



P-ISSN: 2349-8528

E-ISSN: 2321-4902

IJCS 2019; 7(1): 718-719

© 2019 IJCS

Received: 09-11-2018

Accepted: 13-12-2018

P Thirunavukkarasu

Assistant Professor,
Animal, Husbandry Statistics
and Computer Applications
Madras Veterinary College
Chennai, India

Dr. B Nagarajan

Professor and Head, Dept of
Veterinary Preventive Medicine,
Madras Veterinary College,
Chennai, Tamil Nadu, India

Dr. K Vijayarani

Professor and Head, Dept of
Animal Biotechnology, Madras
Veterinary College, Chennai,
Tamil Nadu, India

Dr. K Kumanan

Professor and Head, Dept of
Bioinformatics and ARIS cell,
Madras Veterinary College,
Chennai, Tamil Nadu, India

Canine N-terminal-pro brain natriuretic peptides (NT-proBNP): A promising marker of heart failure

P Thirunavukkarasu, Dr. B Nagarajan, Dr. K Vijayarani and Dr. K Kumanan

Abstract

Acquired heart diseases (AHD) are common and often fatal when it leads to CHF in dogs and it occurs most often secondary to degenerative mitral valve disease (MVD), dilated cardiomyopathy (DCM), pericardial diseases and Hypertrophic cardiomyopathy (HCM). Early recognition of AHD is of clinical importance. Animals with acquired heart diseases were selected from the animals that were brought to MVC teaching hospital and they were grouped as following apparently healthy dogs (Control group), Dilated Cardiomyopathy (DCM), Mitral Valve Disease (MVD), Pericardial diseases, Hypertrophic Cardiomyopathy (HCM). NT-proBNP Assay was conducted in the control and clinical group. In NT-proBNP assay highly significant increase in levels was observed in Dilated Cardiomyopathy, MVD with systolic failure, MVD without systolic failure and even in occult cardiac diseases, which indicated that this marker is highly sensitive and specific in cardiac diseases. The cardiac biomarker NT-proBNP was very effective and specific marker and very useful in diagnosing and categorizing the cardiac diseases in dogs.

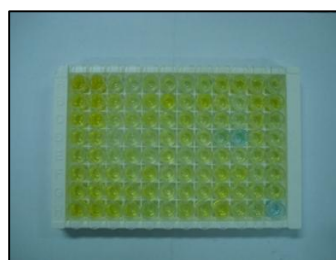
Keywords: canine, dogs, DCM, MVD, HCM, NT proBNP, biomarker

Introduction

The natriuretic peptides are produced in the myocardium as preprohormones, which are subsequently cleaved first into prohormones (e.g. proBNP, proANP) and then mature into active hormones. The cardiac biomarker NT-proBNP is a 76 amino acid N-terminal fragment of brain natriuretic peptide which regulates fluid homeostasis. NT-proBNP level in the blood is used for screening, diagnosis of congestive heart failure (CHF) and may be useful to establish prognosis in heart failure [1]. The plasma concentration of NT-proBNP is typically increased in patients with asymptomatic or symptomatic left ventricular dysfunction [2, 3]. The patients with respiratory signs and exercise intolerance may be easily differentiated from cardiac patients by estimation of these peptides [4]. This marker may be very useful for diagnosis of heart diseases even in the absence of echocardiography.

Materials and Methods

The animals which showed signs suggestive of cardiac disease were selected for this parameter especially with dyspnoea and exercise intolerance. For this study 34 dogs were randomly selected out of 234 dogs screened. Six healthy controls were selected from the twenty healthy controls. Based on the ELISA assay results and echocardiography results the animals were grouped as control, DCM, MVD with systolic failure, MVD without systolic failure, occult cardiac disease and others. In all 34 cases echocardiography was done to compare the efficacy of the marker.

NT proBNP Assay ELISA Plate**Correspondence****P Thirunavukkarasu**

Assistant Professor,
Animal, Husbandry Statistics
and Computer Applications
Madras Veterinary College
Chennai, India

Results

The Mean \pm S.E values of NT proBNP assay in control, DCM, MVD with systolic failure, MVD without systolic failure, occult cardiac disease and non-cardiac cases were 650.00 \pm 30.55 pmol/L, 3041.67 \pm 65.67 pmol/L,

2000.00 \pm 127.24 pmol/L, 1080.00 \pm 177.20 pmol/L, 1233.33 \pm 240.37 pmol/L and 604.28 \pm 37.98 pmol/L respectively. A highly significant increase was observed in Dilated Cardiomyopathy, MVD with systolic failure, MVD without systolic failure and Occult cardiac disease.

Table 1: NT proBNP assay values in acquired heart diseases of dogs

Marker	Control (n=6)	Dilated Cardiomyopathy (n=12)	Mitral Valve Disease with Systolic failure (n=7)	Mitral Valve Disease without Systolic failure (n=5)	Occult Cardiac disease (n=3)	Others (n=7)	F Value
NT proBNP Assay (pmol/L)	650.00 \pm 30.55 ^a	3041.67 \pm 65.67 ^d	2000.00 \pm 127.24 ^c	1080.00 \pm 177.20 ^b	1233.33 \pm 240.37 ^b	604.28 \pm 37.98 ^a	117.12 ^{**}

Same superscript in row do not differ significantly

NS Not significant (P>0.05)

*Significant (P < 0.05)

**Highly Significant (P<0.01)

Discussion

In NT-proBNP assay a highly significant increase in levels were observed in Dilated Cardiomyopathy, MVD with systolic failure, MVD without systolic failure and even in occult cardiac diseases which indicated that this marker is a highly sensitive and specific in cardiac diseases.

Conclusion

In NT-proBNP assay a highly significant increase in levels were observed in Dilated Cardiomyopathy, MVD with systolic failure, MVD without systolic failure and even in occult cardiac diseases which indicated that this marker is a highly sensitive and specific in cardiac diseases and can be used as a prognostic marker in congestive heart failure of dogs.

References

- Oyama MA, Singletary GE. The use of NT-proBNP assay in the management of canine patients with heart disease. *Vet Clin North Am Small Anim Pract.* Jul. 2010; 40(4):545-558.
- Moonarmart W, Boswood A, Luis Fuentes V, Brodbelt D, Souttar K, Elliott J. N-terminal pro B-type natriuretic peptide and left ventricular diameter independently predict mortality in dogs with mitral valve disease. *J Small Anim Pract.* Feb. 2010; 51(2):84-96.
- Oyama MA, Sisson DD, Solter PF. Prospective screening for occult cardiomyopathy in dogs by measurement of plasma atrial natriuretic peptide, B-type natriuretic peptide, and cardiotroponin-I concentrations. *Am J Vet Res.* Jan. 2007; 68(1):42-47.
- Kellihan HB1, Mackie BA, Stepien RL. NT-proBNP, NT-proANP and cTnI concentrations in dogs with pre-capillary pulmonary hypertension. *J Vet Cardiol.* Sep. 2011; 13(3):171-82.