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Abstract

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Purpose: To compare LA indices and cardiac indices among hypertensive with left ventricular diastolic dysfunction

Methodology: It is an echocardiographic based descriptive cross-sectional study. A total of 200 hypertensive patients were recruited from the cardiology clinics using systematic sampling method.

Results: The mean age of the study population was 58.7 ±13.96 (58.42±13.29 for Hypertensives) years while the median age was 59years.The female to male ratio was 1:6. Majority of the cases had isolated diastolic dysfunction n=149 (74.5%), thirty-six (18%) had normal diastolic and systolic functions while 7.5% had combined systolic and diastolic dysfunction (n=15). Left atrial maximum volume correlated significantly with E/E Prime (P= 0.003) and E/A Ratio (P= 0.003). While Left atrial pre-A wave volume (P=0.025), Left atrial diameter did not correlate with IVRT, E/E', E/A ratio.

Unique Contribution to Theory, Policy and Practice: Among the hypertensive patients E/E' significantly correlated positively with all phasic LA volumes compared to E/A ratio. LV mass independently predicted all LA phasic volumes. This study shows that E/E' should be used to assess diastolic function as against the frequently used E/A

Keywords: *Left Atrial Indices, Left Ventricular Diastolic Function, Hypertensive Patients*

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INTRODUCTION

The burden of cardiac diseases is a major problem in the world, with hypertension, ischaemic heart disease and cardiomyopathies as major causes of mortality amongst people. This is particularly worse in developing countries in Africa where there is increased burden of both communicable and non-communicable diseases (for which hypertension and cancers are prevalent). This result in loss of manpower, financial stress on care givers and may also have other socioeconomic implications.[1,2]

Hypertension particularly is found to be more prevalent amongs. Blacks. Patients with hypertension have many target organ damage for which heart disease is an example. Others include stroke and chronic kidney disease. Hypertension notably causes problems of impaired relaxation of the heart (diastolic dysfunction) and this has been found to impact negatively on the heart chamber size particularly the left atrium and left ventricle.[1]

As our understanding of diastology increases and with availability of non-invasive techniques like echocardiography, this will lead to increase in the early diagnosis of diastolic dysfunction (a notable risk factor for increased cardiovascular morbidity) especially so in patients with systemic hypertension.This study will help increase knowledge base and ultimately improve intervention since most hypertensives are asymptomatic in early stages of the disease.This will create opportunities for clinicians, policy makers and those at decision making levels to adopt solutions towards preventing progression into overt heart failure.

METHODOLOGY

It is an echocardiographic based descriptive cross-sectional study done in DELSUTH (Delta State University Teaching Hospital). A total of 149 hypertensive patiens with diastolic dysfunction were recruited from the cardiology clinics using systematic sampling method.P value less than 0.05 is regarded as significant.

Aims of the Study:

To compare echocardiographic left atrial indices with left ventricular diastolic dysfunction in hypertensives. Inclusion Criteria:1)Males and females ≥18years.2)Hypertensive patients,irrespective of,blood pressure control,whether on antihypertensive medications or not and duration of hypertension. Exclusion Criteria;1)Overt heart failure .2)Cardiomyopathy,3)Suboptimal echocardiographic images,4)Rheumatic valvular heart disease (regurgitation or stenosis),5)Non consenting patients,6)Patients with atrial fibrillation7) Pregnant women.

RESULTS

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Correlation between Left atrial Indices and Left Ventricular Diastolic Function among Hypertensive Patients (Cases)

LEFT ATRIAL INDICES	LEFT VENTRICULAR DIASTOLIC FUNCTION		
	Isovolumetric Relaxation Time	E/E Prime	E/A Ratio
	R (P-Value)	R (P-Value)	R (P-Value)
Left atrial diameter(mm)	0.018 (0.800)	0.119 (0.092)	0.018(0.796)
Left atrial maximum volume(mm^3)	0.108 (0.127)	0.208 (0.003*)	-0.210(0.003*)
Left atrial pre a wave volume(mm^3)	0.043 (0.545)	0.158 (0.025*)	-0.085(0.234)
Left atrial minimum volume (mm^3)	0.080 (0.263)	0.166 (0.019*)	-0.055 (0.437)
Left atrial diameter index(mm/m^2)	0.072 (0.312)	0.173 (0.014*)	-0.012 (0.862)
Left atrial maximum volume index(mm^3/m^2)	0.113 (0.111)	0.153 (0.031*)	-0.075 (0.289)
Left atrial pre a wave volume index(mm^3/m^2)	0.063 (0.377)	0.151 (0.033*)	-0.020 (0.776)
Left atrial minimum volume index(mm^3/m^2)	0.108 (0.129)	0.172 (0.015*)	-0.015 (0.832)

** = Pearsons Correlation Significant = P <0.05*

minimum volume (P=0.019), Left atrial linear diameter index (P=0.014), Left atrial maximum volume index (P=0.031), Left atrial pre a

Left atrial maximum volume correlated significantly with E/E Prime (P= 0.003) and E/A Ratio (P= 0.003). While Left atrial pre A wave volume (P=0.025), Left atrial minimum volume (P=0.019), Left atrial linear diameter index (P=0.014), Left atrial maximum volume index (P=0.031), Left atrial pre a wave volume index (P=0.033) and Left atrial minimum volume index (P=0.015) only correlated significantly with E/E Prime. Left atrial diameter did not correlate with IVRT, E/E', E/A ratio.

DISCUSSION

Among the hypertensive patients E/E' significantly correlated positively with all phasic LA volumes compared to E/A ratio which only correlated with LA maximum volume and no correlation was seen with LA linear diameter. The mitral E/E' which is derived from tissue Doppler may be better than mitral E/A ratio because the latter is more subject to loading conditions of the heart than the former. Also of note is that

Left ventricular mass, and pulmonary A wave duration were shown to be independent predictors of increased left atrial linear diameter amongst hypertensives with isolated LV diastolic dysfunction. LV mass independently predicted all LA phasic volumes (maximum, pre A wave and minimum). This finding is in agreement with that of Aje et al [3] who showed that LV mass was an independent predictor of left atrial size. Bamikole et al [4] demonstrated positively significant correlation between LA volume index and E/E' ratio. It can be deduced that progressive increase in left ventricular mass can herald changes in left atrial size which may be associated with cardiovascular events for this group of patients. This may warrant the need for echocardiographic assessments and monitoring for patients with early increase in left ventricular mass.

CONCLUSION

Among the hypertensive patient's E/E' significantly correlated positively with all phasic LA volumes compared to E/A ratio. LV mass independently predicted all LA phasic volumes

RECOMMENDATION

There is need for echocardiographic assessments and monitoring for hypertensives with early increase in left ventricular mass.

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