



Comparative study of 4 echocardiographic methods of left ventricular measurement in German Shepherd dogs

Valéria Marinho Costa de Oliveira, MV, MSc*,
Patrícia Pereira Costa Chamas, MV, PhD ,
Guilherme Teixeira Goldfeder, MV ,
Maria Helena Matiko Akao Larsson, MV, PhD

University of São Paulo, School of Veterinary Medicine and Animal Sciences, Faculdade de Medicina Veterinária e Zootecnia – USP, Av. Prof. Dr. Orlando Marques de Paiva, 87, São Paulo 05508-270, Brazil

Received 12 July 2012; received in revised form 3 November 2013; accepted 3 December 2013

KEYWORDS

Canine;
Cardiac ultrasound;
Imaging

Abstract *Objectives:* To compare dimensions and shortening fraction (SF) of the left ventricle (LV) obtained from two-dimensional (2D) and M-mode imaging of short and long-axis views.

Animals: 40 healthy, adult German Shepherd dogs.

Methods: Left ventricular measurements were obtained using 4 echocardiographic methods: M-mode in short and long-axis and 2D imaging in short and long-axis. The methods were compared by studying the effects of imaging mode and axis on LV parameters, taking into account the influence of weight and gender.

Results: Mean LV end-diastolic diameter was greater in short-axis views. However, this difference was not considered clinically relevant. Mean SF was higher when derived from 2D measurements with poor agreement among methods. A combined influence of axis, gender, and weight was observed on interventricular septal thickness in end diastole with poor agreement among methods.

* Corresponding author.

E-mail address: val.mcoliver@globo.com (V. Marinho Costa de Oliveira).

Conclusions: Some LV parameters were significantly affected by mode and axis, either in isolation or in combination with weight and gender, although the differences observed were not always clinically relevant. These findings show that using the different echocardiographic methods interchangeably to assess LV dimensions should be done with caution.

© 2014 Elsevier B.V. All rights reserved.

Abbreviations

ANOCOVA	analysis of covariance
ANOVA	analysis of variance
GS	German shepherd
HR	heart rate
IVSd	interventricular septal thickness in end diastole
IVSs	interventricular septal thickness in end systole
LV	left ventricular
LVEDD	left ventricular end-diastolic diameter
LVESD	left ventricular end-systolic diameter
LVFWd	left ventricular free wall thickness in end diastole
LVFWs	left ventricular free wall thickness in end systole
SD	standard deviation
SF	shortening fraction
2D	two-dimensional

Introduction

Evaluation of the left ventricle (LV) is one of the most important contributions of echocardiography to the assessment of cardiac function. The quantitative analysis of the LV dimensions in systole and diastole enables the recognition of LV remodeling in response to conditions of pressure or volume overload and permits the evaluation of systolic myocardial function. Consequently, it is useful for determining the severity of a large spectrum of heart diseases.¹

Many factors, such as weight, gender, breed, and cardiovascular variables (e.g., preload, afterload, heart rate (HR), and cardiac contractility) are well known to affect cardiac dimensions in healthy dogs.^{2–5} Qualitative or quantitative analysis of cardiac structures can be performed by echocardiography using two-dimensional (2D) or M-mode recordings.^{6–8} As a general rule, the reference ranges for LV dimensions are derived from measurements obtained in the right parasternal transverse (short-axis) or longitudinal (long-axis)

views.^{2,5–7,9–13} However, the same anatomical section will likely not be obtained using different echocardiographic techniques. M-mode demonstrates improved temporal resolution as compared to 2D imaging, which may enhance accuracy for measurement purposes, but obtaining an optimal alignment of LV structures without the use of anatomical mode is not always possible.¹⁴

We therefore hypothesized that these factors could lead to significant variations in LV measurements and consequently to the normal canine reference range obtained by different echocardiographic methods. The aim of this study was to compare the LV measurements and shortening fraction (SF) of healthy dogs acquired by 4 methods routinely used in veterinary medicine: M-mode imaging in short-axis, M-mode imaging in long-axis, 2D imaging in short-axis, and 2D imaging in long-axis. These techniques were compared while taking into account the possible effects of physiological variables on LV dimensions. Furthermore, the agreement among the methods was assessed to search for the clinical relevance of the differences found.

Animals, materials and methods

Dogs

Only adult German shepherd (GS) dogs were selected to avoid the effect of breed and age and therefore minimize the number of physiological variables influencing the LV parameters. The exclusion criteria consisted of the detection of cardiovascular anomalies, respiratory disease, neoplasia, anemia, obesity, infectious disease, and endocrine, renal, or liver disorders. The dogs were recruited from private owners, commercial kennels, and the police department of São Paulo City.

Fifty-one adult GS dogs were examined. Each dog underwent a complete physical examination, clinicopathologic tests (complete blood count, urea, creatinine, aspartate aminotransferase, alanine aminotransferase, alkaline phosphatase, total protein, albumin, glucose, sodium,

Download English Version:

<https://daneshyari.com/en/article/2400177>

Download Persian Version:

<https://daneshyari.com/article/2400177>

[Daneshyari.com](https://daneshyari.com)