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Research Article

FREQUENCY OF CARDIAC COMPLICATIONS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS AT TERTIARY CARE HOSPITAL

Dr. Syed Fasih Ahmed Hashmi¹, Dr. Mashooq Ali Dasti¹, Dr. Ghulam Hussain Baloch²,
 Syed Imran Zaidi³, Dr. Sumera Bukhari⁴ and *Dr. Zulfiqar Ali Qutrio Baloch⁵

¹Department of Cardiology, Liaquat University of Medical and Health Sciences (LUMHS)
 Jamshoro.

²Department of Medicine, Liaquat University of Medical and Health Sciences (LUMHS)
 Jamshoro.

³East Tennessee State University, Johnson City, TN

⁴St. Francis Medical Center, Trenton, New Jersey.

⁵Brandon Regional Hospital, Brandon, Florida.

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Abstract:

Objective: To determine the frequency of cardiac complications in patients with type 2 diabetes mellitus

Patients And Methods: The six months (July 2016 to December 2016) cross sectional descriptive study was conducted at Liaquat University Hospital Hyderabad, Sindh Pakistan. All the patients with type 2 diabetes mellitus since 5 years duration, ≥ 35 years of age and of either gender were enrolled in the study. After detail history, clinical examination and baseline investigations, the electrocardiography and echocardiography was performed to see the existence of any abnormal cardiac event. The data analyzed in SPSS 16 and frequency, percentages and mean \pm SD was calculated for study variables.

Results: During six months study period total 100 patients of type 2 diabetes mellitus were studied for cardiac complications. Majority of the patients were males (65%) and belonged to rural populated areas (72%). Coronary artery disease was the most predominant cardiac complication had 30% prevalence in diabetic population, 13% patients detected having silent ischemia; 17% of the total study had atrioventricular (AV) conduction disturbances. 10% diabetic individual had left ventricular hypertrophy (LVH), 9% had bundle branch block evidence on ECG while the tachy-arrhythmias were observed in 6% diabetic individuals.

Conclusion: The diabetes patients are more prone to acquire life threatening cardiac complication. Therefore strict glycemic control can reduce the risk of complications.

Keywords: Cardiac complications, Diabetes mellitus, Electrocardiography and Echocardiography.

Corresponding Author:

*Dr. Zulfiqar Ali Qutrio Baloch,
 Brandon Regional Hospital,
 Brandon, Florida.
 Email: zulfikar229@hotmail.com.

QR code



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INTRODUCTION:

It has been observed since several decades that diabetes mellitus is a major risk factor for cardiovascular mortality and morbidity [1,2]. Majority of diabetic population have evidence of cardiovascular disease at diagnosis and responsible for 70% to 80% hospitalization as well as mortality due to diabetes mellitus [3]. The rate of first myocardial infarction in patients with diabetes mellitus is consistent to the rate of recurrent infarctions in non diabetic population while the mortality rate from myocardial infarction is also significantly higher in patients with diabetes mellitus than non-diabetic population, leads to reduction to gain treatment opportunities once the acute event supervenes [4-8].

The atherosclerosis occupies 80% for entire diabetic mortality due to coronary artery disease [9,10]. The increasing burden of diabetes mellitus in the developing countries since years and the growing wave of cardiovascular diseases due to diabetes again a big health trouble facing by health authorities [11,12]. The racial variability bear a disproportionate burden of diabetes and coronary artery diseases [13,14] therefore, there is an increasing need to seek ways to prevent and ameliorate coronary artery diseases, also the prevalence for risk factors of coronary heart disease has been inadequately studied in under developing countries. Thus, this study was conducted at tertiary care hospital on diabetic population, in a view to observe the relationship between diabetes mellitus and cardiac complications as early identification and treatment can save the patients to develop life threatening complications.

PATIENTS AND METHODS: In this cross sectional descriptive study the type 2 diabetes mellitus patients were recruited from July 2016 to December 2016. The detail history was taken, clinical examination was performed and relevant

baseline investigations were advised and recorded on pre-designed proforma. The glycosylated hemoglobin was an additional test to evaluate the glycemic status. The cardiac complications were evaluated by electrocardiography and echocardiograms. Therefore, the inclusion criteria of the study were type 2 diabetic individuals since five years, ≥ 35 years of age and of either gender while the exclusion criteria of the study were subjects with peripheral vascular diseases, congenital heart or valvular heart disease and type 1 diabetic individuals. Regarding cardiac complications only disorders of the myocardium and coronary arteries with ECG and echocardiographic findings were considered to evaluate. The maneuvers were under medical ethics and financial burden were paid by collaboration of whole research team. The data analyses was saved and analyzed in SPSS 16. The results for categorical and continuous variable were computed as frequency / percentages and means \pm SD. Being a descriptive nature of study, no statistical test of significance was applied.

RESULTS:

Total one hundred patients with type 2 diabetes mellitus were recruited to detect the cardiac events via ECG and echocardiography. The mean \pm SD for whole population was 55.75 ± 6.82 . Majority of the subjects (72%) were belonged to rural areas of Sindh Province. The mean random blood sugar and fasting blood sugar in whole population was 222.85 ± 8.62 and 149.77 ± 7.94 . The glycosylated hemoglobin was observed as raised in 60% (10.65 ± 2.53) and 5% (5.10 ± 1.42) diabetic patients with cardiac complications and without cardiac complications whereas the means \pm SD for glycosylated hemoglobin of whole population was 9.56 ± 1.41 . The age, gender, electrocardiographic and echocardiographic observations in diabetic population are presented in Table 01-05.

Table 01: The Demographical Distribution

		GENDER		Total	
		Male	Female		
Age (yrs)	35-39	5	3	8	
		7.7%	8.6%	8.0%	
	40-49	22	5	27	
		33.8%	14.3%	27.0%	
	50-59	21	11	32	
		32.3%	31.4%	32.0%	
	60-69	17	8	25	
		26.2%	22.9%	25.0%	
	70+	0	8	8	
		.0%	22.9%	8.0%	
	Total		65	35	100
			100.0%	100.0%	100.0%

Table 02: The Presentation of Age and Electrocardiographic Findings in Diabetic Population

	E.C.G	AGE (yrs)					Total
		35-39	40-49	50-59	60-69	70+	
Normal	3	3	5	3	1	15	
	37.5%	11.1%	15.6%	12.0%	12.5%	15.0%	
Coronary artery disease	2	8	8	8	4	30	
	25.0%	29.6%	25.0%	32.0%	50.0%	30.0%	
Silent Ischemia	2	5	3	3	0	13	
	25.0%	18.5%	9.4%	12.0%	.0%	13.0%	
Av Conduction disturbance	1	6	6	4	0	17	
	12.5%	22.2%	18.8%	16.0%	.0%	17.0%	
Left Ventricular Hypertrophy	0	2	4	3	1	10	
	.0%	7.4%	12.5%	12.0%	12.5%	10.0%	
Bundle Branch Block	0	3	3	2	1	9	
	.0%	11.1%	9.4%	8.0%	12.5%	9.0%	
Tachy arrhythmias	0	0	3	2	1	6	
	.0%	.0%	9.4%	8.0%	12.5%	6.0%	
Total		8	27	32	25	8	100
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 03: The Presentation of Age and Echocardiographical Findings in Diabetic Population

	Echocardiography	AGE (yrs)					Total
		35-39	40-49	50-59	60-69	70+	
Normal	2	4	8	6	3	23	
	25.0%	14.8%	25.0%	24.0%	37.5%	23.0%	
Dilated Cardio-myopathy	2	6	7	2	1	18	
	25.0%	22.2%	21.9%	8.0%	12.5%	18.0%	
Regional wall motion abnormalities (RWMA)	4	14	16	14	4	52	
	50.0%	51.9%	50.0%	56.0%	50.0%	52.0%	
Diastolic Dysfunction	0	3	1	3	0	7	
	.0%	11.1%	3.1%	12.0%	.0%	7.0%	
Total		8	27	32	25	8	100
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 04: The Presentation of Gender and Electrocardiographic Findings in Diabetic Population

	ECG	GENDER		Total
		Male	Female	
Normal		11	4	15
		16.9%	11.4%	15.0%
Coronary artery disease		17	13	30
		26.2%	37.1%	30.0%
Silent Ischemia		8	5	13
		12.3%	14.3%	13.0%
Av Conduction disturbance		12	5	17
		18.5%	14.3%	17.0%
Left Ventricular Hypertropy		7	3	10
		10.8%	8.6%	10.0%
Bundle Branch Block		6	3	9
		9.2%	8.6%	9.0%
Tachy arrhythmias		4	2	6
		6.2%	5.7%	6.0%
Total		65	35	100
		100.0%	100.0%	100.0%

Table 05: The Presentation of Gender and Echocardiographical Findings in Diabetic Population

	Echocardiography	GENDER		Total
		Male	Female	
Normal		13	10	23
		20.0%	28.6%	23.0%
Dilated Cardio-myopathy		12	6	18
		18.5%	17.1%	18.0%
Regional wall motion abnormalities (RWMA)		35	17	52
		53.8%	48.6%	52.0%
Diastolic Dysfunction		5	2	7
		7.7%	5.7%	7.0%
Total		65	35	100
		100.0%	100.0%	100.0%

DISCUSSION:

Regarding coronary artery disease, Stephens, et al [15] observed evidence for cardiovascular disease (CVD) in diabetic population i.e. (58% coronary heart disease). Weitzman S, et al [16] concluded that diabetics had a higher proportion for anterior wall myocardial infarction with male gender predominance, consistent with present study. Ahluwalia G, et al [17] observed that the prevalence for silent ischemia in diabetic population was 25%. Wackers FJT, et al [18] detect Ischemic changes on ECG in asymptomatic diabetic subjects and found that silent myocardial ischemia occurs in one in five asymptomatic individuals with type 2 diabetes

mellitus. In present series the prevalence for silent ischemia is 13%. Runge M, et al [19] observed whether diabetes mellitus, alone responsible for disturbances for generation of impulse and conduction, and conclude that uncontrolled diabetes itself responsible for the development of atrio-ventricular conduction disturbances. In current series 17% patients had evidence observed to have AV conduction disturbances. Di Bonito P, et al [20] detected that the left atrial diameter, interventricular septum thickness and left ventricular mass index increased in diabetic population responsible for impairment of left ventricular diastolic function in subjects with type 2 diabetes mellitus. Bertoni

AG, et al [21] concluded that the prevalence of diabetes was higher in subjects with cardiomyopathy suggesting that the diabetes is independently associated with cardiomyopathy. In present series 18% of patients had dilated cardiomyopathy. Guzman E, et al [22] concluded that left bundle branch block in diabetic population indicates advanced cardiovascular impairment presenting with severe left ventricular systolic dysfunction. Thrainsdottir IS, et al [23] conducted that right bundle branch block had a strong relationship with persistent elevation of blood glucose level. In present study 9% diabetic subjects had evidence of bundle branch block. Ostgren CJ, et al [24] observed atrial fibrillation in patients with type 2 diabetes mellitus and hypertension and observed that 4% prevalence of atrial fibrillation in patients with type 2 diabetes mellitus and concluded that diabetes mellitus was significantly associated with a risk for atrial fibrillation in male and female population respectively. In present series 6% diabetic population had tachyarrhythmias

CONCLUSION:

Coronary artery disease was the most predominant cardiac complication with 30% prevalence in diabetic population, 13% patients detected having silent ischemia; 17% of the total study had AV conduction disturbances. 10% diabetic individual had LVH, 9% had bundle branch block evidence on ECG while the tachyarrhythmias were observed in 6% diabetic individuals.

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