ORIGINAL ARTICLE

Prevalence of left main Coronary Artery Disease with Diabetes and Hypertension in STEMI patients

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ABSTRACT

Aim: To determine the association of left main stem disease with diabetes and hypertension in STEMI patients underwent coronary angiography

Methodology: This study was conducted at Department of Cardiology, Sheikh Zayed Hospital, Lahore during January to June 2019 where 220 patients with age ranging from 40-70 years whether male or female, presenting with STEMI, In Exposed Group: Patients presenting with STEMI having diabetes and hypertension and Unexposed Group: Patients of STEMI without diabetes and hypertension. We excluded all cases with recurrent MI or undergoing recurrent PCI (on medical record), valvular heart disease, and cardiogenic shock. Then two groups were formed i.e. exposed group with diabetes and hypertension and unexposed group without diabetes and hypertension. All patients underwent angiography by a senior consultant cardiologist with assistance of researcher. On angiography, presence of LMS disease was $\geq 50\%$ occlusion (stenosis) in LMS artery. Angiography reports were assessed and LMS disease was noted labeled. Patients with LMS disease was managed as per hospital protocol.

Results: In this study risk of LMS was higher among exposed group as compared to un exposed group. i.e. exposed: 19.1% & Unexposed: 5.5%, RR=3.50 The risk of LMS among exposed group was higher for patients in the age group 51-60 years (RR=8.00), for male patients (RR=5.76) risk for LMS was higher as compared to female patients in exposed group, patients with normal BMI (RR:2.20) and patients with shorter duration of STEMI in exposed group had higher risk for LMS (1-4 weeks: RR=7.54).

Conclusion: Results of this study showed that hypertensive and diabetic patients presenting with STEMI had higher risk for LMS disease.

Keywords: Left main stem, Diabetes, Hypertension, Coronary, Angiography

INTRODUCTION

ST-elevation myocardial infarction with left main coronary artery disease (CAD) is one of the most life-threatening conditions in daily clinical practice.¹ The patients with severe left main stem (LMS) stenosis have a very high risk of mortality and morbidity as it supplies almost 84% of left ventricle in left dominant system.. Mortality rate of significant LMS disease is 50% at 3 year if treated medically.² ST-Elevation Myocardial Infarction (STEMI) has special consideration due to significant contributor to morbidity and mortality.³ Among STEMI patients Diabetes mellitus is one of serious⁴ and hypertension is one of the most common⁵ risk factors for CAD. Hypertension does not have significant impact on mortality in patients with STEMI going for coronary angiography.^{6,7} But the consequences of hypertension and diabetes in patients with ACS going for percutaneous coronary intervention (PCI) were studied well. However, the long term consequences of both hypertension and diabetes in patients undergoing PCI is not clear.

The frequency of diabetes mellitus and hypertension is increasing due to aging, urbanization, obesity, and sedentary lifestyle. The mortality and morbidity due to CAD is increased in DM patients. DM patients have more advanced CAD disease than non-diabetics.⁹ Hypertension is one of the most common⁴ risk factors for CAD. It has been noticed from literature that LMS was significantly high in patients with risk factors like diabetes and hypertension. But, discrepancy in Prevalence of left main stem disease in patient presenting with STEMI with diabetes and hypertension also noted. One study showed that frequency of LMS was 13.2% in patients with diabetes and hypertension and 3.8% in patients without diabetes and hypertension ($p=0.008$)¹⁰. Another study also showed that frequency of LMS was 3.0% in patients with diabetes and hypertension and 1.1% in patients without diabetes and hypertension ($p=0.002$)¹¹. There is lack of local data which could help us to predict LMS disease in diabetics and hypertensive patients and make treatment plan accordingly.

Rationale of this study is to determine the association of LMS disease with diabetes and hypertension in patients underwent coronary angiography. This study was done to attain local evidence which in future would help us in

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implementing the screening and plan management strategies in STEMI patient for LMS disease, to prevent the hazardous consequences.

METHODOLOGY

This study was conducted at Department of Cardiology, Sheikh Zayed Hospital, Lahore during January to June 2019 where 220 patients with age ranging from 40-70 years whether male or female, presenting with STEMI, In Exposed Group: Patients presenting with STEMI having diabetes and hypertension and Unexposed Group: Patients of STEMI without diabetes and hypertension. We excluded all cases with recurrent MI or undergoing recurrent PCI (on medical record), valvular heart disease, and cardiogenic shock. Then two groups were formed i.e. exposed group with diabetes and hypertension and unexposed group without diabetes and hypertension. All patients underwent angiography by a senior consultant cardiologist with assistance of researcher. On angiography, presence of LMS disease was $\geq 50\%$ occlusion (stenosis) in LMS artery. Angiography reports were assessed and LMS disease was noted labeled. Patients with LMS disease was managed as per hospital protocol. Data was taken and analyzed in SPSS version 21. Mean $\pm$ SD for BMI, age, duration of STEMI was analyzed. Frequency and percentage was analyzed for LMS and gender. To measure relation between LMS and diabetes plus hypertension relative risk was analyzed. $RR > 1$ was taken as significant.

RESULTS

Means age of patients in exposed and unexposed group was 57.76 ± 8.71 and 56.27 ± 9.44 years. In exposed group 63(57.3%) patients were male and 47(42.7%) patients were female. In unexposed group 66(60%) patients were male and 44(40%) were female. Mean BMI of patients in exposed and in unexposed group was 29.68 ± 5.66 and 32.86 ± 4.41 . Mean duration of STEMI in exposed and unexposed group was 6.67 ± 3.66 and 6.89 ± 3.55 . Mean stenosis in exposed and in unexposed group was 42.50 ± 18.57 and 36.35 ± 11.55 . LMS disease in exposed and in unexposed group was seen diagnosed in 19.1% and 5.5% patients. Risk of LMS among exposed was 3.50 times higher as that of unexposed group. Table-1

Table-1: LMS in Study groups

	Exposed	Unexposed	Total
Yes	21(19.1%)	6(5.5%)	27
No	89(80.9%)	104(94.5%)	193
Total	110	110	220

Relative Risk: 3.50 (1.46-8.33) p-value=0.004

Table-2: LMS in Study groups stratified for age of patients

Age	LMS	Exposed	Unexposed	RR	CI
40-50	Yes	5(18.5%)	2(5.9%)	3.14	0.66-14.98
	No	22(81.5%)	32(94.1%)		
51-60	Yes	8(22.9%)	1(2.9%)	8.00	1.05-60.63
	No	27(77.1%)	34(97.1%)		
61-70	Yes	8(16.7%)	3(7.3%)	2.27	0.64-8.02
	No	40(83.3%)	38(92.7%)		

Highest risk was seen in patients in the age group 51-60 years in exposed group. i.e. $RR=8.00$ Table-2. Frequency of LMS disease in women were higher group as compare to males 21.3% vs 17.5% but RR was higher in males as compare to females 5.76 vs 2.34 Table-3 BMI and duration of STEMI was presented in. Table-4-5

Table-3: LMS in Study groups stratified for Gender of patients

Gender	LMS	Exposed	Unexposed	RR	CI
Male	Yes	11(17.5%)	2(3%)	5.76	1.32-24.97
	No	52(82.5%)	64(97%)		
Female	Yes	10(21.3%)	4(9.1%)	2.34	0.79-6.92
	No	37(78.7%)	40(90.9%)		

Table-4: LMS in Study groups stratified for BMI of patients

BMI	LMS	Exposed	Unexposed	RR	CI
Normal	Yes	12(36.4%)	0(0%)	2.20	0.16-28.77
	No	21(63.6%)	2(100%)		
Overweight	Yes	9(36%)	6(19.4%)	1.86	0.76-4.52
	No	16(64%)	25(80.6%)		
Obese	Yes	0(0%)	0(0%)	-	-
	No	52(100%)	77(100%)		

Table-5: LMS in Study groups stratified for duration of STEMI

STEMI (Duration)	LMS	Exposed	Unexposed	RR	CI
1-4 Weeks	Yes	4(11.1%)	0(0%)	7.54	0.42-134.67
	No	32(88.9%)	30(100%)		
5-8 Weeks	Yes	8(25%)	3(8.3%)	3.00	0.86-10.35
	No	24(75%)	33(91.7%)		
9-12 Weeks	Yes	9(21.4%)	3(6.8%)	3.14	0.91-10.82
	No	33(78.6%)	41(93.2%)		

DISCUSSION

ST-elevation myocardial infarction with left main coronary artery disease (CAD) is one of the most life-threatening conditions in daily clinical practice. However, in patient presenting with unstable angina and undergoing PCI, hypertension was the only independent risk factor that predicted mortality.¹² Long term mortality was strongly predicted by insulin dependent diabetes mellitus as compared with non-diabetic mellitus or non- Insulin treated diabetes mellitus patients.¹³ After receiving coronary angiography, the short and mid-term consequences were worst in diabetic patients with ACS compared to non-diabetic patients with ACS.¹⁴⁻¹⁷

For patients presenting with ACS and having both hypertension and diabetes mellitus, the presence of both DM and hypertension increases the likelihood of mortality than in patients with hypertension or diabetes mellitus alone.¹⁷ mid-term outcomes in stable CAD patients receiving PCI were still worse in diabetic patients.¹⁸ However, the long term consequences of both hypertension and diabetes in patients undergoing PCI are still not clear.

LMS disease is an important and independent risk factor which causes an increased mortality and morbidity in patients undergoing diagnosis and treatment with CAD. LMS pathology is often silent, with unpredictable presentation: as such it poses diagnostic and management challenges. With the advent of drug-eluting stents, improvements in percutaneous intervention and aggressive interventional centers, the management of left main coronary disease is no longer purely surgical¹⁹.

In this study, risk of LMS was higher among exposed group as compared to unexposed group. i.e. exposed 19.1% & Unexposed: 5.5%, RR=3.50 The risk of LMS among exposed group was higher for patients in the age group 51-60 years (RR=8.00), for male patients (RR=5.76) risk for LMS was higher as compared to female patients in exposed group, patients with normal BMI (RR:2.20) and patients with shorter duration of STEMI in exposed group had higher risk for LMS (1-4 weeks: RR=7.54).

One study showed that frequency of LMS was 13.2% in patients with diabetes and hypertension and 3.8% in patients without diabetes and hypertension ($p=0.008$).¹⁰ Another study also showed that frequency of LMS was 3.0% in patients with diabetes and hypertension and 1.1% in patients without diabetes and hypertension ($p=0.002$).¹¹

Tanjima Parvin in his study reported higher fluency of LMS among diabetics compared to non-diabetics. i.e. 21% & 5%, p -value=0.031²⁰ All the above-mentioned studies did not calculated relative risk for LMS in patients with and without diabetes and hypertension.

It has been noticed from literature that LMS was significantly high in patients with risk factors like diabetes and hypertension. But, not much work has been done in this regard and also there is lack of local data which could help us to predict LMS disease in diabetics and hypertensive patients and make treatment plan. Consider Hybrid cath lab and cardiac surgery back up in such patients. This data of high risk cardiac disease may be used in health education and risk awareness campaigns among general population specifically in diabetic and hypertensive patients.

CONCLUSION

Results of this study showed that hypertensive and diabetic patients presenting with STEMI undergoing coronary angiography had higher risk for LMS disease.

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