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Status of canine cardiac disorders in Mahakaushal region of Madhya Pradesh

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Abstract
Study was aimed to know the status of cardiac disorders in canines in Mahakaushal region of Madhya Pradesh from November, 2019 to June, 2020. A total of 5110 dogs presented at Veterinary Clinical Complex, College of Veterinary Science & A.H., Nanaji Deshmukh Veterinary Science University, Jabalpur, Madhya Pradesh, were screened. Among them 137 dogs had clinical signs were subjected to thorough investigations (i.e. auscultation, ECG, thoracic radiography, echocardiography, haemoglobin and serum electrolyte estimation) for the confirmation of cardiac disorders. Overall occurrence was 1.23% in dog population. Out of 137 suspected dogs, 63 dogs (45.99%) were found to be affected with various types of cardiac disorders. Age wise maximum occurrence was recorded in dogs of more than 09 years of age group i.e. 53.85%. Highest (67.65%) occurrence was reported in Labrador breed. Cardiac auscultation and electrocardiography are useful diagnostic modalities for the assessment of early cardiac changes.

Keywords: cardiac disorder, occurrence, ECG

1. Introduction
Cardiac disorders produce devastating consequences in canine population. It encompasses a wide range of abnormalities including conduction defects, structural, functional and morphological anomalies in dogs of various age and breed, gender. Geography, climatic conditions, diet pattern, working schedule and stress are some of the predisposing factors responsible for canine cardiac disorders. Newer diagnostic methods allow earlier and more comprehensive evaluations of canine cardiac disorders. Some dogs may die without warning or any clinical signs of the illness. In our country, in majority of cardiovascular disorders, there is frequent omission by clinician and client due to lack of awareness (Singh *et al.,* 2008). However, any cardiac issue requires to be dealt with top priority to avoid morbidity and mortality in canine population (Kumar, 2012) [6].

2. Materials and Methods
A total of 5110 (3581 male and 1529 female) dogs from different corners of Mahakaushal region, presented to Veterinary Clinical Complex, College of Veterinary Science & A.H., Jabalpur, Madhya Pradesh were screened. Among them 137 dogs (95 male and 42 female) had clinical signs suspected to cardiac disorders were subjected to thorough investigation for confirmation of the cardiac disorders. The clinical screening methods included detailed history, palpation and auscultation of cardiac region, electrocardiography, thoracic radiography, echocardiography, haematology and serum biochemistry.

3. Results and Discussion
The overall occurrence of cardiac disorders was reported as 1.23% (63/5110) in the dog population. However, higher occurrence was reported in male (1.26%) as compare to female (1.18%). The occurrence of cardiac disorders among suspected dogs was 45.99% (63/137) and higher occurrence in male 47.37% (45/95) as compared to female dogs 42.86% (18/42).

Table 1: Overall occurrence of canine cardiac disorders in dogs

Sex	No. of dogs	Suspected cases	Positive cases	Occurrence (%)	
				Among dog population	Among suspected dogs
Male	3581	95	45	1.26	47.37
Female	1529	42	18	1.18	42.86
Total	5110	137	63	1.23	45.99

On perusal of literature it was found that there was no systemic study conducted regarding the canine cardiac disorders in Jabalpur region. Similar results are obtained by Kumar *et al.* (2011) [7] and Haritha *et al.* (2017) [4], who reported an overall prevalence of cardiac disorders in dogs, as 1.65% and 1.77%, respectively in and around Hyderabad. Badsar (2017) [1] also reported 2.41% prevalence of cardiac abnormalities in dog population in Indore region of Madhya Pradesh. However, wide range of prevalence (2.5 to 43.22%) has been recorded by various scientists (Patterson *et al.,* 1961; Tilley 1985; Changkija, 2007) [61, 13, 2] from time to time. Therefore, based on the study carried out by the various authors it is concluded that the occurrence depends on the population under study. Haritha *et al.* (2017) [4] and Badsar *et al.* (2017) [1] reported about similar pattern of cardiac disorders prevalence in suspected dogs i.e. 56.21% and 40.81%, respectively.

These findings are in accordance with Kumar *et al.* (2016) [8] who reported higher prevalence of cardiac disorders in male dogs as compared to female dogs. Haritha *et al.* (2017) [4] reported higher prevalence of cardiac disorders in male dogs (62.83%) as compared to female dogs (37.17%). The results are also in accordance with findings of Sisson *et al.* (2000) [12]. Hence, it was opined that the higher occurrence of cardiac disorders in male may be because of predominance of male in pet population. The reason of lower prevalence of cardiac disorders in female dogs might be due to the release of ovarian hormones which reduce the risk of cardiovascular diseases in female.

3.1 Age-wise, breed-wise and body weight wise occurrence of cardiac disorders in dogs

The maximum occurrence of cardiac disorders was recorded in age group of more than 09 years i.e. 53.85% followed by 52.94% in 1-3 years of age group, 45.0% in 3-6 year of age group, 41.30% in 6-9 year age group and minimum 37.50% in <1 year age group of dogs. The breed wise occurrence of cardiac disorders documented highest in Labrador 67.65% (23/34) followed by Non- descript 59.26% (16/27), Giant breeds (Saint Bernard, Rottweiler, Great Dane) 46.15% (06/13), German Shepherd 33.33% (07/21), other breeds (Doberman, French Mastiff, Golden Retriever, Beagle, Boxer) 31.58% (06/19) and lowest in Toy breeds (Pug, Pomeranian/ Spitz, Lhasa Apso) 26.09% (06/23). The significantly higher occurrence of cardiac disorders was reported as 56.25% (36/64) in 10-30 kg body weight dogs followed by 55.56% (20/36) in more than 30 kg body weight and minimum 18.92% in less than 10 kg body weight of dogs.

Table 2: Occurrence of cardiac disorders in dogs

Age group	Suspected dogs	Positive dogs	Occurrence (%)
(A) Age-wise			
< 1 year	08	03	37.50
1-3 year	17	09	52.94
3-6 year	40	18	45.00
6- 9 year	46	19	41.30
> 09 year	26	14	53.85
(B) Breed-wise			
German shepherd	21	07	33.33
Labrador	34	23	67.65
Giant breeds*	13	06	46.15
Toy breeds**	23	06	26.09
Non descript	27	16	59.26
Other breeds ***	19	06	31.58
(C) Body weight (in kg) wise			
<10	37	07	18.92
10- 30	64	36	56.25
>30	36	20	55.56

*Giant breeds (Saint Bernard, Rottweiler, and Great Dane)
**Toy breeds (Pug, Pomeranian/ Spitz, Lhasa Apso)
***Others breeds (Doberman, French Mastiff, Golden Retriever, Boxer, Beagle)

Age-wise the results of present study are in partial agreement with the findings of Kumar (2012) [6], who also documented the lowest prevalence in dogs less than one year of age. However, he reported highest incidence of cardiovascular diseases in 1-3 years of age group (23.17%), although in present study the highest occurrence was observed in age group of more than 09 years (53.85%). Hoque *et al.* (2019) [5] also stated that the incidence of heart diseases increases up to 60% or more in dogs above 7 years of age. Detweiler *et al.* (1968) [3] noted that the prevalence of cardiac diseases increased with advancement of age and found maximally (30-35%) of dogs over 13 years of age. Ageing is associated with the structural and functional changes in the cardiac pacemaker and in its conduction system. An increase of collagen fibres between the tissue cells of the atrio-ventricular node and is more common in bundle of His, this reduces the velocity of impulse conduction in the segments. Possibly this might be the cause of higher frequency of cardiac disorders in aged dogs (greater than 09 years).

Breed-wise similar findings were reported by Haritha *et al.* (2017) [4] with highest in Labrador (38.05%). Varshney *et al.* (2011) [15] also reported higher incidence of cardiac disorders in large and giant breed dogs. The overall prevalence of cardiac problems was observed to be lower in Doberman, French Mastiff, Golden Retriever and Beagle. Lanber *et al.* (2005) [9] reported that the risk of developing a particular type of heart disease varies with breed. This pattern of variation in occurrence could be attributed to occurrence of more number of dogs of Labrador and German shepherd breeds in the area where the study was carried out. In Labrador more occurrences of cardiac diseases might be due to obesity problem in this breed. In this geographical area the frequency of cardiac abnormalities is prevalent in above breeds and may depends on the preference of specific breeds by the pet owners of Jabalpur region.

Prior to this investigation no such study has been conducted for cardiac disorders on the basis of body weight. This current study demonstrates that as in dogs, body weight changes, the occurrence of heart disease also varies. The obesity paradox is a relatively newly addressed phenomenon in canine cardiology. There are number of possible reason that the obesity paradox may exist and it is not yet clear whether this is an association or whether causal relationships exist. Compare to the ideal weight controls; obese dogs have alterations in cardiac structures and function as well as insulin resistance, dyslipidemia, hypoadiponectinemia, and increased concentration of inflammatory markers. This may lead to systemic hypertension which is potential contributing factor for cardiac dysfunction (Tropf *et al.,* 2017) [14].

4. Conclusion
Cardiac disorders are often omitted by clinicians and pet parents in our country due to lack of awareness. In nut shell it can be concluded that cardiac disorders have significant proportion of morbidity among canine population. In Labrador breed, occurrence of cardiac disorders was found higher than the other breeds of dog. Geriatric dogs were at higher risk as compared to other age groups. Cardiac auscultation, electrocardiography, thoracic radiography and echocardiography are useful diagnostic modalities for the assessment of cardiac changes. Cardiac examination of apparently healthy dogs aged more than 9 years should be performed on routine basis for early detection of cardiac morbidity.

5. Acknowledgement

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