



# Vertebral Heart Score

## What's New?

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The vertebral heart score (VHS) was first developed by Dr. James Buchanan as a way of normalizing the size of the cardiac silhouette within the thoracic cavity of an individual dog in order to assess estimated heart size. It was designed to be performed on a right lateral radiograph by measuring the distance between the carina and the apex of the cardiac silhouette as the first measurement and then measuring a distance perpendicular to that line from the cranial to caudal aspect of the cardiac silhouette, typically over the widest portion of the silhouette ending at the ventral border of the caudal vena cava. Then aligning the length of these 2 lines parallel to the vertebral column, starting both at the cranial edge of the 4th thoracic vertebrae. The encompassing vertebral bodies are counted from each line and added together to get the VHS. Less than or equal to 10.7 is the standard normal in dogs (indicating normal heart size). The VHS is a very useful diagnostic aid, with few limitations, in approximating heart size in dogs and is a standard component of the radiographic interpretation by veterinary cardiologists. However, in dogs, the orientation of the heart in the thorax and the enlargement of the region of the left atrium on the silhouette may not be accurately reflected with the measurements of the VHS in all patients. The VHS thereby, may, at times, underrepresent the overall size of the heart.

A recent article, published in the Journal of the American Veterinary Medical Association (JAVMA) has addressed this concern by exploring a complementary “VHS” measurement designed to take into account the left atrial size which, as noted above, may be underrepresented by the standard VHS alone. This new measurement has been coined the “vertebral left atrial size” (VLAS) by the authors of the publication, *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*, Elizabeth L. Malcolm, MS, Lance C. Visser, DVM, MS, Kathryn L. Phillips, DVM, Lynelle R. Johnson, DVM, PhD. (JAVMA October 15, 2018, Volume 253, Number 8, pg. 1038-1045 <https://doi.org/10.2460/javma.253.8.1038>).

The study assessed the utility of a quantitative method to radiographically establish left atrial size in dogs with myxomatous mitral valve disease (MMVD) of

varying severity. Left atrial size being an important factor in determining a therapeutic plan for a dog with MMVD.

The study was a prospective, observational study involving 103 client-owned dogs with a left-sided heart murmur. The technique of the measurement was similar to that of the traditional VHS. Utilizing a lateral thoracic radiograph, a line is initiated at the center of the most ventral portion of the center of the carina and extended to the caudal border of the left atrium at its intersection with the dorsal border of the caudal vena cava. The length of this line is then moved and aligned in parallel with the vertebral column starting at the 4th thoracic vertebrae and extended caudal. Values  $\geq 2.3$  were considered consistent with left atrial enlargement likely involving hemodynamic compromise in dogs with MMVD.

The measurement was found to be accurate on left and right lateral radiographs, however, it was recommended to maintain consistency on serial films for a particular patient (i.e if you start with a measurement on a right lateral, you should continue to use this projection for serial measurements).

The study concluded that the VLAS was a valid and accurate indicator of left atrial size in this population of dogs as noted in the article, "Results indicated VLAS was a repeatable and useful radiographic measurement for prediction of LA enlargement in dogs with MMVD (J. Am Vet Med Assoc 2018;253;1038-1045)".

Echocardiography is still the gold standard for assessing left cardiac chamber size and function in dogs with MMVD. Moreover, it allows the cardiologist to confirm the diagnosis of MMVD and assess other characteristic features of the condition that cannot be appreciated on radiographs including visualization of the valve morphology, degree of coaptation and prolapse, volume of the mitral regurgitant jet, presence, or absence of tricuspid regurgitation and presence, or absence of concurrent pulmonary hypertension. However, baseline and serial assessment of thoracic radiographs can be very instrumental in helping characterize and manage MMVD in dogs.

For more information on this publication click here: <https://doi.org/10.2460/javma.253.8.1038>).