

Original Research Article

Electrocardiographic features in males: a cross sectional study in Prayagraj District, Uttar Pradesh

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ABSTRACT

Background: The electrocardiogram (ECG) is the graphical display of the various electrical changes of the heart. It plays an important role in the diagnosis of various heart diseases. It is one of the methods of assessing the effects of hypertension on one of its target organ heart. It remains one of the most sensitive methods for establishing left ventricular hypertrophy (LVH) and is often abnormal even when there is no left ventricular heave and chest x-ray shows no classical or obvious left ventricular enlargement. The study was done with objective to assess the Electrocardiographic features of male which were ≥ 30 years in Urban and Rural Prayagraj.

Methods: A community based cross-sectional study was carried out in Prayagraj District. Study participants were 620 males, 310 urban and 310 rural of age equal or above 30 years and study sampling technique were two stage random sampling. The data was collected by using predesigned, pretested, semi structured questionnaire and analyzed by using SPSS 23.0 version.

Results: LVH is a marker of severity of hypertension. It is an important cardiac risk factor and it has a substantial clinical significance on the course of cardiovascular events in terms of morbidity and mortality.

Conclusions: Left ventricular hypertrophy, a cardinal manifestation of hypertensive cardiac damage.

Keywords: Hypertension, Left ventricular hypertrophy, Rural and Urban

INTRODUCTION

The electrocardiogram (ECG) is the graphical display of the various electrical changes of the heart. It plays an important role in the diagnosis of various heart diseases. It is one of the methods of assessing the effects of hypertension on one of its target organ heart. It remains one of the most sensitive methods for establishing left ventricular hypertrophy (LVH) and is often abnormal even when there is no left ventricular heave and chest x-ray shows no classical or obvious left ventricular enlargement.¹ The electrocardiogram (ECG) is commonly used for studying the electrical activity of the heart. The standard ECG is recorded using an electrocardiograph,

which is a galvanometer that records potential differences between two electrodes or between one electrode and a standard reference electrode kept at “zero” potential.² An ECG do not determine whether one has hypertension or not but it can reveal the effects of long standing hypertension. So in a sense, the findings of ECG may be a reflection of hypertension. There had been found a linear correlation between the electrocardiographic changes with the severity and duration of the hypertension.³ Electrocardiographic evidences of left ventricular hypertrophy are highly predictive of cardiovascular complications in patient with hypertension and therefore particularly useful in risk assessment.⁴ LVH has been reported to be the first and commonest manifestation of

heart disease in hypertensive patients and frequently present after the age of forty.⁵ Several studies have shown that left ventricular hypertrophy (LVH) is an important risk factor in patients with hypertension, leading to a 5-10 fold increase in cardiovascular risk.⁶ So detection of LVH has become an important part of the cardiovascular risk assessment in hypertensive patients. The 12-lead surface Electrocardiogram has long been used as the major means for this purpose.⁷

A lot of studies had been conducted worldwide including India for the study of the electrocardiographic features in the study group. However, very few hospital based studies on ECG interpretation in hypertensive had been found in Allahabad District and had not been done community based (field study) study and seen on concerned topic. Objective was to study the Electrocardiographic features among the study participant.

METHODS

A community based cross-sectional study was carried out in Prayagraj District from September 2018 to September 2019. All males aged 30 or above were included and those not willing to participate or having any emergency condition were excluded in the study. Allahabad district was divided first in four quadrants and the list of ward in urban areas and villages in rural areas were drawn. One ward in urban area and one village in rural area were selected from each quadrant. For the selection of study participants, first house was selected randomly (Pen drop method) from the selected wards/villages. Then moving in a fixed direction, subsequent participants fulfilling eligibility criteria were selected from other household to achieve the required sample size for that ward/village. In case, the required sample size for each selected ward or village was not achieved, then the next nearby ward or

village was selected for completion of sample size. The data was analyzed using statistical software, SPSS Version 23. Chi-square tests was used to test the associations between the different variables. P value less than 0.05 was considered as significant.

This study has been approved by the institutional ethics committee, M.L.N Medical College, Prayagraj in the meeting held on 31- 07- 2018.

RESULTS

Figure 1 shows that number of hypertensive participants was 133 in urban areas and 122 in rural areas, in which 69 participants and 63 participants were untreated respectively. Rest of all were treated but 25 participants in urban areas and 18 participants in rural areas blood pressure was not controlled. Table 1, All the ECG parameters were normal except rate, PR interval and ST segment. Out of 16 participants with abnormal rate, 7 (2.75%) were hypertensive and out of 28 participants with abnormal PR interval 16 (6.27%) were hypertensive. 11 participants showed abnormal ST segment but none were hypertensive.

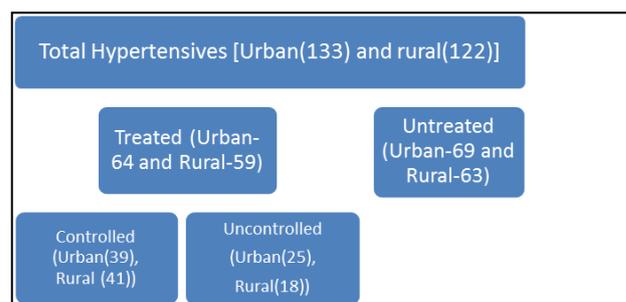


Figure 1: hypertension awareness, treatment, and control of study population.

Table 1: ECG features in study participants.

ECG interpretation	Normal (No. of participants)	Abnormal	Hypertensive	
			No.	%
Rhythm	620	0		
Rate	604	Bradycardia – 3		
		Tachycardia- 13	7	2.75
Axis	620	0		
P- Wave (LII, V1)	620	0		
PR Interval	592	28	16	6.27
QRS Complex	620	0		
ST Segment	609	11		
T- Wave	620	0		
QT	620	0		

Table 2: Number of left ventricular hypertrophy in study participants.

ECG	Urban (n= 360)		Urban hypertensive		Rural (n= 360)		Rural hypertensive	
	No.	%	No.	%	No.	%	No.	%
LVH	6	1.94	6	4.51	4	1.29	4	3.28

Table 2 showed percentage of study participants showing ECG abnormality in urban hypertension population was higher than that in normal urban population with 6 (4.51%) showing LVH. Percentage of study participants showing ECG abnormality in rural hypertensive population was higher than that in normal rural population with 9 (6.77%) showing LVH.

DISCUSSION

Anchala et al found prevalence of hypertension to be 33.1% in urban and 28.3% in rural south India.⁸ A study from Chennai has reported a prevalence of 22.1% out of which 37.3% were known hypertensives and among them only 50% were taking treatment. Among the hypertensive taking treatment only 41% had controlled hypertension.⁹

Our results differ from the above study. Near about half (48.24%) were already diagnosed with hypertension and all of them were taking treatment but only 65.04% among them were under control. Another Indian review article incorporating 88 studies published in 2014 reported the prevalence of hypertension in Kerala to be high ranging from 36.1% to 47% in different studies.¹⁰ This was comparable with our results.

Left ventricular hypertrophy is a cardinal manifestation of hypertensive cardiac damage. This target organ damage is strongly associated with increased cardiac events. In this study, the prevalence of LVH in hypertensive population was found to be 3.92%. LVH is a marker of severity of hypertension. It is an important cardiac risk factor and it has a substantial clinical significance on the course of cardiovascular events in terms of morbidity and mortality.¹¹⁻¹⁶ The prevalence rate of LVH observed in various previous studies in Kenya, Nigeria, South Africa and Ghana were 27.5%, 31.0%, 35% and 33.3% respectively.^{11,13,17-19} In this study, participants were selected from community but in study of Kenya, Nigeria, South Africa and Ghana, participants were selected from hospital, which had hypertension resulting in huge difference in prevalence of LVH features in ECG.

Limitation

Most morbidity was elicited by asking questions, self-reporting and simple clinical examination without any further confirmation by other laboratory investigations, because of which morbidity may have been underestimated or missed.

Strength

The strength of the study lies in the fact that very few comparative studies have been done on male participants to assess the morbidity pattern in Northern India, which will help to specify the need of non-hypertensive, pre hypertensive and hypertensive in these areas which will further contribute in strengthening the on-going

preventive and curative aspect of health services and better utilization of them.

CONCLUSION

Number of hypertensive participants was 133 in urban areas and 122 in rural areas, in which 69 participants and 63 participants were untreated respectively. Rest all were treated but among 25 participants in urban areas and 18 participants in rural areas blood pressure was not controlled. Features of Left ventricular hypertrophy, a cardinal manifestation of hypertensive cardiac damage, were found in ECG of 3.92% of hypertensive population among study participants.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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