



DURATION OF HYPERTENSION AS A PREDICTOR OF CARDIOVASCULAR EVENTS IN PATIENTS WITH DIASTOLIC DYSFUNCTION WITH NORMAL EJECTION FRACTION

General Medicine

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ABSTRACT

Hypertension is a major health problem and its complications have significant socioeconomic impact worldwide. Especially in a developing country like India, we are expected to face a phenomenal increase in the burden of chronic diseases in the near future. Most cases of diastolic dysfunction in patients with hypertension is an afterthought and is left undiagnosed and ignored due to a normal ejection fraction on echocardiography, causing increased morbidity and mortality. In our study assessment of correlation of ventricular diastolic dysfunction in hypertensive patients with normal left ventricular ejection fraction, with an aim of early identification. The present study was undertaken to determine the association of left ventricular diastolic dysfunction (DD) in hypertensive patients with normal ejection fraction and duration of hypertension at SGT Medical Hospital, Budhera. In our study 60 patients of hypertension attending the department of medicine were recruited. After a detailed history and physical examination, all patients were subjected to routine investigations and Doppler Echo cardiography. The association of the variables which were quantitative in nature were analysed using ANOVA. Spearman correlation coefficient was used to correlate duration of hypertension with grade of diastolic dysfunction. Final analysis was done with the use of Statistical Package for Social Sciences (SPSS). For statistical significance, p value of less than 0.05 was considered significant. DD was observed very early in the course of hypertension and hence early detection and management can help mitigate the mortality and morbidity associated especially in hypertensive patients. Doppler echocardiography can detect DD changes even before ECG changes appear and hence be a very apt non-invasive investigative methodology to detect left ventricular diastolic dysfunction in hypertensive to detect early LVDD even in cases with preserved EF.

KEYWORDS

INTRODUCTION:

Hypertension is attributable to be one of the major causes of diastolic dysfunction, which plays a major part in the pathogenesis of a large proportion of congestive heart failure cases. Diastolic dysfunction is now well established as a cause of left sided heart failure and a powerful predictor of cardiovascular events. Systemic hypertension is one of the most commonly associated conditions in patients with left ventricular diastolic dysfunction.¹

Diastolic Dysfunction has been defined as left ventricular diastolic dysfunction, with normal systolic function but however, without the diagnosis of congestive heart failure (HF). The pathogenesis of diastolic dysfunction involves abnormality of active ventricular relaxation and passive ventricular compliance leading to an elevation of ventricular end diastolic pressure and increased ventricular stiffness, at any given diastolic volume. Grade of diastolic dysfunction also has a prognostic value in relation to quality of life and longevity. The most common attributable cause of diastolic dysfunction is hypertension related changes, mainly left ventricular hypertrophy.³

Although, till the recent past a lot of importance was mainly accorded to systolic function of the heart in congestive heart failure, but over the last decade or so numerous studies have focused on the abnormalities of left ventricular diastolic function and the term diastolic dysfunction has taken centre stage. Diastolic dysfunction assessment in hypertensives can be an early indicator in assessing and planning future treatment strategies in patients.

MATERIAL AND METHODS:

The study was conducted in hypertensive patients from indoor patients department (IPD) and outpatient department (OPD) of SGT Medical

College and Hospital, Budhera, from November 2018 to October 2019.

Diagnosis of hypertension was made according to American Heart Association guidelines⁴

Examination was performed by cardiologist, a senior physician in assistance with research candidate, (PG student) of General Medicine at this institute. Echocardiography machine available for study was PHILIPS (SONOS). The transducer used was with a 2.5 MHz. All data were recorded with patient in left lateral position during end expiration apnea.

RESULTS:

Significant association was seen in the distribution of duration of hypertension (years) with grade of diastolic dysfunction. (p value < 0.05) Duration of hypertension (years) was ≤ 5 years in 31.25% of patients without diastolic dysfunction which was significantly higher as compared to 0% in grade I, grade II and grade III each.

Duration of hypertension (years) was 6-10 years in 100% of patients in grade III which was significantly higher as compared to 65.63% of patients without diastolic dysfunction, 69.23% in grade I and 70% in grade II. Duration of hypertension (years) was 11-15 years in 30.77% in grade I which was significantly higher as compared to 3.13% of without diastolic dysfunction, 20% in grade II and 0% in grade III.

Mean ± SD of duration of hypertension (years) in grade II (9.85 ± 4.61) was highest followed by grade I (9.35 ± 2.81), grade III (8.2 ± 1.64) and mean ± SD of duration of hypertension (years) in patients without diastolic dysfunction (6.53 ± 2.29) was lowest.

Duration of hypertension (years)	Absent (n=32)	Grade I (n=13)	Grade II (n=10)	Grade III (n=5)	Total	P value	Test performed
≤ 5 years	10 (31.25%)	0 (0%)	0 (0%)	0 (0%)	10 (16.67%)	0.007	Fisher Exact test
6-10 years	21 (65.63%)	9 (69.23%)	7 (70%)	5 (100%)	42 (70%)		
11-15 years	1 (3.13%)	4 (30.77%)	2 (20%)	0 (0%)	7 (11.67%)		
> 15 years	0 (0%)	0 (0%)	1 (10%)	0 (0%)	1 (1.67%)		
Mean ± SD	6.53 ± (2.29)	9.35 ± (2.81)	9.85 ± (4.61)	8.2 ± (1.64)	7.83 ± (3.15)	0.003	ANOVA; F value=5.092
Median (IQR)	6.75 (5-8)	8 (8-11)	8 (6.5-13.125)	9 (7-9)	7 (6-9)		
Range	3-14	6-15	6-19	6-10	3-19		

DISCUSSION:

In our current study we can conclude that diastolic dysfunction in hypertensive affects approximately 46% of hypertensive patients with normal ejection fraction, although a very strong positive correlation was observed in patients with the duration of hypertension more than an average mean of 9.85 years. Doppler echo is a better investigative tool for early assessment of diastolic dysfunction than ECG in routine clinical practice with more importance afforded to E/A ratio and deceleration time than E/e' ratio.

CONCLUSION:

Our study is accordance to most studies that hypothesised the importance of diastolic dysfunction despite of normal ejection fraction which can later progress to heart failure and cause morbidity and mortality to the patient. The results signify that despite of normal or insignificant ECG findings patients with long standing or uncontrolled hypertension should be screened for diastolic dysfunction to prevent silent progression of disease.

Diastolic dysfunction is an aspect of hypertensive complications that is left undiagnosed and ignored, due normal ejection fraction in echocardiography and can lead to heart failure in long run. If diagnosed early, then morbidity as well as mortality due to heart failure could be decreased.

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