

Electrocardiographic survey on dogs in Baghdad province

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Abstract

This study was designed to investigate electrocardiography changes in 100 dogs (50 male and 50 female) in Baghdad province to detect incidence of cardiac disorder. The results indicated that electrocardiographic abnormalities are 27% of examined dogs, nodular ectopic 2%, complete heart block 5%, ventricular tachycardia 6%, bradycardia 8% and decreased T amplitude 6%. The cardiac arrhythmia and hypokalaemia were the most common cause of cardiac disorders. There were differences between sexes for ECG parameters.

key word :Electrocardiogram , Iraqi dogs,

دراسة التخطيط الكهربائي للقلب في الكلاب في محافظة بغداد
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الخلاصة:

صممت هذه الدراسة للتحري عن التغيرات في مخطط القلب الكهربائي لـ 100 كلب (50 ذكر و 50 انثى). في محافظة بغداد واكتشاف الخلل في الجهاز القلبي الوعائي اظهرت النتائج وجود تغيرات في المخطط الكهربائي للقلب بنسبة 27% و تميزت الحالات المرضية العقدية الهاجرة بنسبة 2% وبسرعة ضربات القلب بنسبة 6% وتباطؤ ضربات القلب بنسبة 8% مع وجود حصر القلب بنسبة 5% وانخفاض موجة تي 6% حيث كانت حالة اللانظمية وانخفاض تركيز اليوتاسيوم هي الحالات الاكثر شيوعا في هذه الدراسة المسحية مع وجود فرق معنوي بين ذكور واناث الكلاب.

Introduction

Cardiac diseases are caused by abnormalities in the cardiovascular system and may involve valvular, myocardial, arrhythmic and/or vascular irregularities. Disease may be caused by congenital defects, such as patent ductus arteriosus or acquired alterations, such as valvular degeneration and

cardiomyopathy. Acquired disease can occur secondary to other conditions, such as hyperthyroidism and heartworm infection, but in many cases the etiology is unknown. Diagnosing cardiac disease may be challenging in some patients because animals may present with no clinical signs or the clinical signs may be identical to those

of respiratory illness. Diagnosis of cardiac disease is based on patient history, a thorough physical examination and appropriate diagnostic tests. Many diagnostic methods are available, including: Electrocardiogram (ECG), Chest radiographs, Echocardiography, Doppler blood flow, Cardiac biomarker- NTproBNP and Blood pressure. (1). The electrocardiogram (ECG) is an evaluation of the heart's electrical activity (depolarization and repolarization) as assessed from the body surface (2). The analysis of the ECG wave form supports identifying a wide range of heart diseases. The characterization of each cardiopathy, manifests itself by specific modifications on the characteristics (3)(4). The purpose of this study was conducting a survey to detect heart disorders by using the ECG recorder in dogs in Baghdad province.

Materials and Methods

Animals:

A total of 100 adult dogs (50 male and 50 female) their ages ranged from 5-5.5 years were chosen randomly to investigate the cardiac disease. They were detected by ECG in either as a patient from private veterinary clinic or as a home dog. **The Electrocardiogram (ECG):**

The ECG were recorded by using the recorder from (Nhon kohden Co., Germany). The animal was left about 5-10 minutes to get calmed, all recording were made on the same time, electrodes were attached to the dogs muscle in the front and rear legs and gel applied on skin before ECG record and used specific Paper speed. (2). All ECGs were standardized at 1 mV = 10 mm, with a chart speed 50 mm/sec. blood pressure was calculated by using indirect methods and placing the cuff

around the limb and sometime around the tail to occlude blood flow. It is important to choose the appropriate sized cuff and read the systolic and diastolic blood pressure. The heart rate was detected from the ECG recorder.

Statistical Analysis:

The statistical analysis of data was performed on the basis of two way analysis of variance (ANOVA) using a significant level of ($p < 0.01$) depending on the experimental design, at each time specific group differences were determined using least significant differences (LSD) test (5).

Results and Discussion

The mean value of P wave interval (sec) and amplitude (mv) illustrated in the Table (1), the statistical analysis indicated that the mean value of Psec was not significantly different, but P mv was significant ($P < 0.05$) in male and female. Most studies involving P-wave analysis have noted the abnormalities associated with mitral stenosis or mitral insufficiency. This increased duration could result from decreased conduction velocity through the atria or from a longer path to be traveled (6). The result of this study may be related to different breeds of dogs or atrial abnormality due to heart disease (7).

The QRS complex interval (sec.) was showed no significant differences. The results may be related to several conditions such as Ventricular septal defect, first-degree atrium-ventricular blocks, multifocal premature ventricular complexes, and ventricular tachycardia episodes (8). No significant alteration were recorded in PR waves compared with the normal values. The prolonged PR interval (first

degree of atrioventricular block) occasionally seen in normal animals Age-related degeneration of atrioventricular conduction system,dilated cardiomyopathy(9). The result of this study showed no change in the PR interval waves QT waves results showed no significant differences compared with the normal values. Prolonged Q-T interval could be detected in CNS diseases , hypocalcaemia, hypokalaemia ,hypothermia with the shortened Q-T interval occurred in cases of hypercalcaemia and hyperkalaemia and

drugs/toxins (10).The unchanged QT wave may attributed to no changes in electrolytes balance .

Alterations in T wave:

T waves interval(sec.) and amplitude (mv) Twaves amplitude(T/mv):showed no significant increased compared with the normal. Tall of T waves could of occure with Hyperkalaemia, Hyperventilation during heat stroke ,Left bundle branch block, myocardial hypoxia ,myocardial infarction and Right bundle branch block.(11

Table 1: Mean ±SD values and values for ECG parameters in 100 (male&female) dogs in Baghdad Province .

Waves	Control	Male N=50	Female N=50
P sec.	0.04±0.001	0.04±0.0001	0.04±0.0001
mv.	0.4±0.001 c	0.396± 0.004 a	0.390± 0.005 b
QRS sec.	0.06±0.001	0.058±0.0007 a	0.012±0.056 a
mv.	2.5±0.004	0.724±0.007 a	0.004±0.708 b
mv.	0.2±0.003	0.024±0.014 a	0.022±0.238 b
sec.	0.02±0.033	0.022± 0.001 a	0.002±0.025 b
mv	0.4±0.012	0.410± 0.004	0.004±0.410
P- sec.	0.06-0.15	0.060 ± 0.004	0.001±0.060
Q- sec.	0.15-0.25	0.152 ± 0.002 a	0.006±0.15 b
H. RBpm	70-160	106.1 ± 3.84 a	89.78±3.69 b
Age		5.5	5.0
Weight		25	26

There are no significant differences $p \geq 0.05$ between both sex

heart rate: HR showed no significant differences compared with the normal values, the value were recorded in male 106.1 ± 3.84 but the value in femal was 89.78±3.69 Tachycardia typically refers to aheart rate exceeds the normal range . A heart rate over

100 beats per minute is generally accepted as tachycardia. Tachycardia can be caused by various factors which often are benign. However, tachycardia can be dangerous depending on the speed and type of rhythm. An increase in sympathetic nervous system

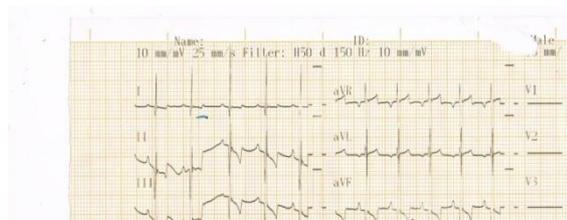
stimulation causes the heart rate to increase both by the direct action of sympathetic nerve fibers on the heart and by causing the endocrine system to release hormone such as epinephrine . Increased sympathetic stimulation is usually due to physical or psychological stress, this is the basis for the so-called "Fight or Flight" response. (12

Bradycardia:

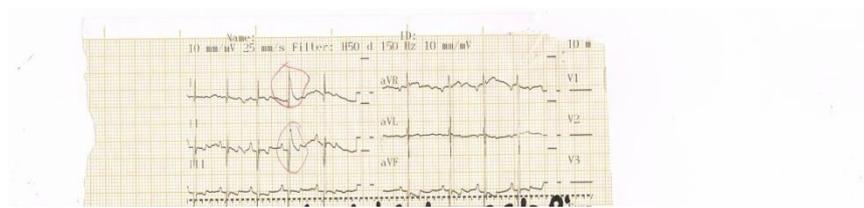
Is the resting heart rate of under 60 beats per minute, though it is seldom symptomatically until the rate drops below 50 beats/min, it may cause cardiac arrest in some patients, because those with bradycardia may not be pumping enough oxygen to their hearts,it sometimes results in fainting,

shortness of breath, and if severe enough, death atrial bradycardia, atrioventricular nodal bradycardia. (13). The percentage of bradycardia in the present study was 6% of the total numbers of dogs .

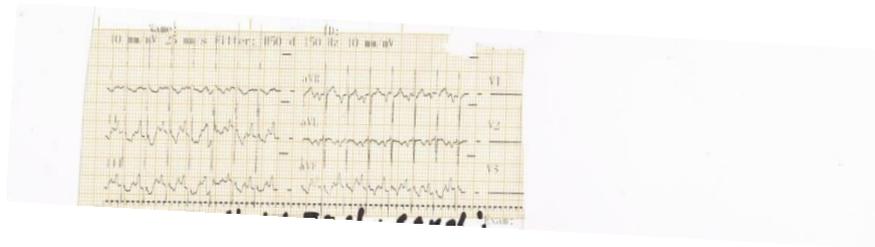
The results appeared that the ECG abnormalities were (27%) dogs. Nodular ectopic were identified in (2%) of examined dogs, complet heart block in (5%), ventricular tacchycardia in (6%), bradycardia 8(8%) ,decreased T wave amplitude in (6%),as shown in.The results also indicated that cardiac arrhythmia and hypokalaemia fig (1 and 2)were the most common cause of cardiac disorders.



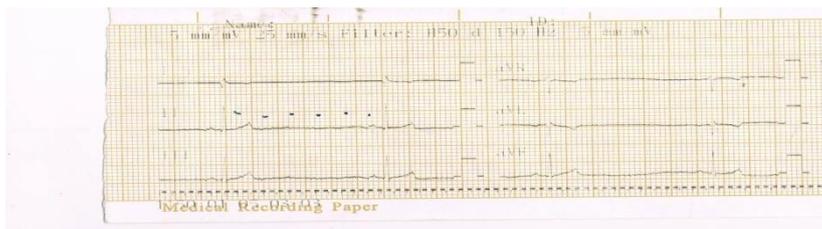
Arrhythmia



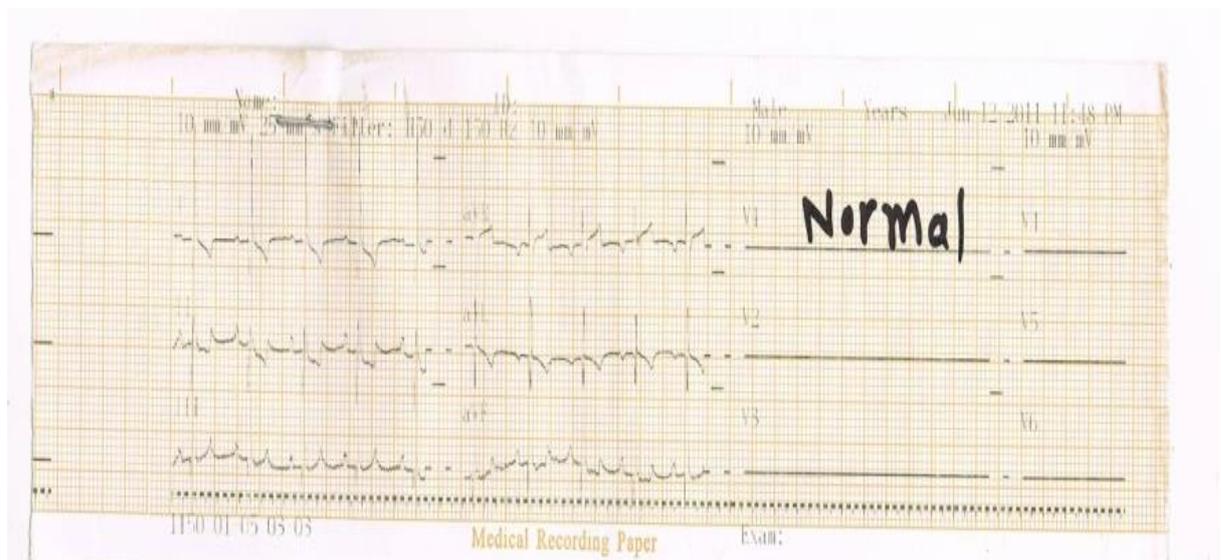
Ventricular ectopic



tachycardia



Brady cardia



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