SUMMARY

Background

Diabetes mellitus (DM) is a common and important non-communicable disease in Nigeria, especially among the urban and relatively affluent individuals. Its interaction with cardiovascular diseases (CVD) is well established, with CVD being the commonest cause of mortality in them. However, the influence of type 2 DM on Left ventricular (LV) structure and function is not well established, although there are suggestions that there are LV modifications in type 2 DM patients.

Objectives

This study evaluated LV function in type 2 DM patients using a non-invasive modality (echocardiography). The correlates and predictors of LV functions were also determined.

Patients and Methods

The study was carried out at the Cardiopulmonary Unit of the University of Ilorin Teaching Hospital, (UITH) Ilorin. One hundred and fifty type 2 DM patients consisting of 65 males and 85 females were consecutively recruited into the study from the Medical Out Patient Department (MOPD), Accident and Emergency (A/E) Department, medical wards and the General Out Patient Department (GOPD) of UITH, Ilorin, North-central Nigeria. They were age- and sex-matched with 150 normal healthy controls recruited from the same hospital community, mainly from the pool of patients presenting for medical fitness certification, artisans, students, hospital staff and other volunteers. Subjects that had any condition that may alter the cardiac morphology and function were excluded from the study. The subjects’ relevant clinical history was obtained and physical examination carried out on them. The fasting plasma glucose, glycosylated hemoglobin, fasting
serum lipid, electrolytes and urea profile were obtained. Electrocardiography and Transthoracic echocardiographic examination was carried out on them and indices of LV systolic and diastolic function assessed, according to the American Society of Echocardiography (ASE) recommendations.

Results

The mean age of the patients (55.4±11.6 years) was similar to that of the control subjects (54.2±9.6 years) (P=0.348). The average duration of diabetes mellitus in the patients was 4.53 years. Parameters of LV systolic function (ejection fraction and fractional shortening) were within normal range for both groups but were significantly better in patients than controls (EF% 70.3±10.69 vs 64.4 ± 9.36 p =0.001; FS% 41.1±10.45 vs 33.22±5.45 p= 0.001 respectively). The mitral EA ratio of LV diastolic filling was significantly lower in diabetic cohort as compared with controls (0.92±0.38 vs 1.32±0.27 p=0.001). Similarly, the early diastolic time (EDT) was lower (p=0.001) in diabetic than controls. However, the isovolumic relaxation time (IVRT) was higher in the diabetic patients ( p=0.001). The pulmonary venous flow (PVF) parameters did not show any statistically significant differences between patients and control. When analyzed holistically, most (72%) of the patients had LV diastolic dysfunction (LVDD) while 6% of controls had LVDD (p=0.001). Patients’ age, weights, LAD were the positive correlates and independent predictors of LVDD. LV mass index (LVMI) is also a positive correlate of LVDD.

Conclusion

The results of this study showed that there is a high prevalence of LVDD in the diabetic patients studied. Majority of these patients have the mildest form (impaired relaxation) of LV diastolic dysfunction. None of the patients had LV systolic dysfunction. Patients’ age, weight and LAD were positive correlates and independent predictors of severity of LVDD. No linear relationship
between the glycemic control and the degree of severity of LV dysfunction was shown. It is recommended that patients undergo regular cardiovascular evaluation to detect early changes of cardiac abnormality. Prompt and early use of drugs such as ARBs and ACE inhibitors that inhibit fibrosis and cardiac remodeling should be considered in diabetics.