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Occurrence of canine cardiac diseases in Bangalore

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Abstract
Cardiac diseases are very common in dogs. Cardiac diseases further leading to congestive heart failure are a major cause of morbidity and mortality in dogs. One hundred dogs presented to the Small Animal Medicine Unit, Department of Veterinary Medicine, Veterinary Hospital, Veterinary College, Hebbal, Bangalore with the classical clinical signs suggestive of cardiac diseases were screened for cardiac diseases based on detailed clinical examination, electrocardiography, radiography, echocardiography, blood pressure measurement and haemato-biochemical assays. In the present study, Dilated Cardiomyopathy followed by Mitral Valve diseases were the most common cardiac disease in dogs. Labrador retriever breed was the most commonly affected breed with cardiac disease. Older dogs were found to be more commonly affected with cardiac diseases and the incidence were high in aged dogs (>6 years) followed by adult dogs (3-6 years). Males were found to be more commonly affected than females.

Keywords: occurrence, canine, cardiac diseases

Introduction
In modern day, dogs have been the most successful canids that are maintained as pets. Irrespective of the social status of the people, dogs have been trained as watch dogs, guard dogs, companion dogs, shepherding dogs, detective dogs and as a guide to handicapped persons. However, there is a sad side to this story of love, loyalty and intelligence. In our efforts to domesticate dogs to suit our every requirement, it is unfortunate that dogs have a shorter life span than its owner. These days cardiac diseases have become very common in dogs. Cardiac diseases further leading to congestive heart failure is a major cause for morbidity and mortality. Cardiac diseases are the most common cause of death in dogs.
The main objective of this study was to classify the canine cardiac diseases

- Occurrence of cardiac diseases in dogs
- To determine the age, breed and gender on the distribution of cardiac diseases in dogs.

Materials and Methods
One hundred dogs presented to the Small Animal Medicine Unit, Department of Veterinary Medicine, Veterinary Hospital, Veterinary College, Hebbal, Bangalore with the classical clinical signs suggestive of cardiac diseases viz. lethargy, weakness, dyspnea, cough, syncope, exercise intolerance, ascites, oedema of dependent parts, anorexia, weight loss and depression were included in the study.
All the dogs were subjected to detailed clinical examination, electrocardiography, radiography, echocardiography, blood pressure measurement and haemato-biochemical assays. The data obtained on age, breed and gender was collected for demographic studies during the study period.

Results and Discussion
In the present study cardiac diseases were diagnosed by utilising the history, physical examination findings, electrocardiography, and radiography and confirmed by echocardiography. Routine haematology and blood biochemical analyses were used to rule out the presence of other diseases rather than in diagnosing cardiac diseases. Along with the imaging techniques, blood tests were used to differentiate cardiac diseases leading to congestive heart failure from other diseases causing similar clinical signs like hepatic disease, renal failure, pyometra, anemia, primary pulmonary conditions and pericardial effusions.

Occurrence of Cardiac Diseases

Cardiac diseases diagnosed in the present study were Dilated Cardiomyopathy (DCM) in 48 (48%) dogs followed by Mitral Valve Disease (MVD) in 40 (40%) dogs, Idiopathic Pericardial Effusion (IPE)/ Cardiac Tamponade in 6 (6%) dogs, Tricuspid Valve Disease (TVD) in 4 (4%) dogs, Hypertrophic Cardiomyopathy (HCM) in 2 (2%) dogs and Aortic Stenosis (AS) in 1 (1%) dog. The occurrences of various cardiac diseases on prospective study of 100 cases are depicted in the Table 1 and Figure 1. Among the cardiac diseases dilated cardiomyopathy followed by mitral valve diseases were common in dogs. Dilated Cardiomyopathy was the most common cause of cardiac diseases in dogs and humans [1, 2]. Cardiomyopathy was the second most common cause of cardiac diseases in dogs with high rate of morbidity and mortality in dogs [3, 4]. Almost 15% of the dogs suffer from heart diseases and the incidence of cardiac diseases increases to 60% or more for dogs over 7 years of age [5]. Young dogs less than one year of age are more susceptible for congenital malformation like patent ductus arteriosus, pulmonary stenosis, aortic stenosis, persistent right aortic arch, ventricular septal defect, tetralogy of fallot, atrial septal defect and persistent left cranial vena cava. Almost 95 percent of heart diseases in canine are acquired of which 75 percent are dilated cardiomyopathy and valvular diseases [6].

In the occurrence of cardiac diseases, dilated cardiomyopathy and mitral valve disease majorly contribute for the congestive heart failure. Dilated Cardiomyopathy and mitral valve disease have been observed in over weight dogs. These days, the life style of the city people has significantly changed and dogs are fed with high calories diet and lack of proper physical activity due to busy schedule of the owners might lead to cardiac systolic dysfunction.

Age

The mean age of the dogs affected with cardiac diseases was 7.08 ± 0.54 years. It was observed that the cardiac diseases were more common in aged dogs (> 6 years, 44 %) followed by adult age dogs (3-6 years, 39 %), followed by young-adult age dogs (1-3 years, 16 %) and followed by young dogs (< 1year, 1 %). The age-wise occurrence of cardiac diseases and Cardiomyopathy in dogs are presented in the Table 2 and Figure 2.

The age of onset of congestive heart failure due to Dilated Cardiomyopathy ranged from 3.5 to 13 years with a mean age of 6.6 – 8.8 years (7, 8, 9 & 10). Age is greater risk factor for heart diseases in both humans and dogs [11]. Cardiac Diseases was observed in older dogs. The frequency of cardiovascular diseases increases with the aging of dogs [12]. This might be due to the aging process that affects the heart and the blood vessels in a way that depletes cardiovascular reserve and alters the responses to various illness and medications. In addition, aging is accompanied by decrease in the response of the myocardium to beta-adrenergic stimulation and aging has selective effects on peripheral vascular function, including a reduced arterial dilating response to catecholamines or sympathetic stimulation and it leads to increase in systolic blood pressure and left ventricular overload during exercise in older animals and hence, contributes to an increase in the incidence of cardiac disease in older dogs [13].

Breed

The cardiac diseases were seen in the different breeds of dogs. The highest occurrence of cardiac diseases was seen in Labrador Retriever (32 %) followed by Rottweiler (13 %), Golden retriever (10 %), Dalmatian and German shepherd (7 % each), Doberman (5 %), Great Dane (4 %), Bull dog and St. Bernard (3 % each), Bull Mastiff, Cocker Spaniel, Pug, Spitz (2 % each) and Dachshund, Irish Setter, Mongrel Pomerian and Schitzu (1 % each). The occurrence of cardiac diseases and Cardiomyopathy in different breeds of dogs are presented in the Table 3 and Figure 3.

These findings are different from the findings of earlier foreign workers who reported that cardiac diseases were commonly observed in purebred, large and giant dogs like Doberman Pinscher, Boxer, English Cocker Spaniel, Portuguese Water Dog, Airedale Terrier, Newfoundland, St. Bernard, Standard Poodle, Scottish Deerhound, Irish Wolfhound and Great Dane [14-18]. The Indian have reported that Labrador retriever breed as the most prone breed to Dilated Cardiomyopathy and followed by German Shepherd Dog, Spitz and Non-descript dogs [19, 20].

Labrador retriever was highly susceptible for cardiac diseases though not referred to in any earlier literature as a breed predisposed for developing Dilated Cardiomyopathy, this might be due to over-representation of Labrador retriever in Bangalore. Labrador retriever breed functions as a sentinel for trends in general pet dog population in Bangalore. Labradors Retrievers are also known for lethargy and obesity. High blood pressure and heart rate resulted from the high fat diet induced abdominal obesity ultimately end up to heart disease due to arterial hypertension and left ventricular hypertrophy [21]. Other highly predisposed breeds have been under represented in the present study like Doberman, Boxer, and Great Dane probably reflecting the demographics of Bangalore pet dog population.

Gender

In the present study, the occurrence of cardiac diseases in male dogs and females was 70 percent and 30 percent respectively. Gender-wise occurrence of cardiac diseases and Cardiomyopathy are presented in the Table 4 and Figure 4.

A male predominance has been observed in Dilated Cardiomyopathy by foreign authors [16, 13] and Indian authors [19, 20]. Cardiac related mortality in males and females was 27.3 deaths and 15.4 deaths per 10,000 dog years at risk (approximately twice) [18]. The reason for this pattern is not known. A possible reason could be that Dilated Cardiomyopathy may be an X linked recessive trait as in Great Danes [23].

A male predominance has been observed in cardiac diseases might be due to increase in the body weight and body surface area leading to structural and functional changes of the heart due to adverse impact on cardiac function leading to decreased cardiac output or might also be due to preference of the owners to rear male dogs than female dogs or also might be due to Genetic predisposition.

Table 1: Occurrence of Cardiac Diseases in Dogs

Sl No.	Group	Cardiac Diseases	No. of Cases	% of Cases
1.	Group II	Dilated Cardiomyopathy (DCM)	48	48
2.	Group III	Mitral Valve Disease (MVD)	40	40
3.	Group IV	Idiopathic Pericardial Effusion (IPE)	6	6
4.	Group V	Tricuspid Valve Disease (TVD)	3	3
5.	Group VI	Hypertrophic Cardiomyopathy (HCM)	2	2
6.	Group VII	Aortic Stenosis/ Subaortic stenosis (AS)	1	1
Total			100	100

Table 2: Age-Wise Occurrence of Cardiac Diseases in Dogs

Age	Cardiac Diseases						Total	Per Cent
	DCM	Mitral Valve Disease	Idiopathic Pericardial Effusion	Tricuspid Valve Disease	HCM	Aortic Stenosis		
Young (< 1 year)	0	0	0	0	0	1	1	1
Young- adult (1-3 years)	7	6	1	2	0	0	16	16
Adult (3-6 years)	19	14	4	1	1	0	39	39
Aged (> 6 years)	22	20	1	0	1	0	44	44
Total	48	40	6	3	2	1	100	100

Table 3: Breed-Wise Occurrence of Cardiac Diseases in Dogs

Breed	Cardiac Diseases						Total	Per Cent
	DCM	Mitral Valve Disease	Idiopathic Pericardial Effusion	Tricuspid Valve Disease	HCM	Aortic Stenosis		
Boxer	3	0	0	0	0	0	3	3
Bull dog	1	2	0	0	0	0	3	3
Bull Mastiff	0	0	1	0	1	0	2	2
Cocker Spaniel	2	0	0	0	0	0	2	2
Dachshund	0	0	1	0	0	0	1	1
Dalmatian	5	1	0	0	1	0	7	7
Doberman	3	1	1	0	0	0	5	5
Golden Retriever	6	3	1	0	0	0	10	10
Great Dane	2	2	0	0	0	0	4	4
German Shepherd	2	3	2	0	0	0	7	7
Irish Setter	1	0	0	0	0	0	1	1
Labrador	18	12	0	2	0	0	32	32
Mongrel	1	0	0	0	0	0	1	1
Pomerian	0	1	0	0	0	0	1	1
Pug	0	1	0	1	0	0	2	2
Rottweiler	3	10	0	0	0	0	13	13
Spitz	0	2	0	0	0	0	2	2
Schitzu	0	0	0	0	0	1	3	3
St. Bernard	1	2	0	0	0	0	3	3
Total	48	40	6	3	2	1	100	100

Table 4: Gender-Wise Occurrence of Cardiac Diseases in Dogs

Gender	Cardiac Diseases						Total	Per Cent
	DCM	Mitral Valve Disease	Idiopathic pericardial effusion	Tricuspid Valve Disease	HCM	Aortic Stenosis		
Male	36	26	4	2	1	1	70	70
Female	12	14	2	1	1	0	30	30
Total	48	40	6	3	2	1	100	100

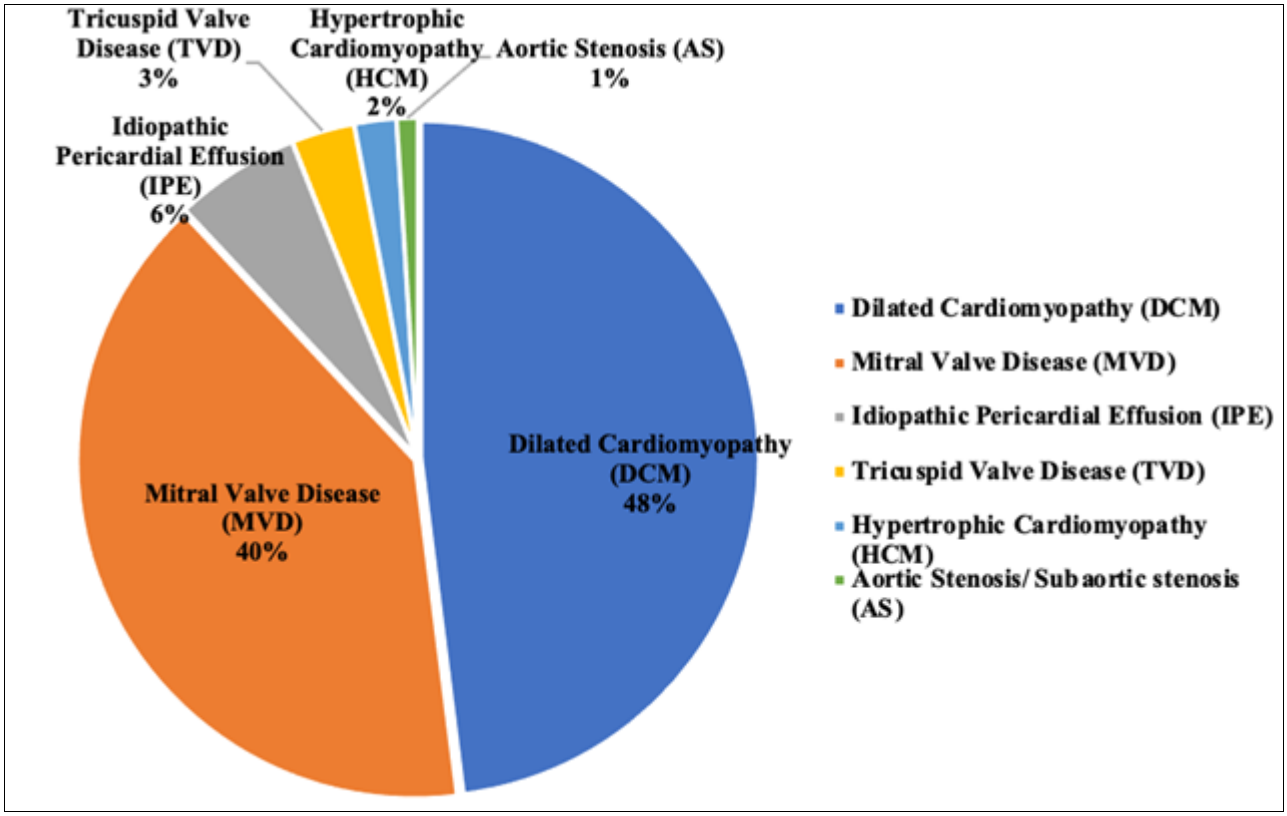

Fig 1: Occurrence of Cardiac Diseases in Dogs

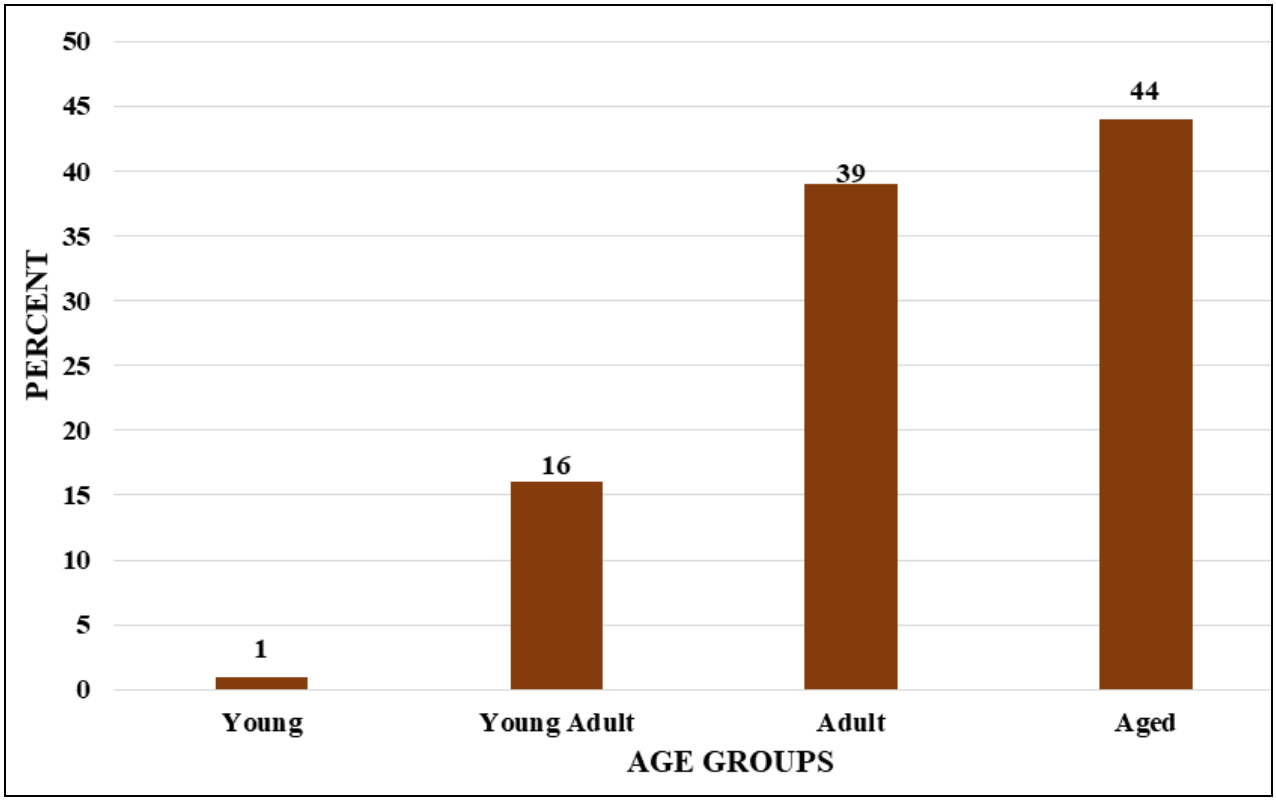

Fig 2: Age-Wise Occurrence of Cardiac Diseases in Dogs

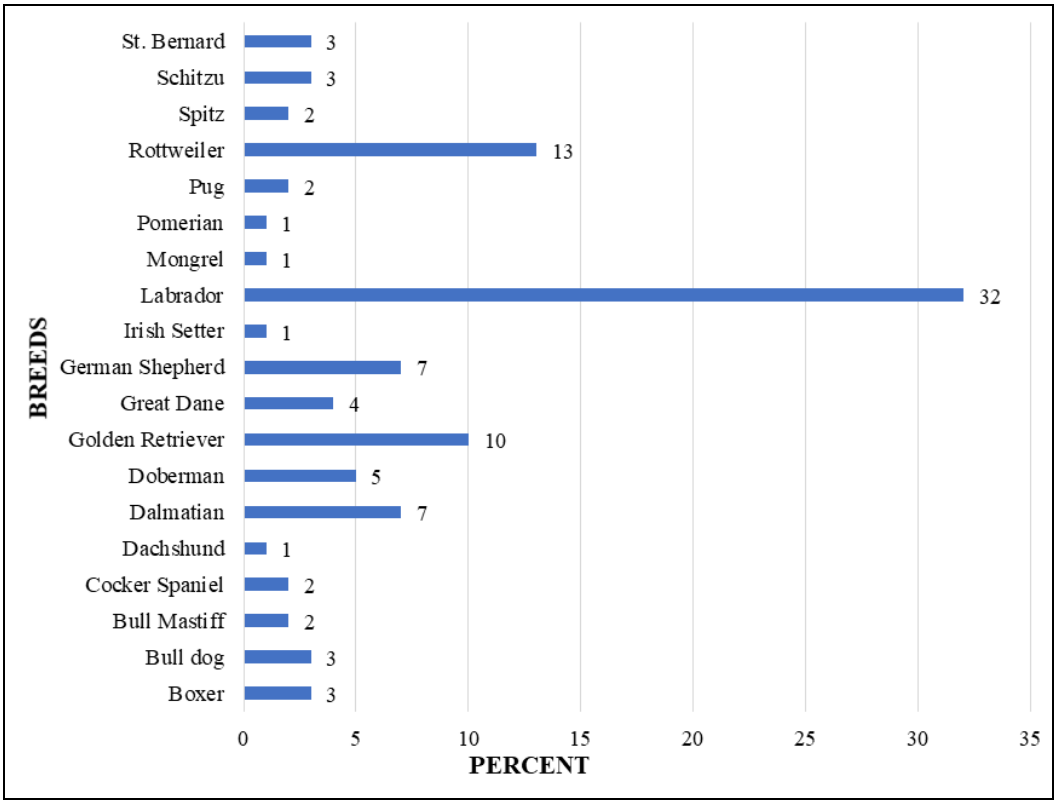

Fig 3: Breed-Wise Occurrence of Cardiac Diseases in Dogs

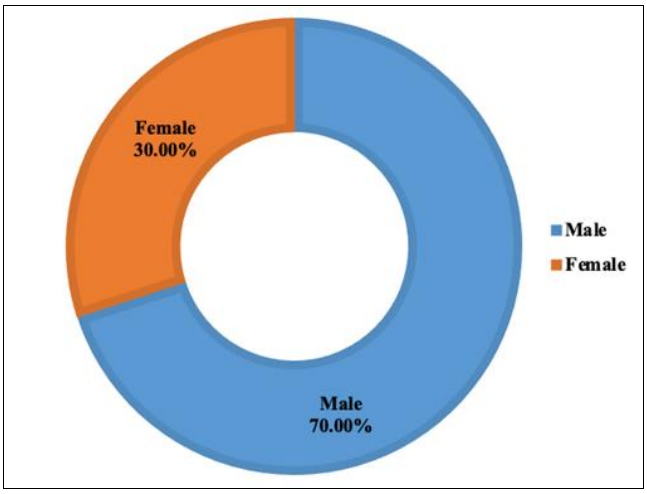

Fig 4: Gender-Wise Occurrence of Cardiac Diseases in Dogs

Conclusion

In the present study, among the cardiac diseases Dilated Cardiomyopathy followed by Mitral Valve diseases were common in dogs of Bangalore. Labrador retriever was most commonly affected with cardiac diseases in Bangalore. Older dogs were found to be more commonly affected with cardiac diseases and the incidence was higher in aged dogs (>6 years) followed by adult dogs (3-6 years). Males were found to be more commonly affected than females in dogs of Bangalore.

The variation in the occurrence of cardiac disease observed in dogs of Bangalore with that of the dogs of the other places might be due to

- The Estimates based on high-risk breeds (higher prevalence)
- The criteria used for establishing diagnosis (antemortem v/s post-mortem)
- The breed and age distribution of the study population, geographical location
- The practice setting (primary v/s referral).

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