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Research Article

ABNORMAL VARIATIONS OF E.C.G IN HEALTHY ADULT POPULATION -A MULTICENTERED STUDY

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ABSTRACT

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Key Words: ECG, Bradycardia, Tachycardia, PR interval, QRS duration.. This study was done on 200 normal healthy individuals both males and females, 56 females and 144 males within the age groups from 16 years to 48 years were taken after careful clinical examination and ruling out any cardiac abnormality in particular, and others in general.. It is well known that pulmonary, endocrinal, renal and electrolyte abnormalities can show changes in the ECG pattern. Symptomatic individuals of any system involvement were not included in this study. Aims & **Objectives:** To analyze the pattern of Rate, Rhythm, Axis, PR Interval, QRS duration, QT duration, PR and ST segments of 12 lead ECG to note any abnormalities in above parameters, their relation to age, various types of abnormality and it is a normal variant or associated with diseased state. Material & Methods: The 12 lead ECG was taken for this study with 10 mm standardization.12- lead ECG was done. Observations & Results: We observed abnormalities like Sinus Tachycardia, Sinus Bradycardia, Sinus arrhythmias, T wave inversion, Coving ST elevation, RsR pattern, LVH and Rvh Conclusion: ECG varies from individual to individual even in normal individuals. Majority of the ECGs in normal individuals shows a pattern, which falls within normal range. A considerable percentage of individuals deviate from the normal pattern So understanding normal ECG and deviations in normal individuals is very important to interpret the diseased states & treating them.

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INTRODUCTION

Every heart beat is because of electrical activity. This electrical activity is initiated in S.A. Node and through specialized fibers spreads through the myocardium. The same electrical activity passes to the surrounding tissues and finally to all parts of the body. The intensity of electrical activity decreases as the distance increases from the heart. Hence the electrical activity can be recorded from any part of the body. However it needs to be augmented while recording eg.AVR, AVL, AVF. Routine ECG is recorded from standard points of the body-limbs and chest. Study of ECG includes the intervals, axis of different waves and their patterns. These parameters do change from individual to individual within a range. However, there are some deviations either due to disease or in normal individual also. The present study aims at knowing the variations in normal individuals.

200 normal healthy individuals both males and females, 56 females and 144 males within the age groups from 16 years to 48 years were taken after careful clinical examination to rule out any cardiac abnormality in particular, and other diseases in general by following the given pattern. It is known that pulmonary, endocrinal, renal electrolytes and other abnormalities, all can result in changes in the ECG pattern, a detailed careful clinical examination was done to rule out the above disorders. Only those individuals with all normal parameters were included in this study.. The ECG in the following leads L I, LII, L III, AVR, AVL, AVF, V1 V2 V3 V4 V5 V6 were taken. COPD and other common diseases and people, with habits like smoking, alcoholism which are known to alter the ECG were all excluded from the study. Adults with known history of congenital heart disease, IHD were also excluded from the study.

METHODS AND MATERIALS

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OBSERVATIONS AND RESULTS

The present study includes 200 normal, healthy individuals out of which 144 were males, 56were females. The lowest age is 16yrs and highest age is 48yrs. The heart rate varied between 56 and 114beats/min taking 60 to 100beats/min as normal range of heart rate. Below 60beats/min was considered as Bradycardia and above 100beats/min as Tachycardia. Among the 200 studied 112 individuals showed normal sinus rhythm. Another significant finding about young individuals was higher heart rates falling in normal range.

There were two people with bradycardia above 40yrs. Sinus Tachycardia was seen in 8 individuals and all were less than 40vrs 6 males and 2 females with tendency for tachycardia at lower age groups. P-R interval varied between 0.12 sec to 0.24 sec (normal range- 0.12 sec to 0.20). QRS duration varied between 0.08 sec to 0.12 sec. Majority showing 0.08 sec (normal range- 0.08 sec to 0.1 sec). Only two individuals showing Right bundle branch block. The electrical position of the heart, which may or may not be related to the anatomical position, is determined by just 2 leads AVL and AVF based on the above principle, the electrical position of the heart is determined as depending on the position of the heart, the complexes in AVL and AVF may be either positive or negative. Both can be positive and both can be negative. But in practice physician determines the axis of the heart in preference to its position, the former having more relevance than the latter in clinical practice.

To summarize list of abnormalities in the present study. Sinus Arrhythymia 30,T Wave Invertion22, Coving ST Elevation, Sinus Tachycardia 08, Sinus Bradycardia 02, RSR pattern14, LVH 08, RVH 02 (shown in table 4)



Table 2 Age Wise Distribution

S.No	Sex Distribution	Number
1	16 - 29	45
2	30 - 40	80
3	41 - 48	75







Table 4 Various ECG Abnormalities

S.No	ECG Abnormality	Number	
1	Sinus Arrhythymia	30	
2	T Wave Invertion	22	
3	Coving ST Elevation	02	
4	Sinus Tachycardia	08	
5	Sinus Bradycardia	02	
6	RSR pattern	14	
7	LVH	08	
8	RVH	02	



DISCUSSION

Electrocardiogram is graphic representation of the electrical activity of the heart the electrical activity can be recorded from various parts of the body, limbs and chest. All these are considered as indirect, semi direct leads. The ECG is good indicator for the change in rate, rhythm, ischemia, electrolyte levels and in many other conditions. The ECG in normal individuals though varies from individual to individual but lies in particular limits of normal range. The present study is aimed at knowing whether the ECG, shows any abnormalities in normal individuals ^{1to4}, if so, their frequency, type and

significance. Certain abnormalities are known to occur is normal individuals. They indicate benign nature like PVC's (Premature Ventricular Contraction) or sometimes a serious disorder which is silent or in some case it could be congenital So, it can be concluded that ECG varies from individual to individual even in normals. Majority of the ECG's innormal individuals shows a pattern, which falls within normal range. A considerable percentage of individuals deviate from the normal pattern ^{5to9}. The frequently observed abnormalities are Tachycardia, and Bradycardia. Less frequently seen abnormalities are LAD, 1⁰heart block PVC's, RBBB. So understanding normal ECG and deviations in normal individuals is very important to interpret the diseased states, treating them, and giving the prognosis ¹⁰.

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