identified more affected dogs than either biomarker alone, although this increase in sensitivity was accompanied by reduced specificity.

Comparison Between Vcheck and Lab cTnI

Bland–Altman analysis of 357 paired samples demonstrated a mean difference of 0.0817 ng/mL, with 95% limits of agreement from -0.361 to 0.525 ng/mL.

Vcheck systematically yielded higher cTnI concentrations than the lab assay, indicating that results from the two assays should not be considered analytically interchangeable.

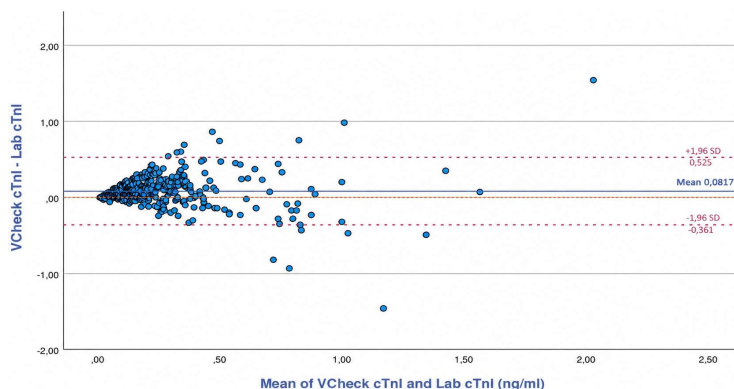


Figure 3. Bland–Altman comparison of Vcheck and Lab cTnI. Mean bias was 0.0817 ng/mL, with 95% limits of agreement from -0.361 to 0.525 ng/mL.

CONCLUSION

The Vcheck V200 NT-proBNP and cTnI assays provided clinically useful diagnostic information for screening Doberman Pinschers at risk of DCM.

Clinically relevant screening thresholds were identified as:

- NT-proBNP ≥ 580 pmol/L
- Vcheck cTnI ≥ 0.21 ng/mL

For detection of DCM stages B1, B2, and C, combining both biomarkers increased sensitivity to 90.3%, although specificity decreased to 55.4%.

The laboratory-based high-sensitivity cTnI assay showed higher diagnostic accuracy, particularly for very early disease. Nevertheless, the Vcheck V200 provides a practical option for rapid in-clinic cardiac biomarker assessment and may help identify dogs that require further evaluation by echocardiography and 24-h Holter monitoring. A normal Vcheck result should not be used alone to exclude early DCM.