



Prognostic value of mitral annular systolic plane excursion and tricuspid annular plane systolic excursion in cats with hypertrophic cardiomyopathy[☆]

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KEYWORDS

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Abstract *Introduction:* Hypertrophic cardiomyopathy (HCM) has a variable prognosis; left atrial size, presence of clinical signs and left ventricular systolic function have been shown to predict outcomes. Mitral annular plane systolic excursion (MAPSE) and tricuspid annular plane systolic excursion (TAPSE) assess longitudinal ventricular systolic function and are decreased in cats with HCM. The aim of the study was to ascertain whether MAPSE and TAPSE have prognostic value in HCM and if cats with pleural effusion have lower MAPSE and TAPSE than cats with pulmonary oedema.

Animals: One hundred eighty-four client-owned cats diagnosed with HCM.

Methods: This is a retrospective study. Echocardiography was used to diagnose HCM (end-diastolic left ventricular wall thickness ≥ 6 mm) and to measure MAPSE and TAPSE. Survival information was obtained.

Results: No multivariable model including MAPSE or TAPSE could be generated in this population. Cats with pleural effusion \pm pulmonary oedema had lower MAPSE

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measured at the interventricular septum (MAPSE IVS) and TAPSE, compared with cats with pulmonary oedema only. MAPSE IVS was the only factor predicting pleural effusion on multivariable regression model.

Conclusions: Lower MAPSE and TAPSE were not independently associated with outcomes on multivariable analysis. Cats with pleural effusion \pm pulmonary oedema had lower TAPSE and MAPSE IVS than cats with pulmonary oedema, and MAPSE IVS was the only predictive factor associated with the development of pleural effusion in this population.

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Abbreviation

ATE	arterial thromboembolism
CHF	congestive heart failure
HCM	hypertrophic cardiomyopathy
LVFS	left ventricular fractional shortening
MAPSE	mitral annular plane systolic excursion
MAPSE FW	MAPSE measured at the free wall
MAPSE IVS	MAPSE measured at the interventricular septum
TAPSE	tricuspid annular plane systolic excursion.

Introduction

Hypertrophic cardiomyopathy (HCM) is defined as a symmetrical or asymmetrical increase in the left ventricular wall thickness in the absence of other cardiovascular or systemic causes that would result in similar changes [1]. Hypertrophic cardiomyopathy is the most common cardiac disease in cats [2,3]; it has a variable clinical progression, and several echocardiographic parameters have been shown to be of prognostic value [4–8]. Furthermore, recent investigations have identified involvement of the right ventricle in HCM with 29–50% of cats in different studies having an increased thickness of the right ventricular wall [9,10]. Mitral annular plane systolic excursion (MAPSE) and the right-sided counterpart tricuspid annular plane systolic excursion (TAPSE) are indices of systolic longitudinal displacement of the atrioventricular annular plane [11,12]. Mitral and tricuspid annular plane systolic excursions can be obtained by M-mode from echocardiography [11–14], by magnetic resonance imaging [15], and TAPSE has also been measured from two-dimensional (2D) cineloops [10]. Mitral and tricuspid annular plane systolic excursions were decreased

in cats with HCM compared with healthy control cats [13], and cats with congestive heart failure (CHF) showed the lowest values. One study showed that MAPSE and TAPSE may be of prognostic importance at the univariable level, but the endpoint included all-cause mortality because of low number of events and sample size; no multivariable analysis was performed for similar reasons [13]. To the authors' knowledge, the potential prognostic utility of MAPSE and TAPSE in cats with HCM has not been fully evaluated.

Cats in CHF due to HCM can present with either pulmonary oedema and/or pleural effusion [16]. The underlying mechanism(s) responsible for the development of pleural effusion in cats with left-sided CHF is not fully understood. One study showed that cats with pleural effusion secondary to cardiac disease had poorer left atrial active emptying and increased right ventricular diameters measured by M-mode echocardiography [17], compared with cats that presented with pulmonary oedema. A more recent article has also identified lower TAPSE values in a subpopulation of cats with pleural effusion compared with cats with pulmonary oedema [10]. Whether the presence of pleural effusion in cats with HCM is associated with a lower value of both MAPSE and TAPSE indicating worse left and/or right heart function has not yet been fully determined.

The aim of the study was to evaluate the prognostic value of MAPSE and TAPSE in a larger population of cats with HCM, for which a longer follow-up is available compared with our previously published study [13], and to determine whether cats presenting with pleural effusion have a lower value of MAPSE and TAPSE compared with cats with pulmonary oedema. Our first hypothesis was that MAPSE and TAPSE would have prognostic value in a population of cats with HCM. Our second hypothesis was that in a subset of cats with HCM and CHF, those presenting with pleural effusion would have lower MAPSE and TAPSE compared with those that presented with only pulmonary oedema.

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