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## Incidence of cardiac arrhythmia in dogs

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#### Abstract

Dogs came to teaching veterinary clinical service complex (T.V.C.S.C) Mhow, Indore (M.P.) irrespective of age breed, sex and clinical problem screened for physical examination and electrocardiography. It was noticed that over all incidence of cardiac disease among dogs was 14.44% out of these cases which were examined electrographically and radiographically, the different electrocardiogram patterns observed were sinus tachycardia 7.69%, atrial fibrillation 7.69%, Low voltage 'QRS' 11.53%, Sinus block 7.69%, Sinus bradycardia 7.69%, 'T' wave > 1/4 R 08 30.76%, pulmonary congestion 1.11%, cardiomegaly 15.38% and pleural effusion 3.88%.

**Keywords:** Arrhythmia, ECG, cardiac diseases

#### Introduction

Cardiac arrhythmias are defined as abnormal rhythms of heart. Causes of Cardiac arrhythmias include anesthesia, autonomic imbalances, surgical stimulation, electrolyte and acid-base disturbances, alterations in blood pressure, or temperature and low oxygen delivery<sup>[1]</sup>. Electrocardiography (ECG) is a frequently used tool in veterinary medicine for recording of cardiac electrical activity. It is a measurement method of heart action current used in medicine from 1912 and in veterinary medicine 1913<sup>[2]</sup>. ECG is a test that records the electrical activity of the heart as a graphic display on graph paper. It is very significant in evaluating rhythm disturbances or arrhythmias<sup>[3]</sup>. Presented a practical approach to interpretation of canine ECG and opined that interpretation is the most important and often most difficult aspect of ECG. Although the ECG is very good at detecting disturbances in heart rhythm, it is relatively insensitive at detecting how well the heart is pumping and more specific anatomical changes such as chamber enlargement.

#### Material and Methods

The present work was carried out at Teaching Veterinary Clinical Service Complex (T.V.C.S.C), College of Veterinary Science and A.H, MHOW, (M.P). All the 180 dogs were put through initial examination for the cardiac ailment, consisted of history taking, auscultation of mitral, tricuspid, aortic and pulmonic valve area of the heart, palpation of the pre cordium, palpation of the femoral arteries and general clinical examination. Dogs found to be having signs compatible examination with special emphasis on the auscultation of the heart, subject to ECG with cardiacart, 108T- M.K.VI, a single channel, 12 Lead electrocardiograph (BPL India ltd.), with the paper speed of 25 mm/ second.

Guidelines of<sup>[4]</sup> for measuring complexes and intervals were followed for interpretation of the electrocardiograms:

#### Heart rate

Any alteration in normal heartbeat in different groups was recorded. The range of heart beat/min. considered normal for different breeds of dogs are

1. 70 to 160 beat per minute (bpm) for adult dogs
2. Up to 180 bpm for toy breeds
3. Up to 220 bpm for puppies

#### Rhythm

1. Normal sinus rhythm
2. Sinus arrhythmia

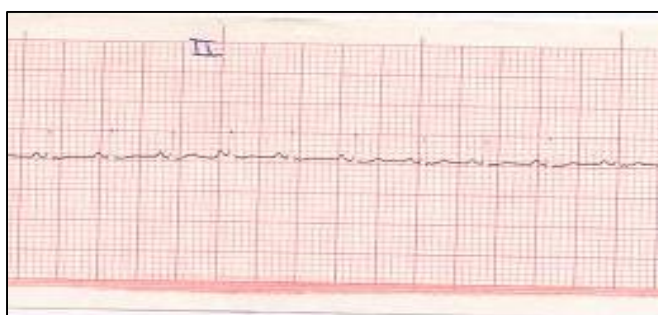
3. Wandering SA pacemaker
4. P wave: Up to 0.4 mv (4 boxes tall) in amplitude; up to 0.04 second (1 boxes wide) in duration; always positive in leads II and aVF; positive or isoelectric in lead I.
5. P-R interval: 0.06-0.14 second
6. QRS complex: Mean electric axis (frontal plane) - + 40° to + 100°
7. Amplitude- Maximum amplitude of R wave 3.0 mv (30 boxes) in large breeds and 2.5 mv (25 boxes) in small breeds in leads II, III and aVF. Complex positive in leads II, III, aVF and negative in V10.
8. Duration – up to 0.05 second in small breeds and 0.06 second in large breeds.
9. S-T segment: No depression – not more than 0.2 mv (2 boxes)
10. No elevation – not more than 0.15 mv (1.5 boxes).
11. T wave: It can be positive, negative, or biphasic. T wave amplitude not greater than 25% of amplitude of R wave.
12. Q-T interval: It is 0.15 to 0.25 second at normal heart rate.

**Results**

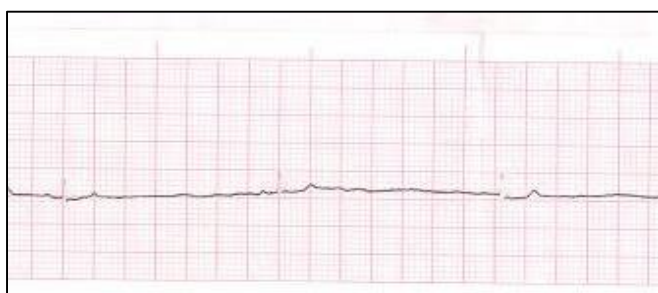
A total of 180 dogs, comprising 80 male and 100 female were screened for cardiac ailments and 26 found positive for it. Out of these 26 dogs 19 dogs have cardiac arrhythmias in the electrocardiographic examination. Out of those 7.69% (02 dogs) showed sinus tachycardia (Fig. 1), bradycardia (Fig. 2), atrial fibrillation (Fig. 3), 03 dogs (11.53%) low voltage QRS complex (Fig. 4) and 08 dogs (30.76%) having T wave amplitude > than ¼ R (Fig. 5 and Table 1).

**Table 1:** Electrocardiographic finding of cardiac arrhythmias in dogs (n=26)

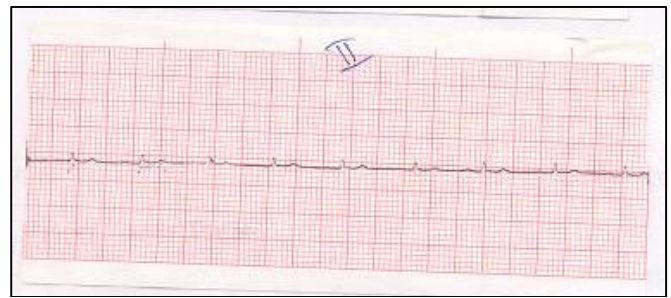
Cardiac arrhythmias	No. of cases	% Incidence
Sinus tachycardia	02	7.69
Atrial fibrillation	02	7.69
Low voltage QRS complex	03	11.53
Sinus block	02	7.69
Sinus bradycardia	02	7.69
'T' wave > ¼ R	08	30.76
Total	19	7.30



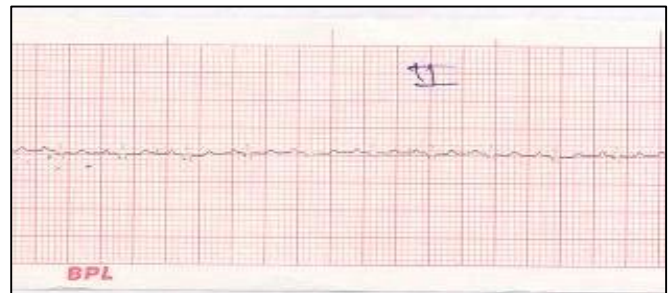
**Fig 1:** Tachycardia



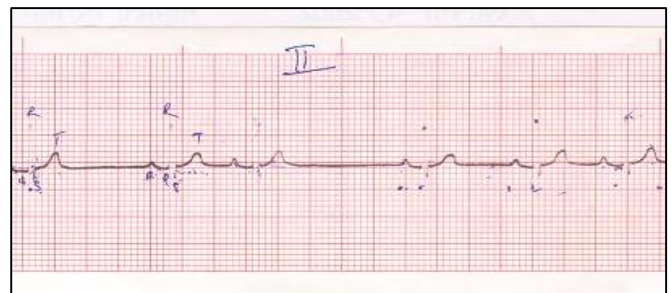
**Fig 2:** Bradycardia



**Fig 3:** GSD Dog Atrial fibrillation



**Fig 4:** GSD Dog Low voltage



**Fig 5:** GSD Dog "T" wave > ¼ R

**Discussion**

When multi-lead electrocardiograms were taken, a number of abnormalities, including conduction disturbances and abnormal arrhythmias were found which had not been detected during the initial screening examination.

Electrocardiograms were found to be particularly useful in diagnosing right or left sided heart enlargement, particularly when radiography and clinical findings were inconclusive.

The ECG gave a general indication of the amount of hypertrophy or dilation in a roentgenological enlarged heart. This was useful in determining the general condition of the heart and the prognosis, since a hypertrophied heart with normal or increased amplitude of the QRS complex would respond better to treatment than a dilated heart with low amplitude of the QRS complexes. The differentiation between hypertrophy and dilation as described by [5] was found to be very useful in these cases.

In general, electrocardiography was found to be very useful in detecting cardiac abnormalities but it has certain limitation. A wide variation of body confirmation and dependency of electrocardiographic contours on this body confirmation has prohibited the establishments of limits of normal variation of dogs, as showing by the work of [6, 7, 8]. However, in the present study, valuable information could be obtained when the electrocardiograms were analyzed empirically and in conjunction with the clinically finding and radiography.

The types of ECG shows sinus tachycardia (7.6%) (Table 1) occurs because of the stimulation of the sympathetic nervous system and decreased parasympathetic tone in heart disease as

reported by <sup>[9]</sup> and because of this, presence of sinus arrhythmia a (which is a normal phenomenon in dogs) is highly unlikely in a patient with heart disease.

Atrial fibrillation accounted for 1.11% of the ECG abnormalities and 7.69% of cardiac problems. It is characterized by an ECG which reveals disorganized atrial activity and was mostly recorded from large breeds of dogs with signs of respiratory distress. This is similar to finding of <sup>[10]</sup> who reported that atrial fibrillation was more common in large and giant breeds of dogs and is typically associated with dilated cardiomyopathy or advanced valvular heart disease.

Low voltage QRS complexes occurred in 1.66% of the ECG abnormalities and 11.53% of cardiac problems. They are characterized by R waves, which are < 0.5 mv in amplitude. The ECG abnormality in a dog was accompanied by plural effusion. This is in accordance to the finding of <sup>[11, 12]</sup>. They also reported that low voltage QRS complexes are also seen in pericardial effusion.

Sinus block accounted for 1.11% of the dog showed abnormalities in ECG and 7.69% of cardiac problems. It is a condition where one beat is skipped so a flat line equivalent to twice the normal R-R interval is seen. A pause in the heart rhythm coinciding with the block was the clinical finding in these cases. Which is in an agreement with the finding of the <sup>[12]</sup>? Who also reported that this condition may be seen in atrial dilation and cardiomyopathy.

Sinus bradycardia was seen in 1.11% of the ECG abnormalities and 7.69% of cardiac problems and is indicating by normal appearance complexes and a heart rate of less than 70 per minute or less than 60 per minute for giant breeds <sup>[11]</sup>. This condition was accompanied by weakness in a dog, which correlates with the finding of the above author.

T wave > ¼ R 4.44% of ECG abnormalities and 30.76 of cardiac disease. Prominent 'T' wave observed in myocardial hypoxia, ventricular enlargement and hyperkalemia agreed with <sup>[11]</sup>.

## References

1. Fleix MD, Anthony PC, Tanya D, Cindy LS, Eric M. Prevalence of perioperative arrhythmia in 50 young healthy dogs. *Canine Veterinary Journal*. 2009; 48(2):169-172.
2. Deegan E. In the electrocardiographic curve of clinically healthy dogs of selected breeds. *Ele. J of Poli. Agri. Uni*. 1977, 1-9.
3. Tilley LP. *Essentials of canine and feline electrocardiography*. C.V. Mosby Co., St. Louis, 1979a, 38.
4. Tilley LP. *Essentials of canine and feline electrocardiography interpretation and treatment*. 2<sup>nd</sup> (ed.) Lea and Febiger, Philadelphia, 1985.
5. Hamlin RL. Prognostic value of changes in the cardiac silhouette in dogs with mitral insufficiency. *Journal of Animal Veterinary and Medical Association*. 1968a; 153:1436.
6. Hamlin RL. Electrocardiographic detection of ventricular enlargement in the dog. *Journal of Animal Veterinary and Medical Association*. 1968a; 153:1461.
7. Severin GA. Analysis of the E.K.G. In *Vet. Cardiology Notes*, 2<sup>nd</sup> ed. Colorado, 1971, 18.
8. Eckenfels A, Trieb G. The normal ECG of the conscious dog. *Toxicology and Applied Pharmacology*. 1979; 47:567.
9. Boswood A. Rationale for the use of dogs in treatment of cardiovascular disease. In *practice*. 1996; 18:469-476.

10. DeFrancesco TC. Advanced discussion in the diagnosis of heart failure [www.Waltham.com](http://www.Waltham.com), 2002.
11. Tilley LP. In *tillay LP. (ed.): essential of canine and feline electrocardiography*, 3<sup>rd</sup> edn, Lea and Fabinger, Philadelphia, 1992.
12. Martin M. ECG interpretation in small animals. 3. Practical guidelines. In *practice*. 2002c; 24(5):250-261.