ABSTRACT

BACKGROUND
Persons suffering from Systemic Hypertension are likely to have cardiovascular side effects and this can be evaluated via a Doppler Echocardiography. Hypertension has been shown to be a good prognostic marker in the cardiovascular mortality. This study was done to detect the relationship between Hypertension and Left Ventricular Diastolic Dysfunction to evaluate its role in pathogenesis and its influence amidst other factors such as gender, smoking, hypercholesterolaemia and effect of lifestyle.

MATERIALS AND METHODS
153 random patients presenting with or already having been diagnosed with systemic hypertension and not having any renal disease, diabetes mellitus, IHD, cardiomyopathy, valvular heart disease, pericardial disease etc. Consent was taken from all patients. History and examination was done according to a proforma. Blood pressure was taken along with haematological and biochemical examination and ECG was done to rule out secondary hypertension and IHD. All those in the inclusion criteria were taken for Echocardiography and M-mode measurements were taken and EF was calculated.

RESULTS
55.6% were having diastolic dysfunction. Majority of them, i.e. 67 (72.8%) of those having diastolic dysfunction were from age group of 51 - 60 years. Overweight patients, i.e. 52 (33.98%) among which 27 (51.9%) were having diastolic dysfunction. 64 patients (41.8%) were having hypertension since 5 - 10 years, out of which 39 (60.9%) were having diastolic dysfunction. There are 3 patients above 15 years history of hypertension and all had diastolic dysfunction.

CONCLUSION
Our study revealed that there is positive co-relation of duration of hypertension with diastolic dysfunction. Other contributory factors found were greater age, male sex, urban population, obesity and smoking which contributed to development of diastolic dysfunction.

KEYWORDS
Hypertension, Diastolic Dysfunction.


BACKGROUND
The World Health Organisation attributes hypertension as the leading cause of cardiovascular morbidity and mortality and ranked third as a cause of disability-adjusted life-years. Nearly, one billion people are affected by hypertension worldwide and this figure is predicted to increase to 1.5 billion by 2025. The hypertension and cardiovascular disease burden is ever increasing globally. As estimated 17.3 million people, i.e. 30% of all global deaths are attributed to cardiovascular disease in 2008; in Indian scenario it is 29% of all deaths. The earliest detectable consequence of hypertension is diastolic dysfunction.

MATERIALS AND METHODS
Type of Study
Observational Study.

Duration of Study
July 2016 to June 2017

Place of Study
Shyam Shah Medical College and Associated S. G. M. H, Rewa.
Sample Size
This study was carried out on patients admitted to our hospital in Medicine wards from July 2016 to June 2017 (153 patients).

Inclusion Criteria
Patients with systemic hypertension.

Exclusion Criteria
- Renal disease.
- Diabetes mellitus.
- Ischaemic heart disease.
- Acute myocardial ischaemia.
- Chronic coronary heart disease.
- Cardiomyopathy (hypertrophic, infiltrative, restrictive).
- Valvular heart disease (Acute aortic or mitral regurgitation, Mitral stenosis, Aortic stenosis).
- Pericardial disease.
- Tamponade.
- Circulatory congestive states.
- Rapid fluid administration.
- Arteriovenous fistula.
- Severe anaemia.
- Thyrotoxicosis.
- Patients with congenital heart disease.
- Patients with LVEF is < 40%.
- Coarctation of aorta, Vasculitis, Collagen vascular disease.
- Primary hyperaldosteronism, Cushing syndrome, Pheochromocytoma, Congenital adrenal hyperplasia.
- Neurogenic causes include the following: Brain tumour, Bulbar poliomyelitis, Intracranial hypertension.
- Drugs and toxins that cause hypertension include the following: Alcohol, Cocaine, Cyclosporin, tacrolimus, NSAIDs, Erythropoietin, Adrenergic medications, Decongestants containing ephedrine, Herbal remedies containing liquirice or ephedrine.
- Other causes include the following: Hyperthyroidism and hypothyroidism, Hypercalcaemia, Hyperparathyroidism, Acromegaly, Obstructive sleep apnoea, Pregnancy-induced hypertension.

A written informed consent was taken from all patients, complete history and clinical examination done according to a proforma. Duration of hypertension was taken as the period from the diagnosis of hypertension until the time of assessment. Blood pressure is the measure before echocardiography and then staging was done according to JNC VII guideline, blood pressure was measured as a mean of two readings recorded on the right arm, measured under standardised conditions with the participant seated (after 5 mins rest).

Then patients were subjected to detailed clinical examination, routine haematological and biochemical examination and ECG was done to rule out secondary hypertension and IHD.

All those included for study were subjected for echocardiography and colour Doppler. Analysis was performed by using PHILIPS HD-7 and following parameters were measured: M-Mode measurements were taken, ejection fraction (EF) and other parameters were taken.

Statistical Analysis
Data was collected and analysed via Chi-square test to assess the categorical data presented as numbers and percentages. P value of 0.05 or less was considered statistically significant.

RESULTS

85 were males and 68 were females; 49 males i.e. 57.6% had diastolic dysfunction, while 36 females i.e. 52.9% had diastolic dysfunction.

Chi-square= 0.3388, P value= 0.6757 and hence it is not significant.

Most patients belonged to age group of 51 – 60, i.e. 92 patients and had the maximum number of patients with diastolic dysfunction.

Chi-square= 27.923, P value < 0.0001 and hence there is significant co-relation between age group and increasing chance of diastolic dysfunction.

Majority of patients, 91 (59.4%) were from urban areas where 59 (64.8%) were having diastolic dysfunction.

Among the 153 patients 62 (40.5%) were from rural areas, where 36 (58.1%) were found to be normal.

Chi-square= 7.832, P value= 0.0051 and there is significant co-relation between area of population and diastolic dysfunction.
Among the 153 patients, 64 (41.83%) were having hypertension since 5 - 10 years, out of which 39 (60.9%) were having diastolic dysfunction. There are 3 patients above 10 years of history of hypertension, all of whom are having diastolic dysfunction.

Chi-square= 14.481, P value is 0.0059 and hence there is a significant co-relation between duration of hypertension and prevalence of diastolic dysfunction.

Majority of patients, i.e. 96 (62.7%) were non-smokers, 55 (57.3%) were found to be normal. In 57 (37.3%) smokers, 44 (77.19%) were having diastolic dysfunction.

Chi-square= 17.225, P value is < 0.0001 and hence there is significant association with smoking and the presence of diastolic dysfunction.

**DISCUSSION**

Out of 153 patients of hypertension which we have screened, 85 (55.55%) were found to having abnormal diastolic function.

In 2006, Ike and VO Ikehi et al in study population of 69 males and 71 females found that prevalence of diastolic dysfunction in the hypertensive groups in this study was 82.86%. Majority, i.e. 67 (78.8%) of the patients of diastolic dysfunction were from the age group of 51 - 60 years out of 153 patients. Similar to this Margaret M Redfield and Steven J Jacobsen et al in 2003, cross-sectional survey found that out of 502 patients with diastolic dysfunction 272 were above 65 years.

In our study, out of 85 patients having diastolic dysfunction, 49 (57.6%) were males and 36 (42.4%) were females. Same results were found by Rolff Wachter and Claus Lüers et al in 2007. In their study, 439 hypertensive patients were selected for participation in this study. Sex-specific analysis revealed that diastolic function was mainly limited to the male subgroup.

Majority of patients, 91 (59.4%) were from urban areas out of which 59 (64.8%) were having diastolic dysfunction. Among the 153 patients 62 (40.5%) were from rural areas, out of which 26 on ARB (58.1%) were having diastolic dysfunction.

Chi-square= 24.904, P value < 0.05 and therefore there is significant association with type of lifestyle and presence of diastolic dysfunction.
Leslie W Miller and Emil D Missov in 2001, the duration of hypertension seemed to play a role in the development of diastolic dysfunction. Looking at the data, one may find it peculiar to have patients with less than 8 years history of hypertension have higher incidence of developing diastolic dysfunction (Refer interpretation of results). This may contradict the fact that patients with longer history of hypertension tend to have higher incidence of diastolic dysfunction.9

Majority of patients 96 (62.7%) were non-smokers, 55 (57.3%) were found to be normal. In 57 (37.25%) smokers, 44 (77.19%) were having diastolic dysfunction. In 2006 Osman Karakaya and Irfan Barutcu et al, thirty chronic smokers underwent a complete transthoracic echocardiographic examination found that acute cigarette smoking impaired both left and right ventricular diastolic function in chronic smokers.10 Majority of patients, 75 (49%) were having sedentary lifestyle and 57 (76.5%) were having diastolic dysfunction.

Louse Bennet and Charlote Larsson et al studied men and women of 30 - 75 years of age were consecutively invited for conventional echocardiography and tissue velocity imaging (n=1149). Structured questionnaires and physical examinations were conducted using standardised methods. Sedentary leisure time physical activity is independently associated with DD in females. Identification of a sedentary lifestyle in females increases the probability of diagnosing DD.11

Out of 84 patients with desirable cholesterol levels 47 (55.96%) were having normal diastolic function and out of 38 patients with high cholesterol levels 31 (81.57%) were having abnormal diastolic function.

Pasquale Palmiero and Maria Maiello et al in 2002 in a total of 200 consecutive postmenopausal women (mean age 47.5 ± 4 years) with mild-to-moderate hypertension were studied, in women with mild-to-moderate hypertension, high total cholesterol levels and low HDL levels are associated with impaired diastolic function.12 Among the 31 (20.2%) patients on ARBs 18 (58.1%) were found to be normal, similarly 26 on ARBs + H, 16 (57.7%) were normal. Out of 10 on blockers, 7 (70%) were having diastolic dysfunction. In combination, out of 7 who were on ARB + CC blockers 3(32.86%) were normal, 3 on Beta blockers + CC blockers, of which 2 (66.67%) were having diastolic dysfunction.

In our study we found ARB and ARB + H are much effective antihypertensive than others, and in combination ARBs and Calcium channel blockers are more effective than others.

Williams B and Lacy PS et al in 2006 recruited 2199 patients in 5 ASCOT centres found that optimal blood pressure reduction using agents such as diuretics, calcium antagonists and RAAS antagonists can reduce CV-related morbidity and mortality and is associated with enhanced myocardial relaxation, reduced central aortic stiffness and a dramatic reduction in the incidence of heart failure.13

CONCLUSION
• Based on the result of our study, we found that age was one of the factors that contribute to the development of diastolic dysfunction.

REFERENCES