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MEASURING THE HEART SIZE OF DOGS WITH VHS METHOD

Alexandru-Gabriel NEAGU, Niculae TUDOR, Constantin VLĂGIOIU

Faculty of Veterinary Medicine, Splaiul Independenței, nr. 105, sector 5, cod postal 050097, Bucharest
Corresponding author email: neagualex29@yahoo.ro

Abstract
In small animal practice thoracic radiography is a useful diagnostic tool providing important information about heart disease. The purpose of this study was to determine heart size of six clinically healthy dog breeds by computerized radiographic technique. The study was taken into account 90 dogs: 15 Pekingese, 15 Bichon, 15 German Shepherds, 15 Labradors, 15 German Brack and 15 Mongrel. Ages ranging from 1 to 15 years. Following the evaluation of VHS of the six dog breeds were obtained the following values: German Brack had an VHS mean value of 10.9 v (10.5-11.7 v), Labrador had an VHS mean value of 10.1 v (9.6-11 V), Bichon had an VHS mean value of 9.2 v (8.7-10.7 v), Pekingese had the VHS mean of 9.3 v (8.7-10.4 v), Mongrel had an VHS mean value of 9.5 v (8.8- 10.5 v) and German Shepherd had an VHS mean value of 9.8 v (9.1-10.5 v). VHS method represents a useful method for monitoring progression of heart dimensional changes over time for each individual.
Key words*: cardiac silhouette, computerized radiographic technique, dog, VHS.*

INTRODUCTION

Cardiac diseases in small animals recorded an increasing frequency in recent years expressing itself through a wide range of signs. Important information about heart disease are often obtained by thorax radiography, which in small animals is a useful diagnostic tool.

A system for measuring the cardiac silhouette (vertebral heart scale) was designed for the first time by Bucheler Buchanan (1995) in a study of 100 clinically healthy dogs and a variety of breeds. This method brings additional information about clinical examination, but also can be used for monitoring cardiac disease that evolves with size and shape changes (Apetrei et al., 2014). There is a close link between race, the thorax appearance and the shape of cardiac silhouette of the animal examined by VHS method (Owens and Biery, 1999; Root and Bahr, 2002). Lamb et al. (2000, 2001) points out that when making VHS is necessarily to take into account the crosses between breeds. Ghadiri et al. (2010) adds that it's important from what incidence the radiography is made (right or left) in order to avoid any misinterpretation of cardiac dilation.

The purpose of this study was to determine heart size of six healthy dog breeds by computerized radiographic technique.

MATERIALS AND METHODS

In this study were examined only clinically healthy dogs which were presented to Faculty of Veterinary Medicine from Bucharest, Department of Imaging during 2013. Were evaluated 90 dogs, belonging to a number of six breeds: Pekingese, Bichon, German Shepherds, Labradors, German Brack and Mongrels. Ages ranging between 1 and 15 years, including 41 males and 49 females. Radiographs were performed using a computerized radiographic system (Philips Otimus), and images were taken with a source-image distance of 100 cm. Animals were prepared according to the procedures described in the literature (Tănase and Cristescu, 2001). The films were developed using an automatic device called PCR-Eleva-S.

VHS method was used which involved measuring the long axis (L - representing the distance from the carina to the cardiac apex) and short axis (l - representing maximum diameter perpendicular to the long axis of the heart) and their value was compared with the length of the thoracic vertebrae (v) from cranial edge of thoracic vertebra 4 (T4) from right side incidence.

Table 1.
Cardiac silhouette values (mean, minimum and maximum) from right side incidence

Measurements	Dog breeds						Total (n=90)
	Pekingese (n=15)	Bichon (n=15)	German Shepherd (n=15)	Labrador (n=15)	German Brack (n=15)	Mongrel (n=15)	
L - cardiac long axis (v)[1]	5 4.7-5.7	5.1 4.7-5.9	5.4 4.6-6	5.6 5.3-6	5.5 5.1-5.7	5.3 4.8-6	5.3 4.9-5.9
l - cardiac short axis (v)[1]	4.3 3.9-4.8	4.1 3.8-4.8	4.4 4-4.8	4.5 4.1-5.1	4.5 4.1-4.9	4.2 4-4.8	4.3 4-4.9
VHS (v)[1]	9.3 8.7-10.4	9.2 8.7-10.7	9.8 9.1-10.5	10.1 9.6-11	10.9 10.5-11.7	9.5 8.8-10.5	9.8 9.2-10.7

[1]Length measured in vertebrae

RESULTS AND DISCUSSION

Measurements of cardiac silhouette and VHS's values are presented in Figures 1-6 and Table 1 for each breed separately. The VHS mean from all 90 dogs was 9.8 v ranging between 9.2-10.7 v.

Figure 1 – Thorax of Pekingese, 13 years, female, right view

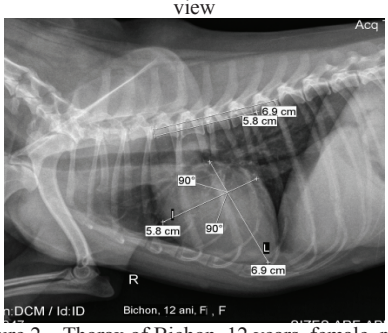

Figure 2 – Thorax of Bichon, 12 years, female, right view

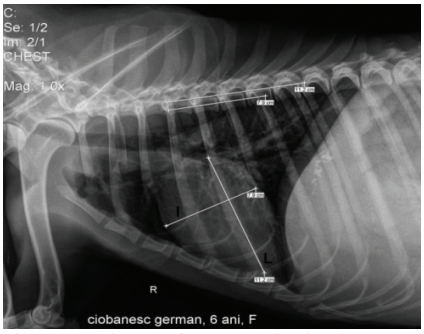

Figure 3 – Thorax of German Shepherd, 6 years, female, right view

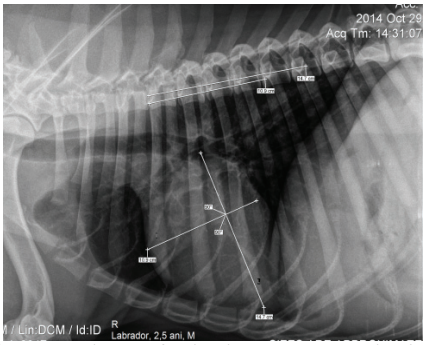

Figure 4 – Thorax of Labrador, 2.5 years, male, right view

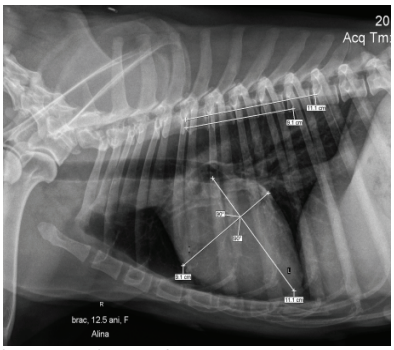

Figure 5 – Thorax of German Brack, 12.5 years, female, right view

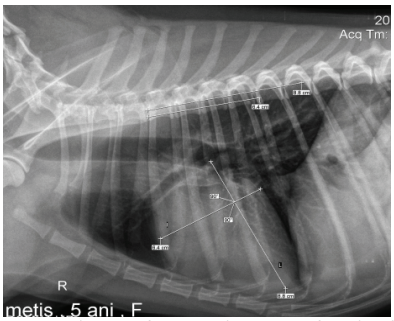

Figure 6 – Thorax of Mongrel, 5 years, female, right view

The values obtained are close to those presented in previous studies, such as Buchanan and Bucheler (1995) who conducted a study on a total of 100 dogs of various breeds, and obtained an VHS mean of 9.7 (SD ± 0.5). Ghadiri et al. (2010) obtained a VHS mean value of 9.6 ± 0.56 v from left side incidence and 9.7 ± 0.59 from right side incidence on a total of 56 dogs. Gulanber et al., (2005) have established a VHS value of 9.7 ± 0.67 v on a number of 120 dogs that ranged between 8.4 to 10.9 v. However, the differences can be attributed to many factors such as different number of animals examined, breed, crosses between animals (Lamb et al., 2000), gender, age (Lamb et al., 2001, Jepsen-Grant et al., 2013) and the incidence from which radiography was performed (Ghadiri et al., 2010).

As shown in the results, conformation of the thorax (deep, narrow, wide and intermediate) is the main factor that influenced the VHS value for this six breeds in our study. The results from this study that we conducted showed that the VHS mean value for each breed varies in proportion to the reference value obtained in previous studies (Buchanan and Bucheler, 1995). Besides, Lamb et al. (2000, 2001), for a proper assessment, he recommends limits for each breed separately.

CONCLUSIONS

Our results indicate a relatively wide range of normal values of cardiac dimensions correlated with breed.

Evaluation of cardiac silhouette with radiological method must be correlated every time with the clinical examination of the animal.

VHS method is one of the easiest and useful tool for measuring cardiac silhouette and monitoring the heart disease at the same time must take into account the status of the individuals evaluated, age, gender, breed, and thorax conformation.

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