

The diagnostic significance of  
plasma N-terminal pro-B type natriuretic peptide concentration  
in dogs and cats with cardiac diseases

Abstract of Doctoral Thesis

Yoshinori Tominaga

(Supervised by Prof. Naoyuki Takemura)

Graduate School of Veterinary Medicine and Life Science  
Nippon Veterinary and Life Science University

N-terminal pro B type natriuretic peptide (NT-proBNP) uses as cardiac biomarker in dogs and cats. However, the diagnostic significance of plasma NT-proBNP concentration is confused by the contradicting report. One cause of such controversy might result from the unknown factors affecting plasma NT-proBNP concentration in dogs and cats.

Therefore, the purposes of the present study were to investigate various factors affecting plasma NT-proBNP concentration, and to establish the diagnostic significance of plasma NT-proBNP concentration for evaluating mitral valve insufficiency (MVI) in dogs and hypertrophic cardiomyopathy (HCM) in cats.

In Chapter 2, intra- and inter-assay variations of NT-proBNP concentration were evaluated. As a result, there was about 20 % measurement variation in dogs and cats. There was the tendency that plasma NT-proBNP concentration was less variable in the sample added to ethylenediamine-tetraacetic acid (EDTA). Based on these result, it was decided that the canine and feline plasma added to EDTA were used in further research in the present study.

In Chapter 3, daily and weekly variations of, and effect of dietary intake and walking on plasma NT-proBNP concentration were evaluated in clinically healthy dogs and cats. As a result, there were insignificant daily and weekly variations in both species, and dietary intake and walking did not affecting plasma NT-proBNP concentrations. However, there were insignificant daily or weekly variation about 20 % in dogs and 35 % in cats were confirmed. Therefore this variation must be considered when plasma NT-proBNP concentration was interpreted in clinical setting.

In Chapter 4, the effects of glomerular filtration rate (GFR) on plasma NT-proBNP concentration were evaluated. Plasma NT-proBNP concentration was significantly increased in dogs and cats with reduced GFR. Therefore plasma NT-proBNP concentration should be evaluated with renal function.

In Chapter 5, the diagnostic significance of plasma NT-proBNP concentration in dogs with MVI was investigated. As a result, plasma NT-proBNP concentration failed to detect dogs with MVI without cardiac enlargement and dogs with complication of tricuspid valve insufficiency and pulmonary hypertension. However, since plasma NT-proBNP concentration elevated in association with increases in volume overload of the left atrium and ventricle, the concentration might be useful for continuous monitoring for left-heart volume overload.

In Chapter 6, the diagnostic significance of plasma NT-proBNP concentration in cats with HCM was evaluated. Plasma NT-proBNP concentration could detect even cats with asymptomatic HCM with reliable sensitivity and specificity. Plasma NT-proBNP concentration was significantly correlated with degree of left ventricle hypertrophy and the left atrial dilation. Therefore, plasma NT-proBNP concentration might be valuable to follow the degree of ventricular hypertrophy and atrial distention in same cat.

In conclusion, plasma NT-proBNP concentration had particularly high usefulness as screening examination for cats with asymptomatic HCM.