

## Electrocardiographic changes in dogs with Mitral Valve Disease

Sindhu K. Rajan<sup>1</sup>, Usha Narayana Pillai<sup>2</sup> and Ajithkumar, S<sup>3</sup>

Dept. of Veterinary Clinical Medicine, Ethics and Jurisprudence,  
College of Veterinary and Animal Sciences, Mannuthy, Kerala

<sup>1</sup>Assistant Professor

<sup>2</sup>Retd. Professor and Head, Dept. of Veterinary Clinical Medicine, Ethics and Jurisprudence, CVAS, Mannuthy

<sup>3</sup>Retd. Professor and Head, TVCC Mannuthy

### Abstract

Mitral valvular disease is the most common acquired cardiac disease in dogs, which is characterised grossly by nodular distortion of the valve leaflets, as well as by thickening and lengthening of the chordae tendineae. The study was conducted in six dogs with mitral valve disease. Confirmation of mitral valve disease was carried out using echocardiography. Fine atrial fibrillation was the major electrocardiographic findings in dogs diagnosed with mitral valvular disease. Even though, no statistical significance could be established between control and diseased dogs, duration of P wave, QRS, PR, ST and QT interval were increased in diseased dogs.

Mitral valvular disease is the most common acquired cardiac disease in dogs, which is characterised grossly by nodular distortion of the valve leaflets, as well as by thickening and, sometimes, lengthening of the chordae tendineae. The present study reports the electrocardiography changes in six dogs with mitral valve disease.

Dogs brought to general health check-up and vaccination were selected as the control animals. Confirmation of mitral valve disease in six dogs was carried out using echocardiography. Standard single channel six-lead ECG was recorded using the BPL-CARDIART-6108T ECG machine. The analysis included measurement of P wave, QRS complexes, PR interval, ST segment, T wave QT interval in Lead II, and evaluation for the presence of arrhythmias. The data were analysed statistically using software package – IBM SPSS Statistics v24 .

Mean values of electrocardiography of control and diseased groups are presented in Table II. Fine atrial fibrillation was the major electrocardiographic findings in dogs diagnosed with mitral valvular disease (Fig1.). Apart from fine atrial fibrillation, intermittent notched P wave and T wave were observed in an eight year old Labrador. Intermittent atrial fibrillation, notched P and T wave and occasional ventricular premature complexes of left ventricle origin could be found out in a 6 year

old Golden retriever. Varying P wave morphology with notched P wave and ventricular premature complexes of left ventricle origin could be recorded in a five year old male Labrador presented with chronic hind limb oedema. Right bundle branch block could be recorded in five year old obese Dachshund presented with dyspnoea. Notched P wave could be detected in a nine-year-old mini-Pom presented with severe dyspnoea and syncope. Even though, no statistical significance could be established between control and diseased dogs, duration of P wave, QRS, PR, ST and QT interval were increased in diseased dogs. The corresponding values of MVD dogs were  $0.050 \pm 0.007$ ,  $0.039 \pm 0.004$ ,  $0.124 \pm 0.008$ ,  $0.099 \pm 0.009$  and  $0.160 \pm 0.019$  sec respectively. Other parameters of dogs with mitral valve disease were similar to or less than the control mean values.

Electrocardiography study in the animals of MVD revealed that all parameters were within the normal range and there was no statistical difference between control and mitral valve disease group. This was further supported by Sisson (1995) who opined that dogs with cardiomegaly and mitral regurgitation in radiography and echocardiography respectively usually showed normal electrocardiographic findings. The predominant morphological changes recorded in ECG were fine atrial fibrillation and notched P waves. This could be correlated with the atrial stretching due to haemodynamically significant volume overload in mitral valvular disease (Ettinger and Feldman, 2017).

\*Corresponding author : sindhu.rajan@kvasu.ac.in

**Table 1: Mean values of ECG of apparently health dogs and dogs with MVD**

Variables	Control	MVD	t-value	P-value
P duration	0.041 ± 0.005	0.050 ± 0.007	1.085 <sup>NS</sup>	0.294
P height	0.460 ± 0.228	0.281 ± 0.033	0.692 <sup>NS</sup>	0.499
PR interval	0.110 ± 0.005	0.124 ± 0.008	1.429 <sup>NS</sup>	0.172
QRS duration	0.037 ± 0.003	0.039 ± 0.004	0.358 <sup>NS</sup>	0.725
QRS height	1.245 ± 0.287	1.550 ± 0.331	0.699 <sup>NS</sup>	0.495
Q dip	0.195 ± 0.072	0.100 ± 0.045	1.054 <sup>NS</sup>	0.307
ST interval	0.098 ± 0.008	0.099 ± 0.009	0.063 <sup>NS</sup>	0.950
QT interval	0.131 ± 0.008	0.160 ± 0.019	1.387 <sup>NS</sup>	0.197



**Fig.1. Lead II ECG tracing of a dog with mitral valve disease showing fine atrial fibrillation. The arrow indicates undulations of baseline(25mm/sec, 10mm/mV).**

### Acknowledgments

The authors would like to thank the authorities of Kerala Veterinary and Animal Sciences University for the facilities provided

### References

Ettinger, S. J. and Feldman, E. C. 2017. Ettinger, S. J., Saunders, W.B. Textbook of Veterinary Internal Medicine. 8th Ed., Philadelphia, pp: 3071-3091

Sisson, D. D. 1995. Acute and short-term hemodynamic, echocardiography and clinical effects of enalapril maleate in dogs with naturally acquired heart failure: results of the invasive multicenter prospective veterinary evaluation of Enalapril study: The IMPROVE study group. *J. Vet. Intern. Med.* **9**: 234-242.