

A COMPREHENSIVE STUDY ON CANINE CARDIAC ABNORMALITIES IN SOUTH GUJARAT, INDIA

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ABSTRACT

A study was conducted to determine the occurrence of canine cardiac diseases in south Gujarat. During a study period, out of 6366 registered cases of dogs, 56 cases with one or more clinical signs of cardiac involvement were confirmed for various cardiovascular abnormalities. The overall occurrence of cardiac abnormalities was 0.88% with highest occurrence of dilated cardiomyopathy (DCM) (58.93%) followed by pericardial effusion (21.43%), mitral valve disease (MVD) (10.71%), hypertrophic cardiomyopathy (7.14%) and cardiac tumour (1.79%). The occurrence of cardiac abnormalities was comparatively higher in dogs aged above 6 years (50%) followed by 3-6 years (41.07%) and below 3 years (8.93%). These were significantly higher in Labrador Retriever (57.14%), non-descript (16.07%), German Shepherd (5.36%), Pug (5.36%), Golden Retriever, Doberman Pinscher and Cocker Spaniel (3.57% each). Bullmastiff, Dachshund and Lhasa Apso breed of dogs were observed to have an occurrence of (1.57 percent each). Further, male dogs were found to be affected more frequently than female dogs.

Keywords: Canines, Cardiac abnormalities, Gujarat

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Cardiac problems are commonly encountered non infectious disease entities in the aging pet population. The importance of heart diseases as a common clinical problem is reflected in the form of increased incidence of cardiac failure which is one of the major causes of death in dogs. Canine cardiac diseases are complex, devastating and considered as silent killer (Parker *et al.*, 2006). According to the information disseminated by American Veterinary Medical Association (AVMA), one in ten dogs has heart disease (Dove, 2001). Myocardial diseases, valvular diseases, arrhythmias and pericardial diseases are commonly recognized cardiac diseases in canines. These are manifested by coughing, dyspnoea, exercise intolerance, abdominal distension, syncope and cyanosis. Therefore, presence of any of these signs may indicate presence of cardiac problem in dogs (Ware, 2009). Looking to the above findings and increasing current status of cardiac diseases in pet population due to increased awareness and infrastructure facilities, the present study was planned to study occurrence of canine cardiac diseases in south Gujarat.

MATERIALS AND METHODS

Study area: The present work was carried out in southern region of Gujarat majorly covering city areas of Navsari, Surat, Valsad and Vapi dog population which come as referral in Veterinary Clinical Complex during a period from April, 2018 to March, 2020. Study was conducted by Department of Veterinary Medicine in collaboration with Department of Veterinary Clinical Complex (VCC), College of Veterinary Science and Animal Husbandry,

NAU, Navsari, Gujarat, India.

Selection of cases: Dogs presented at VCC with one or more clinical signs of cardiac involvement like dyspnoea, exercise intolerance, syncope, cyanosis, peripheral edema, ascites, cough and murmur on auscultation were suspected for cardiac abnormalities and screened further for confirmatory diagnosis using radiography, electrocardiography and echocardiography. In thoracic radiography, Vertebral Heart Score was calculated as suggested by Buchanan and Bucheler (1995). Electrocardiography was recorded by using Scheller ECG unit and interpreted as per guidelines given by Tilley *et al.* (2008). The echocardiography was performed with phased array Cardiac Probe PA320 with frequency ranged between 5.0 to 8.0 MHz. 2-Dimensional (2-D), Motion-Mode (M-mode) imaging as per standard protocols followed by Boon *et al.* (1983). Important epidemiological information was collected during clinical examination. Based on history, clinical examination (Fig. 1), radiography (Fig. 2), ECG (Fig. 3&4) and echocardiography (Fig. 5), the cases of cardiac abnormalities were identified and grouped as per age (<3 years, 3-6 years and >6years), breed and sex of the dogs.

Statistical analysis: Data were analyzed by chi-square test at 5% probability and confidence interval at 95% on IBM SPSS statistical software version 20.

RESULTS AND DISCUSSION

During study period, 56 dogs were confirmed for various cardiovascular abnormalities out of total 6366 registered dogs at VCC which contributed 0.88 percent

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overall occurrence of cardiac abnormalities. Similar trends of occurrence of various cardiac abnormalities were previously reported by Himalini *et al.* (2017) and Thirunavukkarasu (2019) who had observed 1.61 percent and 0.37 percent prevalence of various cardiovascular diseases in dogs, respectively. On the contrary, a previous report from Gujarat recorded comparatively higher (7.67%) prevalence of cardiac diseases in dogs (Devi, 2008). The higher occurrence noticed by previous author could be due to large study area and sample size. In the study, dilated cardiomyopathy showed the highest occurrence (33/58.93%) followed by pericardial effusion (12/21.43%), mitral valve disease (06/10.71%), hypertrophic cardiomyopathy (04/7.14%) and cardiac tumor (01/1.79%). Previously, Thirunavukkarasu (2014) also observed maximum cases of DCM (54.72%) followed by MVD (36.79%), pericardial effusion (5.66%) and hypertrophic cardiomyopathy (2.83%) amongst observed cardiac abnormalities. Whereas, Garncarz *et al.* (2013) stated that the most frequent heart disease recognized in dogs throughout the world is chronic valvular disease. In this context, Vishnurahav *et al.* (2018) reported higher occurrence of atrioventricular valvular diseases (45.6%) followed by dilated cardiomyopathy (43.85%). Occurrence of hypertrophic cardiomyopathy (0.94%) was also recorded by Satishkumar *et al.* (2010) as observed in present study but he opined that hypertrophic cardiomyopathy typically affects cat and quiet uncommon in dogs. During the study, authors diagnosed a case of cardiac tumour in a stray dog with severe ascites.

Age wise higher occurrence of cardiac abnormalities was observed in dogs aged above 6 years (50%) followed by 3-6 years (41.07%) and the lowest in dogs aged below 3 years (8.93%) (Table 1). The finding of higher occurrence in dog aged above 6 years is in accordance with Thangapandiyani *et al.* (2016) and Himalini *et al.* (2017). Elderly dogs have multiple patho-physiological conditions and aging is associated with the structural and functional changes in the cardiac pacemaker and its conduction system could be possible cause of higher frequency of cardiovascular diseases in aged dogs (Berg and Wingfield, 1999). Hence, it can be the probable reason for developing higher affection of cardiac diseases in adult dogs.

Significantly higher occurrence of cardiac abnormalities was observed in Labrador Retriever (57.14%) followed by Non-descript (16.07%), German Shepherd and Pug (5.36% each) (Table 1). Similarly, the highest occurrence of cardiac diseases in Labrador Retriever had been reported by Thirunavukkarasu (2019) and Himalini *et al.* (2017). The higher occurrence in Labrador breed could be due to higher preference of this breed due to its popularity



Fig. 1. Ascites in DCM affected dog

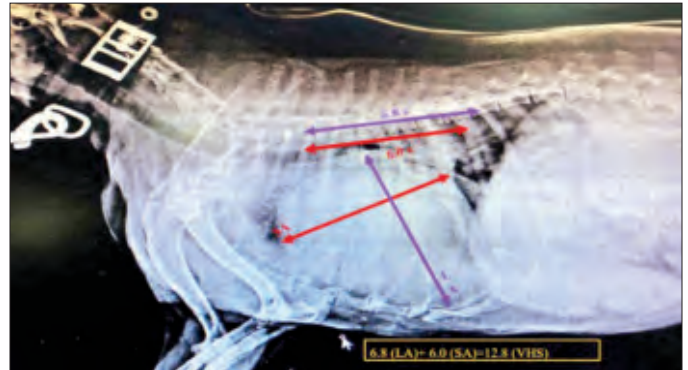


Fig. 2. VHS measurement in lateral thoracic radiograph of DCM affected dog

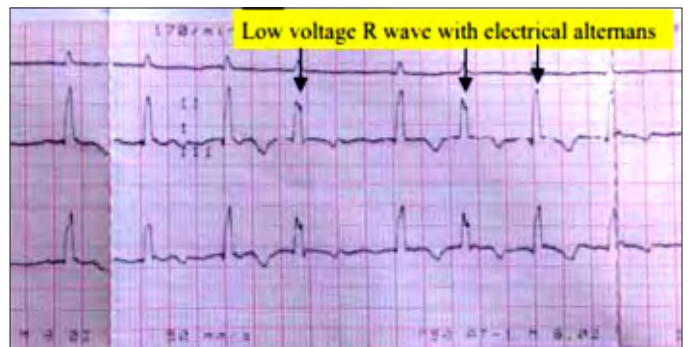


Fig. 3. Atrial fibrillation with Peak R wave and ST coving in DCM affected dog

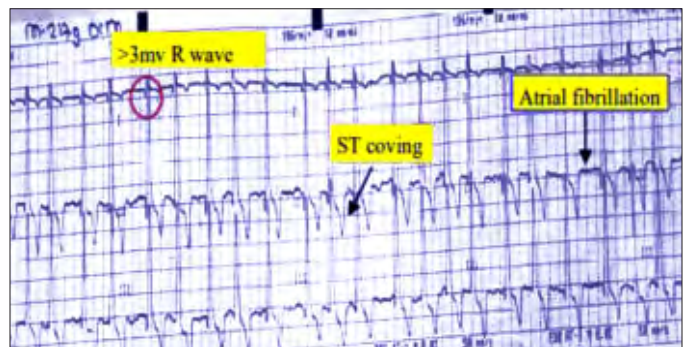


Fig. 4. Low voltage R wave, Bifid P wave with electrical alternans in Pericardial effusion

than any other breed in Gujarat. Further, Ettinger and Feldman (2005) also stated that cardiovascular disease are most commonly seen in large and giant breeds of dogs and



Fig. 5. Dilated four chambers in DCM affected dog (RPLAX view)

Table 1

Occurrence of cardiac diseases with relation to breed, age and sex

| Parameters | No. of Cases | Percentage | p values | |
|--------------------|--------------|------------|----------|-------|
| AGE | | | | |
| < 3 year | 5 | 08.93 | 0.198 | |
| 3-6 years | 23 | 41.07 | | |
| >6 years | 28 | 50.00 | | |
| Total | 56 | 100.00 | | |
| BREED | | | | |
| Bullmastiff | 01 | 01.79 | 0.043* | |
| Cocker Spaniel | 02 | 03.57 | | |
| Dachshund | 01 | 01.79 | | |
| Doberman Pinscher | 02 | 03.57 | | |
| German Shephard | 03 | 05.36 | | |
| Golden Retriever | 02 | 03.57 | | |
| Labrador Retriever | 32 | 57.14 | | |
| Lhasa Apso | 01 | 01.79 | | |
| Pug | 03 | 05.36 | | |
| Non-Descript | 09 | 16.07 | | |
| Total | 56 | 100.00 | | |
| GENDER | | | | |
| Male | 38 | 67.86 | | 0.891 |
| Female | 18 | 32.14 | | |
| Total | 56 | 100.00 | | |

* indicates significance at $p < 0.05$

higher breed wise affection of cardiovascular disease is due to breed popularity than a true frequency of disease. Comparatively occurrence of cardiac abnormalities in males (67.86%) than in females (32.14%) is in agreement with previous reports (Ettinger and Feldman, 2005; Devi, 2008; Himalini *et al.*, 2017; Vishnurahav *et al.*, 2018).

CONCLUSION

The results of present study showed higher occurrence of dilated cardiomyopathy in aged male Labrador Retriever dogs. The results showed that the adult male dogs (>3 years) are more likely to be affected with various cardiac abnormalities with age progression, therefore, periodically screening for presence of any

cardiac modalities is advisable in aged dogs.

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