Original Research Paper

Volume-9 | Issue-11 | November - 2019 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

General Medicine

A STUDY OF INTRAVENTRICULAR CONDUCTION ABNORMALITIES AND LEFT VENTRICULAR HYPERTROPHY IN SYSTEMIC HYPERTENSION

Dr. Triven Sagar Sandepogu	M. D., Assistant Professor Of General Medicine, Apollo Institute Of Medical Sciences & Research, Filmnagar, Hyderabad, Telangana-500096
Dr. Chennakesavulu Dara*	M.D., Assistant Professor Of General Medicine, Esic Medical College And Hospital, Sanathnagar, Hyderabad, Telangana-500038 *Corresponding Author
Dr. M. Sreedhar Sharma	M.D., Nephrologist, Kurnool Medical College, Kurnool, Andhra Pradesh.
Dr. Sunil Kumar. K	DNB(Gen.Med)., Assistant Professor Of General Medicine, Esic Medical College And Hospital, Sanathnagar, Hyderabad, telangana-500038

ABSTRACT Echocardiography is more sensitive investigation for the detection of left ventricular hypertrophy , Electrocardiogram is cost effective , can be applied to large populations and remains the initial investigation and useful tool to diagnose or exclude left ventricular hypertrophy and intraventricular conduction disturbances. In our study to study the prevalence of intraventricular conduction abnormalities in relation with hypertension.

KEYWORDS : Hypertension, Ventricular Hypertrophy, Conduction Disturbances

AIM OF THE STUDY:
To study the prevalence of intraventricular conduction disturbances in patients with systemic hypertension and also identify the most common type of intraventricular conduction disturbance.To study the prevalence of electrocardiographic evidence of left ventricular hypertrophy with or without strain in patients with systemic hypertension and also to identify the role of diastolic blood pressure and its effect on the prevalence of conduction disturbances.

MATERIALS AND METHODS:
Study was conducted in patients attending out patient unit of the Department of General Medicine , Government General Hospital,Vijayawada(Sidhartha Medical College) during the period between November 2016 - September 2017 .

METHOD:
Blood pressure measurement in all the four limbs, recumbent, sitting and s tanding postures were used. Routine urine analysis and Blood for Urea, cholesterol, Electrolyte and Creatinine.Complete clinical examination - to exclude the possibility of secondary hypertension. Standard 12 leads ECG. Those patients with abnormal ECG were followed up a week later with another ECG. Only patients with persistent ECG abnormalities were taken up for analysis. Intraventricular conduction disturbances and LVH were documented using s tandard ECG criteria as mentioned above.

INCLUSION CRITERIA:
1. Patient who have established hypertension.
2. Patients with consistent elevation of blood pressure over a period of three weeks only were taken up for ECG analysis.

EXCLUSION CRITERIA:
1. The patients with secondary hypertension , diabetes mellitus and chronic airway disease were excluded.
2. The patients with ISOLATED SYSTOLIC HYPERTENSION were excluded.
3. The patients with NON SUSTAINED hypertension were excluded.
4. Patients with clinical and ECG evidence of coronary artery disease, valvular heart disease and congenital heart disease were excluded from the study.

DISCUSSION:
From the results it is evident that intra ventricular conduction disturbances and left ventricular hypertrophy form one of the main ECG changes in hypertension. The occurrence of intraventricular conduction disturbances and le ft ventricular hypertrophy as a part of cardiovascular complications of hypertension is well known. The Framingham study has shown that the incidence of left ventricular hypertrophy and conduction disturbances is higher among hypertensives.

INTRAVENTRICULAR CONDUCTION DISTRUABNCES
A review of hypertension and left ventricular hypertrophy by Franz.H.Messerlt et al, s tates that the increased incidence of conduction disturbances in hypertensives is probably due to the increased fibrous tissue or altered collagen content(1) Martin et al in their recent electrophysiological studies have demonstrated that conduction disturbances develop in hypertrophied ventricles in the presence of myocardial ischaemia.(2) Many studies have proved the presence of coronary ischaemia in spite of normal coronary arteries in hypertension

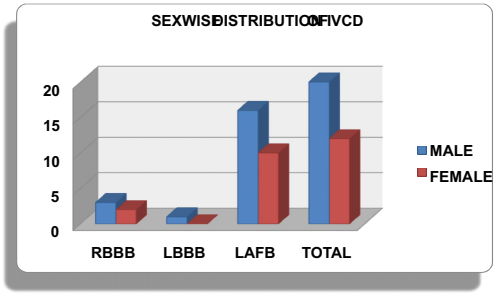
While describing about left ventricular hypertrophy as one of the causes of left deviation is probably not due to the hypertrophied mass as such, but to the associated subendocardial fibrosis involving the anterior fascicle of the left bundle.(3) Gopinath et al, in their three year follow up s tudy of hypertension in Delhi recorded ECG's of 1417 patients, out of which 237 patients (16 .7 %) had LVH with or without strain and 110 patients (7 .8 %) had intraventricular conduction disturbances.(4)

In our study, the prevalence of intraventricular conduction disturbances was slightly higher (10 .66 %) as opposed to 7 .8 % in the above study. The prevalence of LVH with or without strain in our study was 16 .33 % and it was 16 .7 % in the above study. The results of our s tudy correlate well with the above study.

While comparing the relative prevalence of various conductions defects in our study population, LAFB (8 .67 %) was more frequently observed than RBBB (1 .67 %) and LBBB (0 .33 %). This could be explained by the fact that the right bundle and the anterior fascicle of the left bundle are long thread like structures. In addition, the anterior fascicle of left bundle passes below the aortic valve in the left ventricular outflow tract, which is an area of high flow velocity and receives its blood supply from only one vessel, the left anterior descending coronary artery. The main left bundle divides closer to its origin than the right bundle, so that a relatively smaller area of the left bundle is vulnerable to interference. Hence hypertensive heart disease is more like ly to involve the left anterior fascicle and the right

bundle, which was confirmed by our study. LPFB was not observed in our study population.The compactness of the left posterior fascicle makes it the least vulnerable segment of the whole intraventricular conduction system.

SEX AND AGE DISTRIBUTION:



While considering the relative prevalence of various conduction defects in male and female hypertensives, it was 12 .50 % and 8 .57 % respectively. This indicates that conduction defects were observed almost equally in both sexes.

When patients were arbitrarily divided into two groups based on their age such as age > 50 yrs and age ≤ 50 years, the prevalence of intraventricular conduction defects were 14 .38 % and 5 .7 % respectively. The increased prevalence of conduction defects in older patients could be explained by the age related degeneration of the conduction system in addition to the subendocardial fibrosis induced by the hypertensive heart disease.

Irrespective of the type of conduction disturbance, most of these patients had increased diastolic BP (> 110 mmHg) . It was found that out of the 26 patients with LAFB, 19 of them had high BP. This suggests that a high diastolicBP leads to conduction disturbance as LVH and myocardial ischaemia secondary to hypertensive heart disease are common in patients with high blood pressure.

LEFT VENTRICULAR HYPERTROPHY SEX AND AGE DISTRIBUTION:

LVH	NUMBER OF MALES	NUMBER OF FEMALES	TOTAL
WITHOUT STRAIN	13	21	34
WITH STRAIN	8	7	15
TOTAL	21	28	49

The prevalence of LVH in male and female hypertensives were 13 .12 % and 20 % respectively. This clearly demonstrates that female hypertensives were slightly more prone to develop LVH. Several epidemiological studies on hypertension has shown increased incidence of LVH in females.(5,6,7) The prevalence of LVH in patients greater than 50 yrs of age and lesser than 50 yrs of age were 17 .5% and 15 % respectively. This shows that LVH is more likely to be observed in hypertensives who were older. In this regard. Simone et al in his s tudy of evaluation of concentric LVH in humans reports that the prevalence of LVH rises as age increases.(8)

Among the 49 patients with LVH, a majority of them (37 patients) had diastolic BP greater than > 110 mmHg. This shows that the likelihood of developing LVH increases with high blood pressures. This has been demonstrated in various studies.(9)

Among the 43 patients with LVH, it was observed that 7 of them had associated LAFB and 1 patient had RBBB.

Though an objective study was made regarding the number of years of hypertension and the occurrence of conduction disturbances and LVH, no decisive interference could be taken because many patients were aware of having hypertension only from the day they visited a doctor for some other complaint. Hypertension was accidentally detected by them. While some patients had symptoms referable to hypertension, they were having indigenous treatment or postponing consultation with a doctor for an indefinite period. So the exact duration of hypertension in them could not be assessed

CONCLUSION

This s tudy entitled "A study of intraventricular conduction abnormalities and left ventricular hypertrophy in systemic hypertension" included the study of 300 patients of systemic hypertension with the clinical presentation and ECG findings. The following conclusions were derived.

1. The prevalence of intraventricular conduction disturbance in systemic hypertension was 10 .66 % .
2. LAFB was the most common conduction disturbance in systemic hypertension followed by RBBB and LBBB. LPFB was not observed.
3. The distribution of conduction disturbances were almost equal in ma les and females.
4. Conduction disturbances were more common in the older age group.
5. The prevalence of LVH in systemic hypertension was 16 .33 %.
6. The prevalence of LVH without strain and with strain were 11 .3 % and 5 % respectively.
7. Female hypertensives were more likely to have LVH .
8. LVH was more common in the older age group.
9. Patients with conduction disturbances and LVH were more likely to have high diastolic BP.
10. The presence of intraventricular conduction disturbances and LVH in hypertensives indicates the need for more vigilant antihypertensive therapy.

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