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Frequency of diabetic retinopathy in patients of acute ST elevated myocardial infarction (STEMI).

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ABSTRACT… Objective: To determine the frequency of diabetic retinopathy in patients of acute ST elevated Myocardial Infarction (STEMI) in our population. **Study Design:** Cross Sectional study. **Setting:** Department of Cardiology, Lady Reading Hospital, Peshawar. **Period:** 20th November 2018 to 19th May 2019. **Material & Methods:** Detailed history was taken and previous records were reviewed to look for diagnosis of DM, followed by complete examination and investigations including FBC, LFTs, RFTs, ECG and echo to fulfill exclusion criteria. Fundoscopy was performed by two experienced cardiology trainees with riester ophthalmoscope. Consensus was made on ophthalmoscopy findings regarding the presence or absence of Diabetic Retinopathy (DR). **Results:** In this study a total of 189 patients were observed. Mean age was 43 years with SD ±11.23. Sixty six percent patients were male while 34% patients were female. More over 5% patients had diabetic retinopathy while 95% patients did not have diabetic retinopathy. **Conclusion:** Our study concludes that the frequency of diabetic retinopathy was 5% in patients of acute ST elevated MI in our population.

Key word: Acute, Coronaryartey Disease, Diabetic Retinopathy, ST Elevated MI.

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INTRODUCTION

Coronary artery disease (CAD) is a leading cause of mortality in patients with diabetes both type I and type II.[1-3] While macro vascular disease is the primary pathogenic mechanism underlying CAD in the general population, microvascular disease may play a prominent role in CAD development in diabetic individuals.[4-9]

Diabetic retinopathy (DR) is one of the important and lethal micro vascular complication of both types of diabetes. DR incidence and progression is linked to increased blood glucose level. In the United Kingdom Diabetes Prospective Study, good blood pressure control in isolation was associated with reduction in DR progression and loss of vision in type 2 diabetics patients.[10] Dyslipidemia as well is linked to increased in DR development regardless of hyperglycemic status of patients without concrete evidence in some of epidemiological study.[11–14] Result of recent research provides evidence that retinopathy is one of initial and common sign of vascular complications and is closely linked to the development of coronary artery disease (CAD).[15,16] Coronary atherosclerosis (CAS), manifest as an initial and subclinical manifestation of CAD, begins with the inflammatory activation of endothelial cells and the deposition of cells and extracellular matrix within the inner vessel wall, resulting in intimal thickening followed by accumulation of lipid and formation of thin fibrous cap resulting in soft plaque.[17,18] Calcified plaque formation start late in the course of development of atherosclerosis. Ischemia results when artery lumen is narrowed more than 70% due to increased intimal thickening. Therefore, accelerated CAS is one of the important cause of CAD in type II diabetes, which accounts for the higher rates of complications.

Diabetic retinopathy is a one of the important complication of microvascular disease in T2DM. The presence of DR along with increased risk of

CAD could not be clearly defined. Few studies have provided inconclusive results regarding the association of retinopathy with CAD risk in diabetic patients.[17-23] However, in a number of studies conducted in Taiwan, Europe, America, Turkey the frequency of coronary artery disease in patients with diabetic retinopathy has been 70%, 71.5%, 73.9% and 81%.[24-28] On the other hand, Fawzia et al[29] reported 80% stenotic CAD in patients with DR. Gimeno-Orna et al[30] also elaborated DR as a risk factor for CAD. In another study forty percent diabetic patient with CAD had DR as well, which was confirmed by non-mydriatic fundus images.[31]

The idea of doing this study came to us after carefully reviewing the literature where we found that still little evidence is available regarding frequency of diabetic retinopathy in patients of acute ST elevated MI in our population. We want to determine the frequency of diabetic retinopathy in patients of acute ST elevated MI in our population in this study. Once the frequency will be known, which is not known in our population yet we will be able to identify the high risk population for AMI just by looking for diabetic cardiovascular events.

MATERIAL & METHODS

This cross-sectional study was conducted at Department of Cardiology, Lady Reading Hospital, Peshawar from 20th November 2018 to19th May 2019. Sample size was calculated as 189, using WHO sample size calculator and keeping 40% prevalence of DR in patients with CAD[31], at 95% confidence interval and 7% margin of error. Sampling Technique was Non-probability consecutive sampling. The study was conducted after approval from hospitals ethical committee (Ref. No. 34/LRH). All patients meeting the inclusion criteria were included in the study through OPD or Emergency Department. The purpose and benefits of the study was explained to all patients and an informed consent was taken.

Patients of both genders, aged 20 to 60 years, with history of diagnosed diabetes mellitus for at least seven years presenting to cardiology unit with acute ST elevated MI within 24 hours of diagnosis of STEMI were in included in the study. Detailed history was taken and previous records was reviewed followed by complete examination and investigations including FBC, LFTs, RFTs, ECG and echo cardiography to fulfill exclusion criteria. Patients were excluded if they have ; Previous history of acute coronary syndrome, angioplasty or bypass surgery, congenital heart disease, cardiomyopathy, heart failure, having hypertensive retinopathy, patients with cataracts or history of cataract surgery, patients with other retinal diseases like pan retinitis, maculopathies etc, patients with conjunctivitis and other conjunctival diseases like pterygium etc. patients with history of retinal photo coagulation. The above variables if included will result in confounder's bias.

Fundoscopy was performed by two experienced cardiology trainees with RIESTER ophthalmoscope. Consensus was made on ophthalmoscopy findings regarding the presence or absence of DR. All the above mentioned information was recorded to a predesigned proforma. Strict inclusion and exclusion criteria had followed to minimize bias. Patients were labelled as having DR if they have, micro aneurysms, Dot and blot hemorrhages, venous beading, and cotton wool spots in retina on fundoscopy. If these features are not present patient was not be having DR. Patients who are already diagnosed cases of diabetes mellitus were included in study. Patients were labelled as having diabetes mellitus if they had a fasting blood sugar level of 126 mg/dl or more at the time of diagnosis of DM or random blood sugar level of 200 mg/dl or more at the time of diagnosis of DM. For this purpose, records were reviewed of every patient. Patient were labeled as Acute ST elevated myocardial infarction if they have central, retro- sternal, constant throbbing chest pain for more than four hours with ST segment elevation of more than 1mm in limb leads and 2mm in chest leads in ECG.

The collected data was stored and analyzed in SPSS version 20 for windows. Continuous data like age, weight, height, BMI were calculated as mean and standard deviation. Categorical variables like gender, smoking, HTN, type of MI

and diabetic retinopathy were represented as frequencies and percentage. diabetic retinopathy were stratified for age, gender, smoking, HTN, BMI, type of MI. Post stratification chi-square test was applied in which P-value ≤0.05 was taken as significant. All results were presented in the form of tables, graphs, and charts.

RESULTS

In this study age distribution among 189 patients was analyzed as 57(30%) patients were in age range 20-40 years, 132(70%) patients were in age range 41-60 years. Mean age was 43 years with SD ±11.23. Gender distribution among 189 patients was analyzed as 125(66%) patients were male while 64(34%) patients were female. Among 189 patients 155(82%) were hypertensive while 34(18%) patients were not hypertensive. Among 189 patients 79(42%) patients were smokers while 110(58%) patients were not smokers. Among 189 patients 123(65%) patients had anterior MI while 66(35%) patients had Inferior MI. Among subjects 119(63%) patients had BMI <30 Kg/m2 while 70(37%) patients had BMI <30 Kg/m^2 as shown in Table-I.

Status of diabetic retinopathy among 189 patients had was analyzed as 9(5%) patients had diabetic retinopathy while 180(95%) patients didn't had diabetic retinopathy (Table-II).

Stratification of diabetic retinopathy with respect to age, gender, smoking, HTN, BMI, type of MI is given in Table-III.

DISCUSSION

Acute myocardial infarction (AMI) is one of the most common medical emergencies worldwide with significant morbidity and mortality. At present, it affects 3 million individuals annually. The adversity of AMI is reduced in recent years due to better understanding of Pathophysiology and advancement in preventive care, diagnostic capability and therapies for AMI with gross reduction in mortality rate from 25 to 30 percent in 1960s to current 6 percent. Cardiac arrhythmias and mechanical complications that result in cardiogenic shock are important causes of mortality in AMI.

Variables	Frequency	Percentage
Age (mean=43±11.23)		
20-40year	57	30%
41-60 year	132	70%
Gender		
Male	125	66%
Female	64	34%
Hypertension		
Yes	155	82%
No	34	18%
Smoking		
Yes	79	42%
No	110	58%
Type of STEMI		
Anterior	123	65%
Inferior	66	35%
BMI		
(mean=28 Kg/m^2 ±11.23)	119	63%
<30	70	37%
>30		

Table-I. Baseline Characteristics (n=189).

Diabetic Retinopathy	Frequency	Percentage
Yes	9	5%
No	180	95%
Total	189	100%

Table-II. Diabetic Retinopathy.

Variables	Diabetic Retinopathy		P-Value
	Present	Absent	
Age			
20-40	3	54	0.8316
41-60	6	126	
Gender			
Male	6	119	0.9725
Female	3	61	
Hypertension			
Yes	7	2	0.7347
No	148	32	
Smoking			
Yes	4	75	0.8690
No	5	105	
STEMI			
Anterior	6	117	0.9184
Inferior	3	63	
BMI (kg/m^2)			
<30	6	113	0.8136
>30	3	67	

Table-III. Stratification of diabetic retinopathy w.r.t various variables (n=189).
Chi square test was applied in which P value

Our study shows mean age was 43 years with SD ±11.23. Sixty six percent patients were male while 34% patients were female. More over 5% patients had diabetic retinopathy while 95% patients didn't had diabetic retinopathy.

Similar findings were observed in other studies conducted by Rong J et al[24], Pradeepa R et al[25] and Xie J[26] in which the frequency of CAD in patients with DR has been 70%, 71.5%, 73.9% and 81%. On the other hand, Fawzia et al[29] reported 80% stenotic CAD in patients with DR. with Gimeno-Orna et al[30] also elaborated DR as a risk factor for CAD. In another study forty percent diabetic patient with CAD had DR as well, which was confirmed by non-mydriatic fundus images.[31]

In a study conducted by Raj BK et al[32], they had mentioned that the presence of microvascular diabetic complications was more with nephropathy then with retinopathy (62 vs 58%). Neuropathy was not documented. Approximately, thirty two (32%) of patients were having no microvascular complications. Other macrovascular diabetic complications were not documented. Twenty four percent (24%) of ACS patient developed hypotension only as a complication while 76% had no complication at all. None of the patient died. Systolic dysfunction was present in eighty two percent (82%) and diastolic dysfunction in 66%. Sixty two patients had very high glycaled hemoglobin level (i.e HbA1c >7%) while 32% of patients had their HbA1c level in the control range.

CONCLUSION

Our study concludes that the frequency of diabetic retinopathy was 5% in patients of acute ST elevated MI in our population.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

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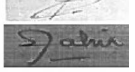
1	Sanaullah	Concept & Design of study, Revising critically, Final approval of version.	
2	Syed Tahir Shah	Drafting, Data analysis, Revising critically.	
3	Abdul Salar Khan	Drafting, Data analysis.	
4	Noor ul Hadi	Data analysis, Revising critically.	
5	Naveed Ahmad	Drafting, Data analysis.