Results

A total of 80 consecutive patients with ACS who were admitted to CCU of Benha University Hospital in the period from February 2008 to May 2008 were included in this study. All patients received conventional treatment. They were followed up during their hospital stay and for three-month after hospital discharge.

• Demographic data of the study group:

Table (1): demographic data of the whole study group.

Parameter	***No.***	***%***
Number of patients	80	100%
Age in years	Mean 60.48 ± 13.46	
Sex:		
*Male	50	62.5%
*Female	30	37.5%
Risk factors:		
*Diabetics	40	50%
*Hypertension	46	57.5%
*Hyperlipidemia	47	58.8%
*Obesity	33	41.3%
*History of prior MI	29	36.3%
* History of renal impairment	8	10%
* History of stroke or TIAs	6	7.5%
Presentation:		
*UA	40	50%
*NSTEMI	19	23.7%
*STEMI	21	26.3%

Ischemic ECG changes:		
*Normal	13	16.25%
*ST-segment, T wave changes	46	57.5%
*ST-segment elevation	21	26.3%
Trans-thoracic echocardiography:		
*systolic dysfunction	15	18.75%
Coronary Angiography:		
*One-vessel disease	32	40%
*Two-vessel disease	23	28.75%
*Three-vessel disease	25	31.25%

n=number, MI= myocardial infarction, TIAs= transient ischemic attacks. , UA= unstable angina, NSTEMI= non ST-segment elevation myocardial infarction, STEMI= ST segment elevation myocardial infarction,.

This study included 80 patients, 50 males (62.5%) and 30 females (37.5%) their mean age was 60.48 ± 13.46 years.

Of the 80 patients; 40 patients (50%) were diabetic, 46 patients (57.5%) were hypertensive, 47 patients (58.8%) were hyperlipidemic, 33 patients (41.3%) were obese, 29 patients (36.3%) had prior MI, 8 patients (10%) had previous history of renal failure, and 6 patients (7.5%) had previous history of stroke or TIAs. Forty patients (50%) presented with UA, 19 (23.7%) presented with NSTEMI and 21 (26.3%) presented with STEMI.

ECG:

Admission ECG showed ST-segment elevation in 21 (26.25%), ST-segment depression and T wave changes in 46 (57.5%) patients and ECG was normal in 13(16.25%) patients.

Echocardiography:

Sixty five patients (81.25%) had normal global contractility [ejection fraction >50%] while 15 patients (18.75%) had impaired contractility.

Coronary Angiography:

Thirty two patients (40%) had one-vessel disease, 23 patients (28.75%) had two-vessel disease, and 24 patients (31.25%) had three- vessel disease.

- ***Patients were classified into two groups:***

Group A: non diabetic group included 40 (50%) patients.

Group B: diabetic group included 40 (50%) patients.

The two groups were further subdivided into four subgroups according to the level of cardiac biomarkers (cTnI, CK-MB) at presentation:

****ND - :*** non diabetic with negative biomarkers 20 (25%) patients.

****ND +:*** non diabetic with positive biomarkers 20 (25%) patients.

****D - :*** diabetic with negative biomarkers 20 (25%) patients.

****D + :*** diabetic with positive biomarkers20 (25%) patients.

• Baseline parameters of diabetic vs non diabetic group:

Table (2): Baseline parameters of diabetic and non diabetic groups.

Parameter	*Group (A)* (n=40)	*Group (B)* (n=40)	*P value*
Age (mean ± SD)	64.05±10.26	56.925±15.352	> 0.05
Sex:			
Male (number, %)	27 (67.5%)	23 (57.5%)	> 0.05
Female (number, %)	13 (32.5%)	17 (42%)	> 0.05
Risk factors			
HTN (number, %)	19 (47.5%)	27 (67.5%)	> 0.05
Dyslipidemia (number, %)	20 (50%)	27 (67.5%)	> 0.05
Obesity (number, %)	15 (37.5%)	18 (45%)	> 0.05
Prior MI (number, %)	9 (22.5%)	20 (50%)	**< 0.05***
Renal impairment (number, %)	1 (2.5%)	7 (17.5%)	**< 0.05***
History of stroke or TIAs (number, %)	2 (5%)	4 (10%)	> 0.05

n=number, SD=standard deviation, HTN = hypertension, MI= myocardial infarction, *=significant result, TIAs= transient ischemic attacks.

In this table, prior myocardial infarction and prior renal impairment were significantly increased in diabetic patients when compared with non diabetic patients ($p<0.05$), while other parameters (age, sex, hypertension, dyslipidemia, obesity, history of stroke or TIAs) were not statistically significant. Diabetic patients had higher frequencies of hypertension (67.5%) vs (47.5%) than non diabetic patients, higher frequencies of hyperlipidemia (67.5%) vs (50%), obesity (45%) vs (37.5%), and history of stroke or TIAs (10%) vs (5%), but these differences did not reach the statistical significant level.

•*Clinical presentation of diabetic vs non diabetic group:*

Table (3): Clinical presentation of diabetic and non diabetic groups

Parameter	***Group (A)*** (n=40)	***Group (B)*** (n=40)	***P value***
Diagnosis on admission			
UA (number, %)	20 (50%)	20 (50%)	> 0.05
NSTEMI (number, %)	8 (20%)	11 (27.5%)	> 0.05
STEMI (number, %)	12 (30%)	9 (22.5%)	> 0.05
Echo EF :			
EF (<50%)	3 (7.5%)	12 (30%)	**<0.05***
Coronary Angiography: (number, %)			
One-Vessel disease	21 (52.5%)	11 (27.5%)	>0.05
Two-Vessel disease	11 (27.5%)	12 (30%)	>0.05
Three-Vessel disease	8(20%)	17 (42.5%)	**<0.05***

n=number, *=significant, UA= unstable angina, NSTEMI= non ST-segment elevation myocardial infarction, STEMI= ST segment elevation myocardial infarction, EF=percentage of ejection fraction.

In this table, patients with diabetes mellitus were more likely to present with non ST-segment elevation myocardial infarction [NSTEMI] (27.5%) and less likely to present with ST elevation myocardial infarction [STEMI] (22.5%) compared to non diabetic patients although these differences did not reach the statistically significant value ($p>0.05$). The frequency of LV dysfunction [EF<50%] was higher in diabetic than non diabetic group. Diabetic patients had higher frequency of three vessel diseases (42.5%) than non diabetic group (20%) ($p < 0.05$). The differences as regard LV dysfunction and three vessel disease were statistically significant.

• In hospital follow up of diabetic and non diabetic groups

Table (4): In-hospital complications of diabetic and non diabetic group.

Parameter	***Group (A)*** (n=40)	***Group (B)*** (n=40)	***P value***
In hospital LV dysfunction (number, %)	6 (15%)	15 (37.5%)	**<0.05***
In hospital arrhythmias (number, %)	3 (7.5%)	8 (20%)	>0.05
In hospital re-infarction (number, %)	1 (2.5%)	5 (12.5%)	**<0.05***
In hospital death (number, %)	1 (2.5%)	4 (10%)	**<0.05***

n=number , *=significant , LV= left ventricle

This table shows that, the in-hospital complications were increased in diabetic vs non diabetic patients. Diabetic patients showed higher frequency of LV dysfunction, re-infarction, and mortality which were all statistically significant ($p < 0.05$),while arrhythmias were not statistically significant.

•Three- month follow up of diabetic and non diabetic groups

Table (5): three-month complication of diabetic and non diabetic groups.

Parameter	***Group (A)*** (n=39)	***Group (B)*** (n=36)	***P value***
3-month LV dysfunction (number, %)	8 (20%)	18(50%)	**<0.05***
3-month re-hosp. for ACS (number, %)	7 (17.9%)	18 (50%)	**<0.05***
3-month death (number, %)	4 (10%)	12 (33%)	**<0.05***

n=number, *=significant, LV= left ventricle, ACS= Acute Coronary Syndrome.

This table shows that, the three-month complications including LV dysfunction, re-hospitalization with acute coronary syndrome, and death were all increased in diabetic patients than non diabetic patients. The differences between both groups were statistically significant ($p < 0.05$).

•Baseline parameters of (ND -) vs (ND +) subgroup:

Table (6): Baseline parameters in non diabetic with negative biomarkers group in comparison with non diabetic with elevated biomarkers group.

Parameter	***ND –*** (n=20)	***ND +*** (n=20)	***P value***
Age (mean ± SD)	55.05±12.31	61.05±13.08	>0.05
Sex:			
Male (number, %)	12 (60%)	15 (75%)	*>0.05*
Female (number, %)	8 (40%)	5 (25%)	
Risk factors:			
HTN (number, %)	9 (45%)	10 (50%)	>0.05
Hyperlipidemia (number, %)	10 (50%)	10 (50%)	*>0.05*
Obesity (number, %)	8 (40%)	7 (35%)	*>0.05*
Prior MI (number, %)	3 (15%)	6 (30%)	>0.05
Renal impairment (number, %)	1 (5%)	0	*>0.05*
History of stroke or TIAs *(number, %)*	2 (10%)	0	*>0.05*

n=number, SD=standard deviation, HTN = hypertension, MI= myocardial infarction, TIAs= transient ischemic attacks.

In this table no significant differences were found between patients with elevated markers of myocardial necrosis and patients with non elevated markers in the non diabetic group in the baseline parameters and risk factors including age, sex, hypertension, hyperlipidemia, obesity, renal impairment, history of prior myocardial infarction and prior history of stroke.

• Clinical presentation of (ND -) vs (ND +) subgroup:

Table (7): Clinical presentation of non diabetic with negative biomarkers group in comparison with nondiabetic with elevated biomarkers group.

Parameter	***ND –*** (n=20)	***ND +*** (n=20)	***P value***
Diagnosis on admission			
UA (number, %)	20 (100%)	0	
NSTEMI (number, %)	0	12 (55%)	
STEMI (number, %)	0	8 (45%)	
Echo EF:			
EF (<50%)	1(5%)	2 (10%)	>0.05
Coronary Angiography (number, %)			
One-Vessel disease	15 (75%)	6 (30%)	**<0.05***
Two- Vessel disease	3 (15%)	8 (40%)	>0.05
Three- Vessel disease	2 (10%)	6 (30%)	>0.05

n=number , *=significant, UA= unstable angina, NSTEMI= non ST-segment elevation myocardial infarction, STEMI= ST segment elevation myocardial infarction, EF=percentage of ejection fraction.

In this table the echocardiography which was done at presentation showed no statistically significant difference between (ND-) group and (ND+) in the LV dysfunction [EF< 50%]. On the other hand the coronary angiography showed that ND- group had significantly higher frequency of single vessel disease (75%) compared to ND+ group (30%),($p < 0.05$).

• *In-hospital follow up of (ND -) vs (ND +) subgroup:*

Table (8): In-hospital complications of non diabetic with negative biomarkers group in comparison with non diabetic with elevated biomarkers group

Parameter	***ND –*** (n=20)	***ND +*** (n=20)	***P value***
In-hospital LV Dysfunction (number,%)	1 (5%)	5 (25%)	**<0.05***
In- hospital Arrhythmias (number,%)	1 (5%)	2 (10%)	>0.05
In-hospital re-infarction (number,%)	0	1 (5%)	>0.05
In-hospital Death (number,%)	0	1 (5%)	>0.05

n=number , *=significant, LV=left ventricle

This table shows that the in-hospital LV dysfunction was significantly higher in (ND +) group than (ND -) group (25% vs 5%, $p < 0.05$) The differences between the two groups as regards in-hospital arrhythmias, re-infarction and death were not statistically significant.

•*Three- month follow up of (ND -) vs (ND +) subgroup:*

Table (9): three-month complications of non diabetic with negative biomarkers group in comparison with non diabetic with elevated biomarkers group.

Parameter	***ND -*** (n=20)	***ND +*** (n=19)	***P value***
3-month LV Dysfunction (number,%)	1 (5%)	7 (36%)	**<0.05***
3-month re-hospitalization with ACS (number,%)	2 (10%)	5 (26%)	>0.05
3-month Death (number,%)	0	4 (21%)	**<0.05***

n=number , *=significant , LV= left ventricle, ACS= Acute Coronary Syndrome.

This table shows that, the three-month LV dysfunction, and death were increased in (ND +) group than (ND -). The difference between two groups was statistically significant ($p < 0.05$), but the difference between the two groups as regard the

three-month re-hospitalization with ACS was not statistically significant.

•Baseline parameters of (D +) vs (D -) subgroup:

Table (10): Baseline parameters of diabetic with negative markers group in comparison with diabetic with positive markers group.

Parameter	***D -*** (n=20)	***D +*** (n=20)	***P value***
Age (mean, SD)	61.8±11.7	55.05±12.3	>0.05
Sex :			
Male (number, %)	9 (45%)	14 (70%)	*>0.05*
Female (number, %)	11(55%)	6 (30%)	
Risk Factors*:*			
HTN (number, %)	11 (55%)	16 (80%)	*>0.05*
Hyperlipidemia (number, %)	13 (65%)	14 (70%)	*>0.05*
Obesity (number, %)	7 (35%)	11 (55%)	*>0.05*
Prior MI (number, %)	9 (45%)	11 (55%)	*>0.05*
Renal impairment (number, %)	4 (20%)	3 (15%)	*>0.05*
History of stroke or TIAs (number, %)	*2 (10%)*	*2 (10%)*	*>0.05*

n=number, SD=standard deviation, HTN = hypertension, MI= myocardial infarction, TIAs= transient ischemic attacks.

In this table no significant differences was found between diabetic with negative markers (D -) group and diabetic with positive markers (D +) group in the baseline parameters and risk factors.

• *Clinical presentation of (D-) vs (D +) subgroup:*

Table (11): Clinical presentations of diabetic with negative biomarkers group in comparison with diabetic with positive biomarkers group.

Parameter	***D -*** (n=20)	***D +*** (n=20)	***P value***
Diagnosis on admission:			
UA (number,%)	20 (100%)	0	
NSTEMI (number,%)	0 (0%)	11 (55%)	
STEMI (number,%)	0 (0%)	9 (45%)	
Echo EF			
EF (<50%)	2(10%)	10(50%)	**<0.05***
Coronary Angiography (number,%)			
One-Vessel dise	6 (30%)	5 (25%)	>0.05
Two- Vessel dise	8 (40%)	4 (20%)	>0.05
Three- Vessel dise	6 (30%)	11 (55%)	>0.05

n=number, *=significant, UA= unstable angina, NSTEMI= non ST-segment elevation myocardial infarction, STEMI= ST segment elevation myocardial infarction, EF=percentage of ejection fraction.

.

In this table, the echocardiography which was done on presentation showed that LV dysfunction [EF<50%] was significantly higher in the (ND+) group than (ND-) group (50% vs 10%, $p < 0.05$), but no significant differences was found between the two groups as regard the number of coronary vessels affection.

•*In hospital follow up of (D -) vs (D +) subgroup:*

Table (12): In-hospital complications of diabetic with negative biomarkers group in comparison with diabetic with positive biomarkers group.

Parameter	***D -*** (n=20)	***D +*** (n=20)	***P value***
In-hospital LV Dysfunction (number, %)	2 (10%)	13 (65%)	**<0.05***
In- hospital Arrhythmias (number, %)	3 (15%)	5 (25%)	>0.05
In-hospital re-infarction (number, %)	1 (5%)	4 (20%)	>0.05
In-hospital Death (number, %)	1 (5%)	3 (15%)	>0.05

n=number, *=significant, LV=left ventricle.

In this table, in-hospital LV dysfunction was increased in (D +) vs (D -) patients (65% vs 10%). This difference was statistically significant ($p < 0.05$). But, the differences between the two groups as regards in-hospital arrhythmias, re-infarction and death were not statistically significant.

•Three- month follow up of (D -) vs (D +) subgroup:

Table (13): three-month complications of diabetic with negative biomarkers group in comparison with diabetic with positive biomarkers group.

Parameter	***D -*** (n=19)	***D +*** (n=17)	***P value***
3-month LV Dysfunction (number, %)	6 (31%)	12 (70%)	< **0.05**
3-month re-hospitalization with ACS (number, %)	4 (21%)	14 (82%)	< **0.05**
3-month Death (number, %)	2 (10.5%)	10 (58%)	< **0.05**

n=number, *=significant, LV=left ventricle, ACS= Acute Coronary Syndrome.

In this table, the three-month complications including LV dysfunction, re-hospitalization with acute coronary syndrome, and death were all increased in (D+) group vs (D-). The differences were all statistically significant ($p < 0.05$).

•In-hospital complications of all subgroups:

Table (14): in-hospital complications of all subgroups.

Parameter	***ND-*** (n=20)	***ND+*** (n=20)	***D -*** (n=20)	***D +*** (n=20)
In-hospital LV Dysfunction (number, %)	1(5%)	5(25%)	2 (10%)	13 (65%)
In- hospital Arrhythmias (number, %)	1(5%)	2(10%)	3 (15%)	5 (25%)
In-hospital re-infarction (number, %)	0	1(5%)	1 (5%)	4 (20%)
In-hospital Death (number, %)	0	1(5%)	1 (5%)	3 (15%)

n=number, LV=left ventricle

Table (15): the in-hospital complications of ND+ versus D- subgroup

Parameter	***ND +*** (n=20)	***D -*** (n=20)	***P value***
In-hospital LV Dysfunction (number, %)	5(25%)	2 (10%)	>0.05
In- hospital Arrhythmias (number, %)	2 (10%)	3 (15%)	>0.05
In-hospital re-infarction (number, %)	1 (5%)	1 (5%)	>0.05
In-hospital Death (number, %)	1(5%)	1 (5%)	>0.05

n=number, LV=left ventricle

In tables (14-15), in-hospital complications including LV dysfunction, arrhythmias, re-infarction, and death were nearly similar in both (ND +) group and (D-) group. The differences between both groups were not statistically significant. On the other hand diabetic group with elevated markers (D+) appears to have the highest in-hospital complications.

• Three-month complications of all subgroups:

Table (16): three-month complications of all subgroups.

Parameter	***ND-*** (n=20)	***ND+*** (n=19)	***D -*** (n=19)	***D +*** (n=17)
3-month LV Dysfunction (number, %)	1(5%)	7(36%)	6 (31%)	12 (70%)
3-month re-hospitalization with ACS (number, %)	2(10%)	5(26%)	4 (21%)	14 (82%)
3-month Death (number, %)	0	4(21%)	2 (10.5%)	10 (58%)

n=number, LV=left ventricle, ACS= Acute Coronary Syndrome.

Table (17): three-month complications of ND+ and D- subgroups.

Parameter	***ND +*** (n=20)	***D -*** (n=20)	***P value***
3-month LV Dysfunction (number, %)	7(36%)	6 (31%)	>0.05
3-month re-hospitalization with ACS (number, %)	5 (26%)	4 (21%)	>0.05
3-month Death (number, %)	4(21%)	2 (10.5%)	>0.05

n=number , LV=left ventricle

In tables (16-17): no statistically significant differences was found between non diabetic with elevated markers (ND +) group and diabetic without elevated markers (D -) group in three-month complications including LV dysfunction, re-hospitalization with acute coronary syndrome, and death. Diabetic with elevated markers patients group (D+) showed also the highest incidence of complications through the three months duration.