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## Cardiovascular diseases associated with obesity in dogs

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#### Abstract

The present study was carried out to record all the pathologies associated with obesity in dogs. A total of 2,332 dogs, were screened and 732 (31.39%) dogs were found to be obese. cardiovascular affections were found to be high in dogs with obesity indicating the utmost need in treating the new epidemic canine obesity.

**Keywords:** Canine obesity, cardiovascular affections

#### Introduction

Obesity is a chronic stigmatized and rapidly growing world-wide problem (Rao *et al.*, 2010) [9] and in the past few decades, the incidence of obesity in companion animals has increased dramatically perhaps even in a more extreme way than in humans, and became a serious concern in veterinary medicine (German, 2006) [2]. Obesity is defined as a morbid condition characterized by excessive fatty deposits leading to serious changes in various bodily functions (Lund *et al.*, 2006) [6].

Canine obesity is a common medical disorder with a known risk factor for associated diseases thereby limiting the longevity of the animal (Pereira *et al.*, 2018) [8]. The incidence of obesity in dogs was estimated in the range of 20–40% of the general population (Gossellin *et al.*, 2007) [3].

Obesity increases risk of death from all causes, is linked to increased risk of development of hypertension and negatively impacts cardiovascular and pulmonary functions (Kuruvilla and Frankel, 2003) [5]. Obesity is clearly associated with increased morbidity and mortality (Kealy *et al.*, 2000) [4].

To our knowledge, the specific effects of obesity on the cardiovascular system in dogs have not been addressed, although it has been reported that weight loss is associated with improvement in cardiovascular and respiratory function in obese dogs (Manens *et al.*, 2014).

The purpose of the study reported here was to portray all the cardiovascular disorders associated with obesity in dogs so as to acknowledge the consequences of obesity in companion animals and to create exigency in addressing the canine obesity as a serious epidemic.

#### Material and Methods

All the dogs with complaint of morbid obesity and high body mass index exceeding specific breed standards presented to the Department of Veterinary Surgery and Radiology, NTR College of Veterinary Science, Gannavaram during the period from December, 2018 to September 2019 were included in the present study. The obese dogs with history of exercise intolerance, early exhaustion, difficulty in climbing upstairs, laboured breathing and panting were subjected for thoracic radiography with lateral and ventro dorsal views. Vertebral heart score and cardiac thoracic ratio were assessed to objectively confirm cardiomegaly.

#### Results and Discussion

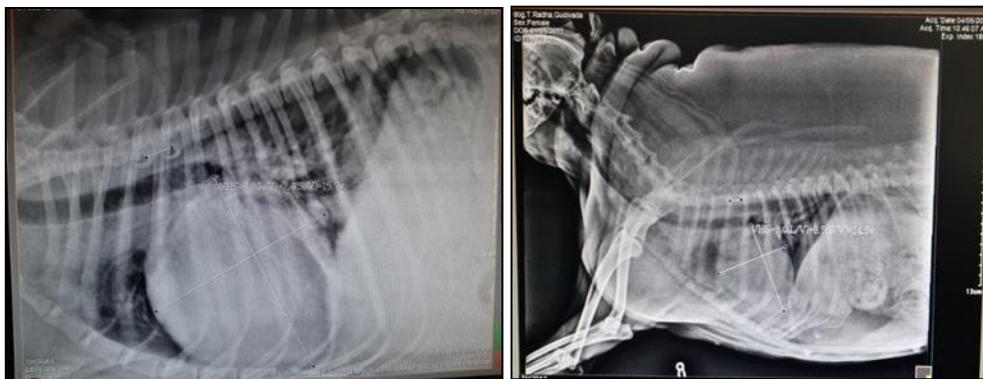
A total of 2,332 dogs were screened during the study period and out of them 732 (31.39%) dogs were obese. Out of 732 obese dogs, 141(19.26%) orthopaedic, 171 (23.36%) cardiovascular, 175 (23.90%) respiratory, 16 (2.18%) endocrinological, 62 (8.46%) with ear, 43 (5.87%) reproductive system, 14 (1.94%) neoplastic, 17 (2.32%) spine 55 (7.52%) skin related and 38 (5.19%) miscellaneous problems were noticed.

The details of various health problems associated with obesity in dogs were furnished.

Out of 732 obese dogs, 171 (23.36%) were diagnosed with cardiovascular disorders like dilated cardiomyopathy (n=129), pericardial effusions (n=23) and right sided heart failure (n=19). The lateral radiographs were used for assessing the vertebral heart score index and ventro-dorsal views were used to assess the cardiothoracic ratio. In majority of the cases there were associated lesions in the lung parenchyma.

The vertebral heart score index varied from 12-15 VHS in different animals (Fig. 1 to 4). These had exercise intolerance and cyanosis on exertion. All these animals were reared under air conditioning and were hand fed. The radiographic signs included segmental elevation of trachea, increased sternal contact etc. Pericardial effusions were diagnosed in a few animals all of which had dilated cardiomyopathy (Fig. 5 and 6). Kneeling of heart towards right side was observed with or without ascites (Fig. 7 and 8). Out of 732 obese dogs, 171 were diagnosed with cardiovascular disorders like dilated

cardiomyopathy, pericardial effusions and right side heart failure. Many of these dogs were in a serious condition, by the time they were presented from the referring centres. In many cases, the respiratory system was also found affected concomitantly. Montoya *et al.* (2006) [7] and German *et al.* (2010a) [1] also reported that obesity in dogs was associated with an increased risk of high blood pressure and cardiac diseases. Thengchaisri *et al.*, (2014) [11] indicated that, abdominal obesity rather than overall obesity was associated with heart disease in dogs. Slupe *et al.*, (2008) [10] found that overweight in dogs could result in reduced survival rates due to congestive heart failure. Kurvillla and Frankel (2003) reported that excess body weight was associated with or might exacerbate a wide range of potentially serious conditions, such as locomotor and musculoskeletal problems, respiratory distress, hypertension, cardiac disease, diabetes mellitus, dystocia, decreased heat tolerance, dermatologic problems, neoplasia, increased surgical risk and impaired fertility.

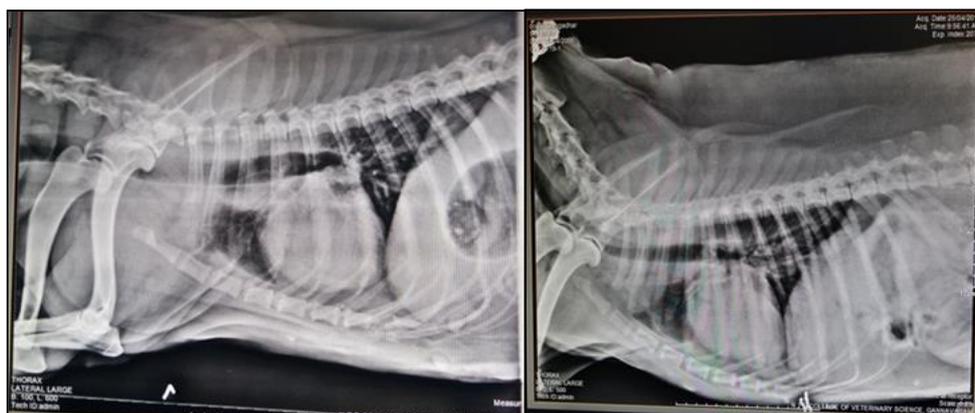


**Fig 1:** Note dilated cardiomyopathy with VHS-15.7 **Fig 2:** DCM with VHS-14.5 and pericardial effusions



**Fig 3:** DCM with VHS 13.8V

**Fig 4:** DCM with VHS-12.2 V



**Fig 5:** DCM with pericardial effusions

**Fig 6:** Pericardial effusions with mixed lung patterns



**Fig 7:** kneeling of heart towards right side and absence of sternal contact



**Fig 8:** Kneeling of heart occupying four sternbrae and segmental elevation of trachea

### Conclusion

To conclude the discussion weight reduction alleviate the signs of cardiovascular diseases and would improve the quality of life. This study provides evidence that weight reduction approaches in canine practice should be given the utmost importance and further with these study results, there is outright need for maintaining canines in ideal body weight and ultimate role of veterinarians in communication regarding the new epidemic canine obesity.

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