

Study of Extent of Involvement of Various Coronary Arteries in Diabetic and Non-diabetic Patients Diagnosed with Acute Myocardial Infarction

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Abstract

The present study aimed at assessing the extent of involvement of various coronary arteries in diabetic and non-diabetic patients diagnosed with acute myocardial infarction. Out of the total 100 cases of acute myocardial infarction, 70 patients had an ST-elevation myocardial infarction (STEMI) and 30 patients had a non-ST-elevation myocardial infarction (NSTEMI). Anterior wall was the commonest site of infarct followed by inferior, global, anteroseptal and lateral wall myocardial infarction. Normal coronary angiogram was seen in one non-diabetic patient. In diabetic, single vessel disease was present in 24%, double vessel disease in 40% and triple vessel disease in 36%. In non-diabetic patients, single vessel disease was present in 54%, double vessel disease in 30% and triple vessel disease in 14%. This study showed that the severity and extent of coronary artery disease and incidence of triple/multiple vessel disease was significantly high in diabetics when compared to non-diabetics with myocardial infarction.

Key Words

Coronary Arteries, Myocardial Infarction, Diabetes

Introduction

Diabetes mellitus is one of the commonest disease worldwide ranking next to cardiovascular disorder leading to complications, both acute and chronic. Cardiac affliction is by far the commonest cause of mortality in patients with diabetes (1).

Cardiac involvement in diabetes commonly manifest as coronary artery disease (CAD) and less commonly as diabetic cardiomyopathy and cardiac autonomic neuropathy. A breakthrough in the field of cardiology came with the introduction of "interventional cardiology" which serves as a diagnostic as well as therapeutic aid in the management of coronary artery disease (2,3).

Coronary angiography or arteriography remains the 'Gold-standard' technique for diagnosing and evaluating coronary artery disease. Hence, this study titled comparative angiographic profile in diabetics and non-diabetic patients diagnosed with acute myocardial infarction was undertaken with an attempt to find out, how coronary angiographic profile in diabetics differ from that in non-diabetics.

Material and Material

The present study was conducted in the Postgraduate Department of Medicine in association with Cardiology Department of Government Medical College, Jammu. The patients were selected from the outdoor and indoor wards of medicine and Cardiology department.

In the present study, Group I had 50 patients, both males and females, of diabetes mellitus with acute myocardial infarction and Group II was having 50 patients, both males and females, with acute myocardial infarction but non-diabetic.

Details of clinical history, physical examination and laboratory investigations were recorded

Inclusion Criteria: Age >18 years & Patients with acute myocardial infarction (diabetic and non-diabetic).

Exclusion Criteria: Type-4a myocardial infarction - myocardial infarction associated with Percutaneous coronary intervention; Type-4b myocardial infarction - myocardial infarction associated with stent thrombosis as documented by angiography or at autopsy; Type-5 myocardial infarction - myocardial infarction associated

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with CABG; Patients with renal insufficiency; Patients refusing for coronary angiography; Patients with valvular heart disease & Dyslipidemia.

The investigation profile included: Complete blood count, Renal function tests, Liver function tests, 12-lead surface electrocardiogram, Serum cardiac biomarkers; TROPONIN T level, Chest X-ray P/A view, Urine routine, Blood sugar (fasting), BT, CT, PTI & Coronary angiography.

Results

This study was done over a period of one year on 100 cases of acute myocardial infarction, diagnosed on the basis of history, clinical features, 12-lead ECG, biochemical markers, etc. The cases were carefully chosen according to a pre-set protocol with properly defined inclusion and exclusion criteria.

Age and sex wise distribution of patients in Group I and Group II is depicted in *table 1 and table 2*.

Clinical Presentation: chest pain was the commonest symptom at presentation with 60% of the patients having this complaint. Diaphoresis was the next commonest complaint seen in 60% of the patients. As depicted in *Table no: 3* dyspnoea was present in 40% of the patients, vomiting was present in 30% of the patients. Palpitations were present in 30% of the patients and 25% patients had a sense of impending doom.

Five patients (5%) in this study had history of syncope/presyncope. Out of these, 4 patients had complete heart block.

ECG Profile: Out of the total 100 cases of acute myocardial infarction, 70 patients had an ST-elevation myocardial infarction (STEMI) and 30 patients had a non-ST-elevation myocardial infarction (NSTEMI) which is depicted in *table 4*. Anterior wall was the commonest site of infarct followed by inferior, global, anteroseptal and lateral wall myocardial infarction.

Coronary Angiographic Profile: Normal coronary angiogram was seen in one non diabetic patient. In diabetic

, single vessel disease was present in 24%, double vessel disease in 40% and triple vessel disease in 36%. In non diabetic patients, single vessel disease was present in 54%, double vessel disease in 30% and triple vessel disease in 14%. Thus it was concluded that diabetes affect the coronary arteries more adversely than non diabetes. The diabetics had three vessel disease more frequently and single vessel disease less frequently. Also coronary calcification was more common in diabetes.

Calcified coronary arteries were seen in 60% diabetic patients with acute myocardial infarction. The details of coronary angiographic profiles are shown in *table 5*.

A total of 190 lesions were observed in the 100 patients that were studied angiographically. The commonest vessel involved was LAD. Sixty six (34.33%) lesions were present in the LAD. The RCA had 28.4% lesions. Details of which are shown in *table 6*.

Discussion

The present study of 50 diabetic patients and 50 non-diabetic patients with CAD were analyzed with special emphasis laid on the coronary angiographic findings in acute myocardial infarction. In the present study it was seen that the peak incidence of myocardial infarction in diabetics and non diabetics was in fifth and sixth decade. This finding correlated with the Framingham heart study (4). Present study corroborates the hypothesis of a greater severity of angiographic proven coronary artery disease in diabetic than in diabetic patients especially in the left main coronary artery (5). In a study by Henry *et al.* (6) showed patients with diabetes had moderate (50% to 75% narrowing) stenosis much more frequently than patients without diabetes (50.6 versus 30.3%, $p < 0.001$). Moreover, diabetes mellitus was an independent risk factor for moderate stenosis. The lesions were more frequently located on distal arteries, more frequently had a pattern of three-vessel disease, and had a trend toward more diffuse disease (7,8,9). The commonest vessel involved in our study was LAD in

Table 1 Age wise Distribution of Patients in Group I and Group II

Age group (in years)	Group I (N = 50)				Group II (N = 50)			
	Male No.	Female No.	Total No.	%	Male No.	Female No.	Total No.	%
21-30	1	–	1	2.00	1	–	1	2.00
31-40	3	1	4	8.00	1	1	2	4.00
41-50	13	1	14	28.00	14	2	16	32.00
51-60	12	4	16	32.00	13	3	16	32.00
61-70	7	2	9	18.00	8	2	10	20.00
71-80	4	1	5	10.00	2	2	4	8.00
81-90	–	1	1	2.00	1	–	1	2.00
Total	40	10	50	100.00	40	10	50	100.00
Mean+SD	55.72+11.927				55.64+12.81			

Table 2: Sex-wise Distribution of Patients in Group I and Group II

Sex	Group I (N = 50)		Group II (N = 50)	
	No.	%	No.	%
Male	40	80.00	40	80.00
Female	10	20.00	10	20.00
Total	50	100.00	50	100.00
Male: Female Ratio	4:1		4:1	

Table 3. Various Types of Clinical Presentation in Order of Occurrence

Clinical Presentation	Group I	Group II
Chest pain – typical	20(40)	40(80)
Diaphoresis	30(60)	30(60)
Dyspnoea	30(60)	10(20)
Palpitations	20(40)	10(20)
Vomiting	10(20)	20(40)
Pain epigastrium	3(6)	7(14)
Syncope	3(6)	2(4)

Table 4. Electrocardiographic Profile of 100 Patients of Acute Myocardial Infarction who Underwent Angiography

ECG Profile	Group I	Group II
STEMI	33	37
NSTEMI	17	13

coronary angiography revealed that the incidence of multivessel disease in diabetics was much higher (50%) compared to non-diabetics which was only 16%. This finding correlates with the other study by Singh RB, Niaz

Table 5. Angiographic Profile

Observations	Group I (N=50)	Group II (N=50)	Total (N=100)	
	No.	No.	No.	%
Normal CAG	–	1	1	1.00
Abnormal	50	49	99	99.00
Total	50	50	100	100.00
Abnormal CAG				
Single vessel disease	12	27	39	
Two vessel disease	20	15	35	
Three vessel disease	18	7	25	
Total	50	49	99	99.00
Two vessel disease:				
LAD + Lt Cx	7	4	11	
Lt Cx + RCA	2	1	3	
RCA + LAD	8	7	15	
LAD + Ramus	2	2	4	
RCA = Ramus	1	1	2	
Total	20	15	35	100.00
Other associations:				
Calcified coronaries	30	20	50	50.00

both the groups followed by Lcx and RCA. This finding is similar to other various studies (10,11,12). Additionally, ejection fraction <50% was more common in diabetic patients confirming the diffuse pattern of atherosclerotic disease in diabetic patients (13,14,15). In our study,

MA (16), showed higher incidence of multi vessel disease in diabetics (76%) compared to 44% in non-diabetics. Sousa JM *et al.* (17) showed severe three-vessel disease was significantly more frequent in diabetic patients than non diabetics (28% vs 10%), as well as totally occluded

Table 6. CALP - Coronary Artery lesion Profile

Lesion	LAD				RCA			Lt Cx			Lt Main			
	Pro	Mid	Dis	Dia	Pro	Mid	Dis	Pro	Mid	Dis	Om	Ostial		Sten
51-60	8	2	–	1	2	10	2	5	1	3	1	–	1	36
61-70	10	5	1	5	2	4	5	2	4	3	3	–	–	44
71-80	15	3	–	3	4	4	5	1	2	2	4	1	1	45
81-90	3	3	1	1	2	2	–	4	1	1	2	–	–	20
91-100	11	3	–	5	10	1	1	4	2	2	6	–	–	45
Total	47	16	2	15	20	21	13	16	10	11	16	1	2	190

LAD = left anterior descending, Lt Cx = left circumflex, RCA = right coronary artery, Lt Main = Left main, Pro = proximal, Dis = distal, Dia = diagonal, Om = obtuse marginal

vessels: 51 (23%) vs 54 (14.3%), $p < 0.005$. In another study conducted at CMC Vellore also showed that multivessel disease was more common in diabetics (87.5% Vs 79.6%) in two separate groups of 516 diabetic and non-diabetic patients (18). In our study, the number of patients having total occlusion was 20% in diabetics and 6% in non diabetics. This finding is statistically significant ($p < 0.01$). Hence the extent and severity of coronary artery disease was significantly high in diabetic patients with acute coronary syndrome when compared to non diabetic with acute coronary syndrome.

This finding were similar in other studies like Gui MH et al (5), Krishnaswami S et al (9), Mahdi M et al., (10), Srinidhi SH et al, (17), Uddin SN et al., (18), where they found the angiographic extent and severity of coronary artery disease was high in diabetic patients with acute coronary syndrome.

Conclusion

This study showed that the severity and extend of coronary artery disease and incidence of triple/multiple vessel disease was significantly high in diabetics when compared to non diabetics with myocardial infarction.

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