

A comparative study of angiographic severity of coronary artery disease in diabetic and non-diabetic patients with acute coronary syndrome by Gensini scoring system

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Abstract

Background: There is enough evidence that the presence of diabetes increases the risk of clinical atherosclerotic disease from twofold to threefold, with coronary artery disease (CAD) as its chief sequelae. So the present study is conducted in order to compare the severity of CAD between diabetic and non-diabetic group of patients with acute coronary syndrome by using Gensini scoring system.

Aim of the study: To study the Type of vessels, Number of vessels, severity of lesions involving coronary artery and its branches in patients with ACS and to compare the involvement in diabetic and non-diabetic patients with ACS by Gensini scoring system.

Materials and methods: 144 Patients (72 diabetics and 72 non diabetics) with acute Coronary Syndrome diagnosed on Clinical, ECG and or/ Cardiac enzyme levels and admitted in ICCU of KIMS Hospital, Hubli, and undergoing coronary angiography during the study period were taken in the study considering the inclusion and exclusion criteria. Each patient was evaluated with History, clinical examination, and lab investigations which included: Electrocardiogram, 2D-ECHO, Coronary angiography, HbA1c, Lipid profile and Renal function test. Based on angiographic findings, coronary artery disease severity was calculated using Gensini, and the data obtained was analysed by different statistical methods.

Results: Out of 144 patients, ACS was commoner among males than females (72.9% vs 27.1%) and age of presentation was earlier in males compared to females (53yrs vs 58yrs). Multi vessel disease was commoner in diabetics compared to non diabetics (52.8% vs 15.3%) and also means Gensini score was higher in diabetics (45.2 vs 19.2).

Conclusion: From this study we can conclude that diabetic patients with ACS have more severe coronary disease with respect to higher number of vessels involved, more severe of occlusion and higher Gensini score and also severity increases with the duration of diabetes and poorglycemic control.

Keywords: ACS, Type 2 DM, Cad Severity, Gensini Score.

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1. Introduction

Diabetes is a complex, chronic illness requiring continuous medical care with multifactorial risk reduction strategies beyond glycemic control [1]. In 1936, the distinction between type 1 and type 2 DM was clearly made [2]. Diabetes is fast gaining the status of a potential epidemic in India with more than 62 million diabetic individuals currently diagnosed with the disease.

In 2000, India (31.7 million) topped the world with the highest number of people with Diabetes mellitus

followed by China (20.8million) with the United States (17.7 million) in second and third place respectively [3].

The prevalence of Coronary Heart Disease rises from 2% to 4% in the general population to as high as 55% among adult diabetic patients. The overall mortality from heart disease is twice as great in men and is 4 to 5 times higher in women with DM than without DM. Cardiovascular disease represents over one-half of all deaths in both type 1 and type 2 DM [4].

1.1 Aims and objectives

To study the

- 1) Type of vessels
- 2) Number of vessels
- 3) Severity of lesions involving coronary artery and its branches in patients with ACS
- 4) To compare the involvement in diabetic and non-diabetic patients with ACS by Gensini scoring system.

2. Materials and methods

2.1 Source of data

Patients with acute coronary syndrome diagnosed based on Clinical, ECG and/or cardiac enzymes levels and admitted in ICCU of KIMS Hospital, Hubli, and undergoing coronary angiography.

2.2 Methods of collection of data

The study will be conducted on 2 groups of patients.

Group A: Patients of acute coronary syndrome with type 2 DM

Group B: Patients of acute coronary syndrome without type 2 DM

2.3 Type of study: Prospective Observational study

2.4 Inclusion Criteria

Patients admitted to ICCU of KIMS hospital, Hubli with a diagnosis of acute Coronary Syndrome based on clinical, ECG and/or Cardiac enzyme levels, with and without type 2 Diabetes mellitus, who undergo coronary angiography in a duration extending from December 2016 to October 2018 were included in the study. A total of 144 cases of acute coronary syndrome were included in the study, of which 72 were diabetic patients admitted during a period extending between December 2016 to October 2018.

2.5 Exclusion criteria:

- Patients with previous revascularization
- Patients with valvular heart disease
- Cardiomyopathy

Patients admitted with above inclusion criteria were divided into two groups (Diabetics & Non Diabetics) based on History of DM (who are on oral hypoglycemics or insulin & Duration of diabetes) and/or satisfying ADA guidelines 51 for diagnosis of Diabetes mellitus. Each patient was evaluated with history, clinical examination, and lab investigations.

3. Results

In the Diabetes group, the mean age of subjects was 55.86±11.08 years and in non diabetic group, the mean age was 53.19±11.11 years. In diabetic and non diabetic group, majority of subjects were in the age group 51 to 60 years (31.9% and 38.9% respectively).

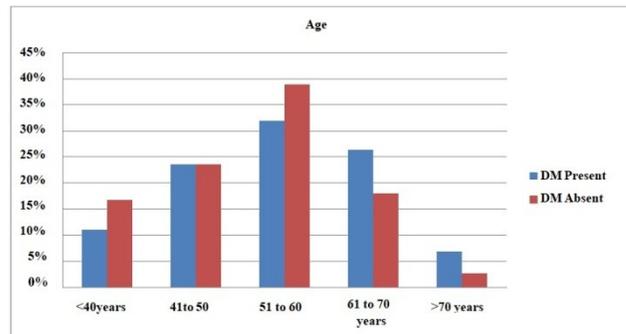


Figure 1: Bar diagram showing Age distribution comparison between two groups

In the DM group, 30.6% were females and 69.4% were males and in non diabetic group 23.6% were females and 76.4% were males. There was no significant association between age and gender distribution between the two groups. In the DM group, 41.7% had HTN and in Non diabetic group 27.8% had HTN. There was no significant difference in prevalence of HTN between two groups.

Table 1: Killip Class comparison between two groups

Killip Class	Count		%	
	DM Present	DM Absent	DM Present	DM Absent
1	110	76.4%	47	65.3%
2	22	15.3%	16	22.2%
3	6	4.2%	5	6.9%
4	6	4.2%	4	5.6%

Killip Class	Group				P value
	DM Present		DM Absent		
	Count	%	Count	%	
1	47	65.3%	63	87.5%	<0.001*
2	16	22.2%	6	8.3%	
3	5	6.9%	1	1.4%	
4	4	5.6%	2	2.8%	

$\chi^2 = 10.2, df = 3, p = 0.017^*$

In the diabetic group, 65.3% were in Killip Class 1, 22.2% were in Class 2, 6.9% were in Class 3 and 5.6% were in Class 4. In the non diabetic group, 87.5% were in Killip Class 1, 8.3% were in Class 2, 1.4% were in Class 3 and 2.8% were in Class 4. There was a significant difference in the Killip class between the two groups, i.e. diabetics belonged to higher Killip class at presentation.

Table 2: Comparison of various laboratory parameters between two groups

Parameter	Group				P value
	DM Present		DM Absent		
	Mean	SD	Mean	SD	
BMI	22.8	2.8	22.5	2.8	0.447
FBS	150.1	42.7	83.2	11.2	<0.001*
PPBS	261.2	73.1	133.0	21.2	<0.001*
HbA1c	8.4	1.52	5.28	0.6	<0.001*
TC	162.9	41.7	150.6	38.7	0.068
TG	185.5	70.0	177.9	64.9	0.503
HDL	40.2	8.5	39.4	11.6	0.639
LDL	96.7	31.6	90.1	30.7	0.210
ECHO	44.4	9.3	47.2	8.5	0.06
GENSINI	45.2	33.8	19.2	18.2	<0.001*

In the study, there was a significant difference in mean FBS, PPBS, HbA1c and GENSINI score between diabetics and non diabetics. Mean values of above said parameters were significantly higher in DM group compared to Non diabetic group.

Table 3: Type of ACS comparison between two groups

		Group			
		DM Present		DM Absent	
		Count	%	Count	%
STE/ NSTEMI-ACS	NSTEMI-ACS	16	44.4%	20	55.6%
	STEMI-ACS	56	51.9%	52	48.1%

$\chi^2 = 0.593, df = 1, p = 0.441$

Among the diabetics, 44.4% had NSTEMI – ACS and 51.9% had STE – ACS. Among the non diabetics, 55.6% NSTEMI – ACS and 48.1% had STE – ACS. There was no significant difference in the type of ACS between the two groups

Among diabetics, 51.6% underwent Thrombolysis and among Non Diabetics, 48.4% underwent Thrombolysis. There was no significant difference in Thrombolysis between two groups. In the DM group, 25.0% had DVD, 38.9% had SVD, 27.8% had TVD, 4.2% were insignificant, 2.8% were normal and 1.4% had Recanalized CAD. In the non DM group, 13.9% had DVD, 54.2% had SVD, 1.4% had TVD, 11.1% were insignificant, 16.7% were normal and 2.8% had Recanalized CAD. There was significant difference in CAG findings between the DM group and non DM group, i.e. diabetics had a higher incidence of multivessel disease compared to non diabetics.

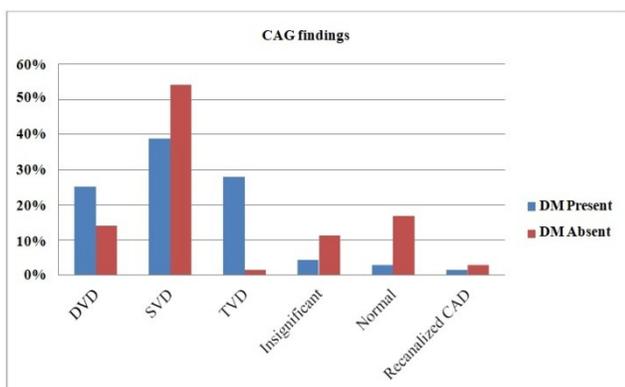


Figure 2: Bar diagram showing CAG findings comparison between two groups

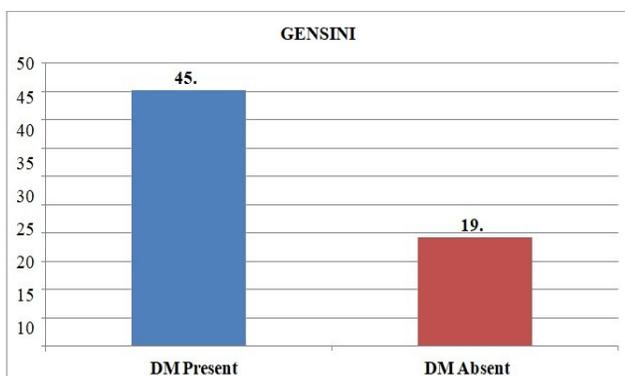


Figure 3: Bar diagram showing Mean GENSINI score comparison between two groups

Table 4: Correlation between HBA1C & Gensini score

Correlations			
		HBA1C	GENSINI
HBA1C	Pearson Correlation	1	0.633**
	P value		<0.001*
	N	144	144

** . Correlation is significant at the 0.01 level (2-tailed).

In the study, there was a significant positive correlation between HbA1c and Gensini score. i.e. with increase in HbA1c, there was an increase in Gensini score and vice versa. This suggests that there is a linear relationship between HbA1c and Gensini score.

Table 5: Correlation between HBA1c & Number of vessel involvement

Correlations			
		HBA1C	No of Vessel
HBA1C	Pearson Correlation	1	0.563**
	P value		<0.001*
	N	144	116

** . Correlation is significant at the 0.01 level (2-tailed).

In the study, there was a significant positive correlation between HbA1c and number of vessels involved. i.e. with increase in HbA1c, there was an increase in number of vessels involved and vice versa.

Table 6: Correlation between duration of DM & Gensini score

Correlations			
		GENSINI	DM Years
GENSINI	Pearson Correlation	1	0.493**
	P value		<0.001*
	N	144	73

** . Correlation is significant at the 0.01 level (2-tailed).

Gensini score. i.e. with increase in Duration of DM, there was increase in Gensini score and vice versa. Among the diabetics, 9.7% underwent a medical line of treatment, 54.2% underwent PTCA and 36.1% underwent CABG. Among non diabetics, 31.9% underwent a medical line of treatment, 68.1% underwent PTCA and 0% underwent CABG. There was significant difference in treatment between the two groups i.e. CABG was advised in more number of diabetics than non diabetics.

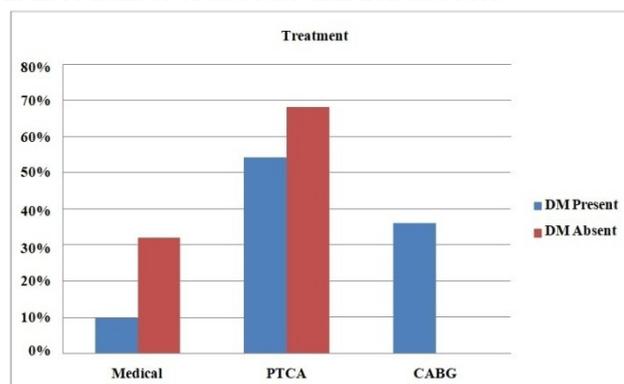


Figure 4: Bar diagram showing Treatment comparison between two groups

4. Discussion

Our study analysed 144 patients admitted to KIMS, Hubballi with Acute coronary syndrome, of which 50% were with T2DM and the remaining 50% were non diabetics. Mean age of subjects was 55.86±11.08 years in diabetic group, and in non diabetic group the mean age was 53.19±11.11 years. Majority of patients were in age group of 50-60 years of age.

The age of presentation was similar to other studies conducted in Karnataka [5-7]. In our study, it was noted that 23-30% were females; in other studies it was between 5-23% [8,9]. The lower incidence of ACS in females can be explained by the protective effect of oestrogen on cardiovascular effect in premenopausal women. However, this protective effect ceases to exist in post-menopausal age group. In our study, females presented at a later age when compared to males; this bore similarities

to other studies like Sharma et al [10] and Iyengar et al [11].

In our study, Occurrence of HTN was higher in diabetic patients compared to non diabetics; which is similar to the study conducted by Shah et al[12]. However, in our study it was not statistically significant.

Cardiogenic shock continues to be the most common cause of death in patients with acute myocardial infarction (MI), occurring in 5–10% of ST-elevation MIs (STEMI) and 2–3% of non- ST-elevation acute coronary syndromes (ACS)[13]. In our study occurrence of cardiogenic shock was 4.16%, which is similar to other studies conducted in India [15,16].

In our study, occurrence of STEMI was higher compared to NSTEMI and USA; this is similar to other studies conducted in India [15,17]. However, Padinahare et al[6] study shows an almost similar incidence.

Table 7: Comparison of number of vessels involved in different studies

DM	SVD		DVD		TVD		Normal		Insignificant		Recanalised	
	YES	No	YES	No	YES	No	YES	No	YES	No	YES	No
Chowdhary et al[7]	24%	54%	40%	30%	36%	14%	0%	2%	0%	0%	00%	0%
Srinidhi et al[18]	30%	64%	26%	20%	44%	16%	0	0	0	0	0	0
Girdhar et al[19]	25%	31%	40%	39%	31%	26%	0	0	0	0	0	0
Our study	38.9%	54.2%	25.0%	13.9%	27.8	1.4%	2.8%	16.7%	4.2%	11.1%	1.4%	2.8%

In our study, the severity of CAD as calculated by Gensini score was higher in diabetics compared to the non diabetics. These findings are similar to other studies conducted [8,18,20].

In our study, LMCA involvement was similar between both diabetics and non diabetics, however severity of occlusion was higher in diabetics compared to non diabetics (25-90% vs<25%). Among the vessels involved, LAD was the most common artery involved, followed by RCA & LCx, which is similar to other studies conducted. [18,21]

In our study, it was shown that increase in HbA1c & GENSINI score correlates with the number of vessels involved. This is found to be similar to studies conducted in Karnataka [19,20].

In our study, it was found that duration of Diabetes directly correlates with the increase in GENSINI score, which was similar to other studies. [20]

In our study, a higher percentage of patients with DM were advised to undergo CABG compared to non diabetics. In Non diabetics with CAD, PTCA was the most commonly advised treatment, followed by medical management, which is similar to other studies. [2,18]

5. Conclusion

- Diabetic patients with acute coronary syndrome have more severe coronary artery disease with respect to the number of vessels involved. They also have high Gensini score as compared to non-diabetics.

- Diabetic patients with ACS have higher mortality compared to non-diabetics, which is depicted in this study by a higher KILLIP class at presentation in diabetics.
- CABG as a treatment modality was advised in a higher percentage of diabetic patients with ACS when compared to non-diabetics

Conflict of Interest: none

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