

Prevalence of Diastolic Dysfunction in Asymptomatic Young and Middle Aged Individuals Attending a Tertiary Care Hospital

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Abstract

Background: Heart problem is a common health issue encountered these days. Hence; the present study was planned for assessing the prevalence of Diastolic Dysfunction in Asymptomatic Young and Middle Aged Individuals Attending a Tertiary Care Hospital. **Subjects and Methods:** A total of 200 patients were included in the present study. The study group comprised of patients who reported to the department for routine medical checkup. Echocardiography using color Doppler was done in all the patients. Physical examination was done to look for any evidence of cardiac involvement in each and every patient. The diastolic dysfunction was graded as; Grade 1: An isolated early relaxation abnormality, Grade 2: Impaired relaxation, but with modestly elevated Left ventricular end-diastolic pressure, and Grade 3: Restrictive filling. All the results were recorded in Microsoft excel sheet. **Results:** Diastolic dysfunction was found to be present in 50 patients. Therefore; prevalence of diastolic dysfunction was found to be 25 percent. Significant increase in the prevalence of diastolic dysfunction was seen among elderly patients. However; no significant correlation was seen among patients with diastolic dysfunction divided on the basis of gender. **Conclusion:** Diastolic dysfunction is a major health issue affecting a significant patient population. Also, increase in severity of diastolic dysfunction is found to be positive correlated with increasing age.

Keywords: Diastolic dysfunction, Prevalence.

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Introduction

Since the first report of the syndrome of heart failure (HF) with a preserved ejection fraction (HFpEF) nearly 30 years ago, the diagnosis, pathophysiology, and most effective therapies for diastolic dysfunction and HFpEF caused by diastolic dysfunction (ie, diastolic HF) have remained controversial.^[1- 3] One issue making the interpretation of the aforementioned reports difficult is that the prevalence of Left ventricular diastolic dysfunction (LVDD) cannot be easily compared, partially because of differing diagnostic criteria and/or divergent distributions of cardiovascular risk factors in the sampled population.^[4- 6] Hence; under the light of above mentioned data, the present study was planned for assessing the prevalence of Diastolic Dysfunction in Asymptomatic Young and Middle Aged Individuals Attending a Tertiary Care Hospital.

Subjects and Methods

The present study was conducted in the Department of Cardiology, Govt Medical College, Amritsar, Punjab to assess prevalence of Diastolic Dysfunction in asymptomatic young and middle aged individuals attending a tertiary care hospital. Before the starting of the study, ethical approval

was obtained. Also written consent was obtained from all the patients after explaining in detail the entire research protocol. A total of 200 patients were included in the present study. The study group comprised of patients who reported to the department for routine medical checkup. Echocardiography using color Doppler was done in all the patients. Physical examination was done to look for any evidence of cardiac involvement in each and every patient. Hematological tests like hemoglobin, white blood cell count, differential count, platelet count and prothrombin time were carried out in all the patients.

The diastolic dysfunction was graded based on echocardiographic findings based on criteria described previously in the literature as follows.^[7]

Grade 1: An isolated early relaxation abnormality.

Grade 2: Impaired relaxation, but with modestly elevated Left ventricular end-diastolic pressure

Grade 3: Restrictive filling

All the results were recorded and were analyzed by SPSS software. Chi- square test was used for assessment of level of significance.

Results

In the present study, a total of 200 patients were analyzed. Diastolic dysfunction was found to be present in 50 patients. Therefore; prevalence of diastolic dysfunction was found to be 25 percent. In the present study, among the patients with diastolic dysfunction, 50 percent had grade 1 diastolic dysfunction, 36 percent had grade 2 diastolic dysfunction, and remaining 18 percent had grade 3 diastolic dysfunction. Significant increase in the prevalence of diastolic dysfunction was seen among elderly patients. However; no significant correlation was seen among patients with diastolic dysfunction divided on the basis of gender.

Table 1: Prevalence of diastolic dysfunction

Parameter	Number of patients	Prevalence percentage
Patients with diastolic dysfunction	50	25

Table 2: Distribution of patients with diastolic dysfunction on the basis of severity

Diastolic dysfunction	Number of patients	Prevalence percentage
Grade 1 diastolic dysfunction	25	50
Grade 2 diastolic dysfunction	18	36
Grade 3 diastolic dysfunction	07	14
Total	50	100

Table 3: Age wise distribution of patients with diastolic dysfunction

Diastolic dysfunction	Age group			p- value
	Less than 30 years	30 to 50 years	More than 50 years	
Grade 1 diastolic dysfunction	5	8	12	0.02 (Significant)
Grade 2 diastolic dysfunction	4	6	8	
Grade 3 diastolic dysfunction	2	2	3	

Table 4: Gender wise distribution of patients with diastolic dysfunction

Diastolic dysfunction	Gender		p- value
	Males	Females	
Grade 1 diastolic dysfunction	13	12	0.55 (Non-Significant)
Grade 2 diastolic dysfunction	10	8	
Grade 3 diastolic dysfunction	4	3	

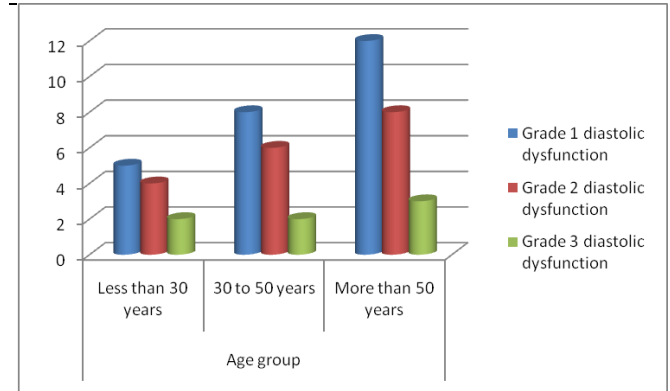


Figure 1: Age wise distribution of patients with diastolic dysfunction

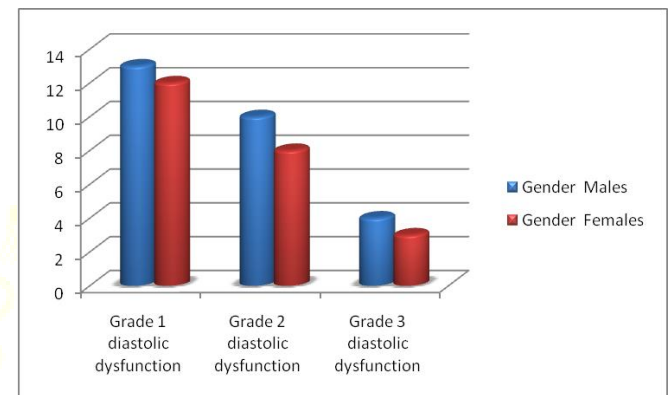


Figure 2: Gender wise distribution of patients with diastolic dysfunction

Discussion

Diastolic function reflects the ability of the heart to change its shape in order to receive blood from the venous system. This property of the heart is essential as it allows myocyte stretch and thus regulation of systolic output through activation of Frank Starling (heterometric) mechanism without necessitating a change in contractility.^[7]

Some of the confusion exists because diastolic dysfunction can be present in asymptomatic patients, patients with preserved EF, and patients with reduced EF. Moreover, not all cases of HFpEF or HF with reduced EF (HFrEF) are associated with diastolic dysfunction. Therefore, the relationship of diastolic dysfunction to the clinical syndrome of HF is somewhat ill-defined.^[8]Hence; under the light of above mentioned data, the present study was planned for assessing the prevalence of Diastolic Dysfunction in Asymptomatic Young and Middle Aged Individuals Attending a Tertiary Care Hospital.

In the present study, a total of 200 patients were analyzed. Diastolic dysfunction was found to be present in 50 patients. Therefore; prevalence of diastolic dysfunction was found to be 25 percent. Many mechanisms have been proposed. Recently, cardiac oxidative stress has been associated with diastolic dysfunction. Increased levels of cardiac reactive oxygen species (ROS) may explain some of the changes in Ca²⁺ handling proteins and the increased

Ca²⁺ sensitivity of myofilaments in diastolic dysfunction.^[9-11] In developed countries heart failure represents a heavy epidemiological burden, with a prevalence of 1–2% of the adult population, rising to $\geq 10\%$ among people with > 70 years of age. Diastolic heart failure (Heart Failure with preserved Ejection Fraction, HFpEF) accounts for a relevant proportion of all HF admissions, ranging from 22 to 70% according to its definition, setting, population age and sex, with the highest prevalence in the elderly.^[12]

Diastolic dysfunction may be present for several years before any symptoms occur and may represent the first phase of diastolic heart failure. Thus, it is important to detect diastolic dysfunction early and to start treatment before irreversible structural alterations and systolic dysfunction have occurred.^[13]

In the present study, among the patients with diastolic dysfunction, 50 percent had grade 1 diastolic dysfunction, 36 percent had grade 2 diastolic dysfunction, and remaining 18 percent had grade 3 diastolic dysfunction. Significant increase in the prevalence of diastolic dysfunction was seen among elderly patients. However; no significant correlation was seen among patients with diastolic dysfunction divided on the basis of gender. In a previous study conducted by Fischer M et al, authors identified abnormal diastolic function by echocardiography in an age-stratified population-based European sample. The overall prevalence of diastolic abnormalities, as defined by the European Study Group on Diastolic Heart Failure (i.e. age dependent isovolumic relaxation time (92-105 ms) and early (E-wave) and late (A-wave) left ventricular filling (E/A-ratio, 1-0.5)) was 11.1%. The prevalences of diastolic abnormalities and diastolic dysfunction are higher than that of systolic dysfunction and are increased (despite age-dependent diagnostic criteria) in the elderly.^[12] Kloch-Badelek M et al compared across populations age-specific echocardiographic criteria for diastolic LV dysfunction as well as their correlates and prevalence. The age-specific criteria for diastolic LV dysfunction were highly consistent across the study populations with an age-standardized prevalence of 22.4% vs. 25.1%.^[13]

Conclusion

Under the light of above obtained data, the authors conclude

that diastolic dysfunction is a major health issue affecting a significant patient population. Also, increase in severity of diastolic dysfunction is found to be positive correlated with increasing age.

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