



Diagnostic accuracy of plasma atrial natriuretic peptide concentrations in cats with and without cardiomyopathies

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KEYWORDS

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Abstract *Objectives:* Plasma atrial natriuretic peptide (ANP) levels have been reported to be elevated in cats with cardiomyopathy. We investigated the diagnostic accuracy of plasma ANP concentration as an indicator of the severity of cardiomyopathies.

Animals: This study included 78 control cats and 83 cats with various types of cardiomyopathy.

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Hypertrophic cardiomyopathy

Methods: This was a prospective multicentre study. Control cats were determined to have a normal heart, and diseased cats were diagnosed by echocardiography. Diseased cats were divided into asymptomatic cats without left atrial dilation (LAD), asymptomatic cats with LAD, and cats with heart failure. Plasma C-terminal ANP concentrations were measured using chemiluminescence.

Results: The median plasma ANP concentration in controls was 43.3 (interquartile range, 33.0–56.3) pg/mL. Plasma ANP values were significantly higher in the cardiomyopathic cats with LAD and heart failure, but the values in cats without LAD were comparable to those in control cats. To distinguish cats with cardiomyopathy from controls, a plasma ANP concentration >77.5 pg/mL afforded sensitivity of 66.3% and specificity of 84.6%. Use of plasma ANP concentration >110.9 pg/mL to identify cats with LAD had a sensitivity of 73.6% and specificity of 93.5%. The areas under the receiver-operating characteristic curve were 0.80 and 0.86.

Conclusions: Plasma ANP concentrations were higher in cats with more advanced cardiomyopathy. Although assaying the ANP concentration alone may not help to diagnose cardiac disease, measuring provides additional information that is useful for assessing the severity of cardiomyopathies.

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Abbreviations

ANP	atrial natriuretic peptide
HCM	hypertrophic cardiomyopathy
HF	heart failure
LAD	left atrial dilation
NT-proANP	N-terminal proANP
NT-proBNP	N-terminal pro B-type natriuretic peptide
ROC	receiver-operating characteristic

Introduction

There are five types of primary cardiomyopathy: hypertrophic cardiomyopathy (HCM), restrictive cardiomyopathy, dilated cardiomyopathy, unclassified cardiomyopathy and arrhythmogenic right ventricular cardiomyopathy. Of these, HCM and restrictive cardiomyopathy are most commonly seen in cats [1,2]. Previous studies have reported that cats with advanced cardiomyopathy are at increased risk of congestive heart failure (HF) and thromboembolism; the prognosis is poor in these cases [1,2].

Several hormones and peptides are used in veterinary practice as biomarkers to diagnose heart disease. The members of the natriuretic peptide family include atrial natriuretic peptide (ANP), B-type natriuretic peptide and C-type natriuretic peptide. The N-terminal pro B-type natriuretic peptide (NT-proBNP) level can be used to indicate the presence and severity of HCM

[3,4]. Similarly, cardiomyopathic cats have been reported to have higher plasma concentrations of N-terminal proANP (NT-proANP) than healthy cats [5].

Atrial natriuretic peptide is synthesised and stored in the atrial myocardium as a prohormone and cleaved into two segments in response to wall stretching. N-terminal proANP and biologically active C-terminal ANP are released into the blood mainly from the left atrium [6]. Previous studies have demonstrated that the production of ANP is often upregulated in the atrium of cats with HF [7,8]. Elevated pulmonary capillary wedge pressure and left atrial pressure appear to be significantly associated with an increase in plasma ANP concentration in dogs and cats, respectively [9,10]. However, only a few studies have evaluated the clinical implications of plasma ANP measurements in cats [9,11].

Although an echocardiographic examination is the gold standard for diagnosing cardiomyopathy, the main limitation of this method is that it requires dedicated equipment that is relatively expensive and requires a high level of skill. Plasma ANP levels may help identify cats with cardiomyopathy, but their value in identifying disease severity remains uncertain. Using the echocardiographic diagnosis of cardiomyopathy as the standard, the objectives of the present study were (1) to compare ANP concentrations in control cats with those of cats with cardiomyopathy and (2) to define the diagnostic accuracy of using plasma ANP concentration to identify different severities of cardiomyopathy in cats.

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