

SPECTRUM OF SEVERITY OF CORONARY ARTERY DISEASE AMONG DIABETICS WITH DIABETIC RETINOPATHY

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Contribution

MA conceived, designed and did statistical analysis & manuscript writing. MSJ, ZUZ and SAH, did data collection and manuscript writing. AMG did review and final approval of manuscript

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ABSTRACT

Objective: To determine the spectrum of severity of coronary artery disease (CAD) among diabetics with diabetic retinopathy (DR).

Methodology: This cross-sectional study was carried out in Cardiology department, Lady Reading Hospital Peshawar from 11 Nov, 2017 to 10 March, 2018. All patients fulfilling the inclusion and exclusion criteria were enrolled in study by using non-probability sampling. After written, informed consent, patients were subjected to detailed history taking and physical examination, followed by fundoscopic examination of eye and angiography for CAD. Based on fundoscopy patients were classified in non-Diabetic Retinopathy (DR), pre proliferative DR (pre-PDR) and proliferative DR (PDR). Angiographic severity of CAD categorized patients into non-CAD, mild, moderate and severe CAD depending on number of vessels involved. Data was analyzed in SPSS 20.

Results: Total of 103 patients were included with mean age of 54+ 8.1 years of which 68% were males. Mean duration of DM was 7.1 + 2.6 years, 26.2% patients had history of CAD with 10.6% STEMI and 15.5% NSTEMI, 30.09% patients had no DR while 50.4% and 15.4% were categorized as pre PDR and PRD respectively. About 26.2% patients had no CAD while 36.9%, 21.3% and 11.6% fell in category of mild, moderate and severe CAD respectively.

Conclusions: Diabetic Retinopathy and CAD are strongly related and increase in stage of Diabetic Retinopathy increases the severity of CAD.

Key Words: Coronary Artery Disease, Diabetic Retinopathy

INTRODUCTION

The worldwide increasing incidence of DM is posing significant economic and social constraints to health care system.¹ Type II DM became the ninth ranked cause of mortality worldwide in 2008.² The association of DM with dyslipidemia, obesity, HTN, NAFLDis proved in different studies.³ Diabetes is also known to be associated with a number of complications including retinopathy, nephropathy, neuropathy, macro vascular complication including Peripheral arterial disease, CAD etc. A lot of data available suggests that newly diagnosed or undiagnosed DM poses greater risk for morbidity and mortality as compared to diagnosed DM.⁴ In a report published in German population, data suggest that 40 percent of population between 55-74 years had impaired glucose tolerance and were undiagnosed or newly DX diabetics.⁵ Another study reports on a cohort undergoing cardiac bypass that patients with newly diagnosed or undiagnosed DM had significant high mortality and morbidity as compared to non-diabetics.⁶ Diabetes has a major effect on micro vascular changes, in renal and retinal vasculature.⁷ Also data is available on DM as a leading cause of CAD, increasing risk of CAD by 2 to 3 folds.⁸ However, limited data is available for the association between micro and macro vascular complication, and whether the macro vascular insult increases with the increase in grade of micro vascular complications. Our current study is focused to find the spectrum of severity of CAD with the increase in the grade of DR. Once the spectrum is known, we will be able to assess the probability of severity of CAD by examining the DR status. The aim of the study was to determine the spectrum of severity of coronary artery disease (CAD) among diabetics with diabetic retinopathy (DR).

METHODOLOGY

This cross sectional study was conducted in Lady Reading Hospital Peshawar after approval from hospital ethical board from November, 2017 to March, 2018. All the patients with history of DM for at least 3 years and taking treatment either with insulin or oral hypoglycemics (OHG), presenting to hospital for coronary angiography indicated for assessment of CAD were included in the study by using non probability

consecutive sampling. Patients with history of other ocular pathologies like hypertensive retinopathy, cataract, cataract surgery, pan retinitis were excluded from the study. Written informed consent was taken from all included patients. Patients were subjected to detailed history taking including history of diabetes, duration of DM, HTN, smoking, family history of CAD, previous history of CAD including AMI, cardiac procedures including angiography, PCI, CABG. All the data was recorded in a pre designed proforma. Included patients underwent thorough clinical exam. Diabetic retinopathy was assessed by two senior, experienced trainees of cardiology by using hand held Riester ophthalmoscope and categorized patients into non DR, pre proliferative DR and proliferative DR. Patients with pre PDR had AV nipping, cotton wool spots, dots and blot hemorrhage on fundoscopic examination. Patients with PDR showed neo vascularization in retina.

All the included patients under went coronary angiography under Semins Artis 2005 machine in cath: lab by experienced cardiologist and were categorized into no CAD, mild CAD, moderate CAD and severe CAD. Patients with SVD involvement of > 60 percent with caliber of > 1.5 mm were labeled as mild CAD. Similarly, patients with DVD and TVD were labeled mod: CAD and severe CAD respectively. All the data was recorded in a predesigned proforma. The statistical analyses was performed in SPSS.v.20. Data regarding continuous variable like age were recorded in mean \pm SD. Data of categorical variable like gender, HTN, smoking etc, was recorded in frequency and percentages. Cross tabulation was done between CAD and DR.

RESULTS

A total of 103 patients were included in the study with a mean age of 54.0 ± 8.1 years. Of them 68% were males and 32% were females with a mean duration of DM of 7.1 ± 2.6 years. About 26.2% of included patients had a history of known CAD, 10.6% had a history of STEMI, 15.5% had a history of NSTEMI, 21% were post PCI while 4.8% had a history of CABG. Base Line Characteristics are given in table 1. Fundoscopy was performed for all the included patients and result of fundoscopy are summarized in table 2.

Table 1: Demographic Variables of Study Population (n=103)

Variable	Mean \pm SD	Frequency (n)	Percentage %
Age (years)	54.0 \pm 8.1		
Male		70	68
Female		33	32
HTN		52	50.5
Smoking		55	53.4
Family Hx		27	26.2
DM duration (years)	7.1 \pm 2.6		
HbA1c (gm%)	7.7 \pm 1.4		
Hx: of CAD		27	26.2
STEMI hx:		11	10.6
NSTEMI hx:		16	15.5
Post PCI		22	21
Post CABG		5	4.8

Assessment of CAD was done in cath lab by coronary angiography and patients were categorized in no CAD, mild, moderate, severe CAD. Angiography findings are summarized in table 3.

Cross tabulation of DR vs CAD was done and results are

shown in table 4. It is evident that highest no of patients with no DR had no CAD while none of the patients with no DR had severe CAD. Also we saw that patients with PDR had either severe CAD or moderate CAD. On the other hand, in our sample all patients with severe CAD had PDR.

Table 2: Fundoscopy Results os Study Population (n=103)

Variable	Frequency (n)	Percentage (%)
No Diabetic retinopathy	31	30.1
Diabetic retinopathy	72	69.9
Pre proliferative DR	52	50.4
Proliferative DR	20	19.5

Table 3: Coronary Angiography Results of Study Population (n=103)

Angiography results	Frequency (n)	Percentage (%)
No CAD	27	26.2
Mild CAD	38	36.9
Moderate CAD	22	21.3
Severe CAD	16	15.6
LMS disease	5	4.8
LAD disease	41	39.8
Lcx disease	52	50.5
RCA disease	64	62.1

Table 4: Cross Tabulation of CAD VS DR

		Diabetic Retinopathy			
		No DR	Pre PDR	PDR	Total
CAD	no CAD	17	10	0	27
	Mild CAD	12	26	0	38
	Moderate CAD	02	16	4	22
	Severe CAD	0	0	16	16
	Total	31	52	20	103

DISCUSSION

Framingham Heart Study in 1974 elaborated a statistically significant 2-3 fold increase in diabetics in cardiovascular morbidity and mortality even after adjustment of various other risk factors.^{9,10} In a study published by Chicago Heart Association, almost similar results was demonstrated for those having abnormal FBS.¹¹ In another study data published on 29.6% diabetes and 5.2% newly diagnosed diabetes, significantly higher proportions of complication relating intubation and resuscitation were noted among diabetics and newly diagnosed diabetics as compared with general population.⁶ Previously a number of studies and even the prospective cohorts had reported the increased numbers of cardiovascular events among diabetics as compared with non-diabetics.¹²⁻¹⁵ In EURODIAB a prospective study for complication of CAD, demonstrated that with increasing

grades of DR the risk of cardiovascular disease increased among white population.¹⁶ Wisconsin's epidemiologic study stated on increase in cardiovascular mortality with increasing grades of DR.¹⁷ Miettinen et al reported in Finnish diabetics the association of PDR with cardiac morbidity even after controlling various risk factors.¹⁸ A recent Japanese study also reported the same after adjusting confounding variables.¹⁹

Our study was unique in a sense that we compared the extent of DR with angiographic severity of CAD. We also saw extent of disease in vessels on angiography. In this study we found that both DR and CAD were closely related. We demonstrated that with increasing stage of DR the severity of CAD increased. As patients with no DR had no CAD. Also the largest number of patients with pre PDR had mild CAD. While patients with PDR had predominantly severe CAD. Also

it was obvious that, none of the patients with severe CAD were either in pre PDR group or NDR group. Also we noticed that none of the patients in NDR group had Severe CAD.

LIMITATIONS

However, several limiting constraints of this study were; loss of follow up, self-reported co morbidities and lack of establishment of individual correlation between diabetes and micro vascular complications as well as diabetes and macro vascular complications.

CONCLUSION

The present study demonstrated a clear relationship of severity of CAD with increasing stage of DR. The results suggested that DR should be vigorously checked in diabetics to estimate the severity of CAD.

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