

Effect of Expiratory Phase in Detecting Left Heart Enlargement

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In the literature

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FROM THE PAGE ...

Myxomatous mitral valve disease (MMVD) is the most common acquired heart disease diagnosed in dogs.¹ Echocardiography is the gold standard for diagnosing MMVD but is not always readily available. Left atrial (LA) size correlates with the severity of mitral regurgitation; thus, echocardiographic assessment of LA size is most commonly performed using the left atrial:aortic root ratio (LA:Ao). A variety of methods have been described for radiographically assessing LA and overall heart size, and phase of respiration has been shown to influence some radiographic findings (eg, pulmonary opacity, relative cardiac size).

This study investigated whether the phase of respiration on thoracic radiographs would influence detection of left heart enlargement in normal dogs and dogs with MMVD. The study group included 100 dogs with echocardiographic documentation of mitral regurgitation (MR) secondary to MMVD. To be included in the study, patients had to have inspiratory and expiratory thoracic radiography performed the same day as the echocardiogram and could not have any concurrent diseases affecting the cardiovascular system or evidence of congestive heart failure. The healthy group consisted of 20 purpose-bred beagles. LA:Ao was measured on standard right parasternal short axis view, and a LA:Ao >1.5 was used to define LA enlargement. Quantitative measurements of LA size on thoracic radiographs consisted of vertebral heart size (VHS) and vertebral LA size, a recently described radiographic measurement.² Qualitative radiographic assessment of the left heart was also performed; on the lateral view, presence or absence of dorsally deviated carina was noted, and bulging of the caudal cardiac waist in the region of the left atrium was graded 0 to 3, with 0 representing no bulging and 3 representing severe bulging. Similarly, on the ventrodorsal view, the severity of bulges associated with the left auricular appendage and left ventricle were also graded on a scale of 0 to 3.

For the normal group, respiratory phase did not affect radiographic measurements or heart assessments. For dogs with MMVD, with the exception of qualitative assessment of left ventricular bulge on expiration, all radiographic measurements on both inspiration and expiration had moderate positive correlation with echocardiographic-derived LA:Ao. Vertebral LA size measured larger on inspiration, whereas qualitative assessments of bulges associated with the LA, left auricular appendage, and left ventricle were greater on expiration. Moreover, there was a higher chance of false-positive assessment of LA enlargement on expiratory views. There was no difference in VHS on inspiratory and expiratory views.

Overall, use of both inspiratory and expiratory thoracic radiography can be helpful in assessing left heart enlargement in dogs with mitral regurgitation due to MMVD. Caution should be used when interpreting expiratory radiographs, as LA enlargement can be overestimated, but, ultimately, several radiographic assessments described in this study showed good correlation with echocardiographic measurement of LA:Ao.

... TO YOUR PATIENTS

Key pearls to put into practice:

- 1** Expiratory thoracic radiography can be helpful in detecting left heart enlargement, but caution should be used, as LA enlargement can be overestimated.
- 2** VHS assessment remains stable regardless of the phase of respiration.
- 3** When echocardiography is not readily available, thoracic radiography can be used to assess LA size as a surrogate for severity of MMVD. In this study, all assessments of LA size and VHS had moderate positive correlation with echocardiographic-derived LA:Ao.

References

1. Parker HG, Kilroy-Glynn P. Myxomatous mitral valve disease in dogs: does size matter? *J Vet Cardiol.* 2012;14(1):19-29.
2. Malcolm EL, Vissver LC, Phillips KL, Johnson LR. Diagnostic value of vertebral left atrial size as determined from thoracic radiographs for assessment of left atrial size in dogs with myxomatous mitral valve disease. *J Am Vet Med Assoc.* 2018;253(8):1038-1045.



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