

### Clinical characteristics of patients

Patients with non-Q-wave and Q-wave myocardial infarction groups were well matched for age, sex, height, body weight, heart rate, systolic and diastolic blood pressure and coronary risk factors (hypertension, hypercholesterolemia, diabetes mellitus and smoking ) (Table, 2& 3).

Peak level of creatine kinase activity was significantly lower among non-Q-wave versus Q-wave groups ( $638 \pm 180$  versus  $1475 \pm 420$  IU,  $p < 0.01$ ) (Table, 4).

Patients with non-Q-wave myocardial infarction were more likely to present with inferior infarction (60% versus 37.5 %,  $p < 0.05$  %) whereas patients with Q-wave infarction, the site of infarction were likely anterior (54% versus 32%,  $p < 0.05$ ) (Table, 4)

Table (2): Clinical characteristics of patients according to infarct type

Patients characteristics	Non-Q-wave MI	Q-wave MI	P value
No. of patients	25	24	
Age ( year)			
range	(43-65)	(42-78)	
mean $\pm$ SD	54 $\pm$ 9	55 $\pm$ 12	>0.05
Sex			
male (%)	24 (96%)	23 (95.8%)	>0.05
Height (cm)			
range	(155-185)	(158-182)	
mean $\pm$ SD	170 $\pm$ 15	165 $\pm$ 7	>0.05
Weight, (Kg)			
range	(60-100)	(64-105)	
mean $\pm$ SD	80 $\pm$ 20	79.5 $\pm$ 20	>0.05
HR, ( bpm)			
range	(72-94)	(75- 95)	
mean $\pm$ SD	83 $\pm$ 11	85 $\pm$ 10	>0.05
SBP, (mmHg)			
range	(130-134)	(129-139)	
mean $\pm$ SD	132 $\pm$ 2	134 $\pm$ 5	>0.05
DBP, (mmHg)			
range	(85-105)	(90- 104)	
mean $\pm$ SD	95 $\pm$ 10	97 $\pm$ 7	>0.05

HR=heart rate

SBP=systolic blood pressure

DBP= diastolic blood pressure

**Table (3): Distribution of risk factors among patients according to infarct type**

Patients characteristics	Non-Q-wave MI	Q-wave MI	P value
No. of patients	25	24	
History %			
angina	12/25 (48%)	12/24 (50%)	>0.05
HTN	9 /25 (36%)	10/24 (41.6%)	>0.05
DM	3 /25 (12%)	4 /24 (16.6%)	>0.05
HChol	7/25 (28%)	8/24 (33.3%)	>0.05
smoking	19/25 (76%)	17/24 (70.8%)	>0.05

DM= diabetes mellitus, HChol= Hypercholesterolemia, HTN= hypertension

**Table (4): Serum creatine kinase level and electrocardiogram changes among patients according to infarct type**

Patients characteristics	Non-Q-wave MI	Q-wave MI	P value
No. of patients	25	24	
Peak CK, (IU)			
range	(300-975)	(785-2165)	
mean±SD	638 ± 180	1475 ± 420	<0.01
ECG diagnosis			
Anterior infarction	8/25 (32%)	13/24 (54%)	<0.05
Inferior infarction	15/25 (60%)	9/24 (37.5%)	<0.05

CK= creatine kinase, ECG= electrocardiograph

The in-hospital course of the patients in the present study showed a similar incidence of ventricular arrhythmias, atrioventricular block, congestive heart failure and shock. However, the incidence of bundle branch block was significantly higher among patients with Q-wave MI (12% in non-Q-wave MI versus 20.8% in Q-wave MI,  $p<0.05$ ). (Table, 5)

Table (5): In-Hospital course after non-Q-wave versus Q-wave myocardial infarction

	non-Q-wave MI	Q-wave MI	P value
No. Patients	25	24	
Ventricular tachycardia	6/25 (24%)	4/24 (16.6%)	>0.05
Ventricular fibrillation	2/25 (8%)	1/24 (4%)	>0.05
Atrioventricular block	2/25 (8%)	1/24 (4%)	>0.05
Bundle branch block	3/25 (12%)	5/24 (20.8%)*	<0.05
Congestive heart failure	7/25 (28%)	7/24 (29.1%)	>0.05
Shock	5/25 (20%)	6/24 (25%)	>0.05

\* significant difference  $p<0.05$

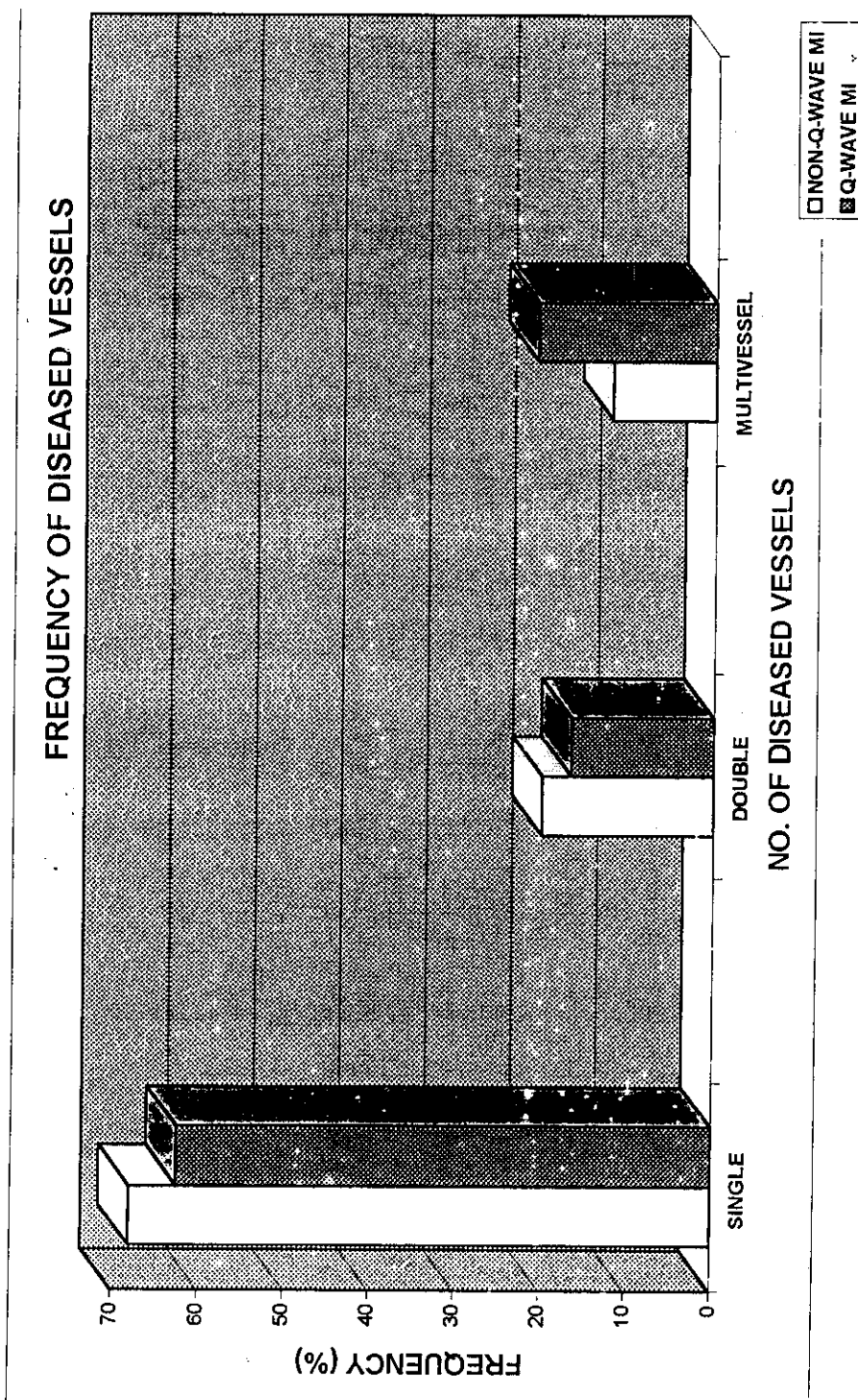
### **Coronary angiographic findings**

Concerning coronary arteries with obstruction  $\geq 50\%$ , single vessel disease was (68% versus 62.5%) and double vessel disease was (20% versus 16.6%) in non-Q-wave infarct group compared to Q-wave infarct group. However, multivessel disease was more common in Q-wave group (20.8% in Q-wave infarct versus 12% in non-Q-wave infarct) (Table, 6) (Figure, 2). There were insignificant differences in overall number of diseased vessels, totally or subtotally occluded vessels, severity or type of lesions between both types of myocardial infarction. However, type A lesions in Q-wave infarction group was significantly more common compared to non-Q-wave infarct group (29% in non-Q-wave versus 41% in Q-wave infarct group,  $p < 0.05$ ) (Table, 6) (Fig. 3)

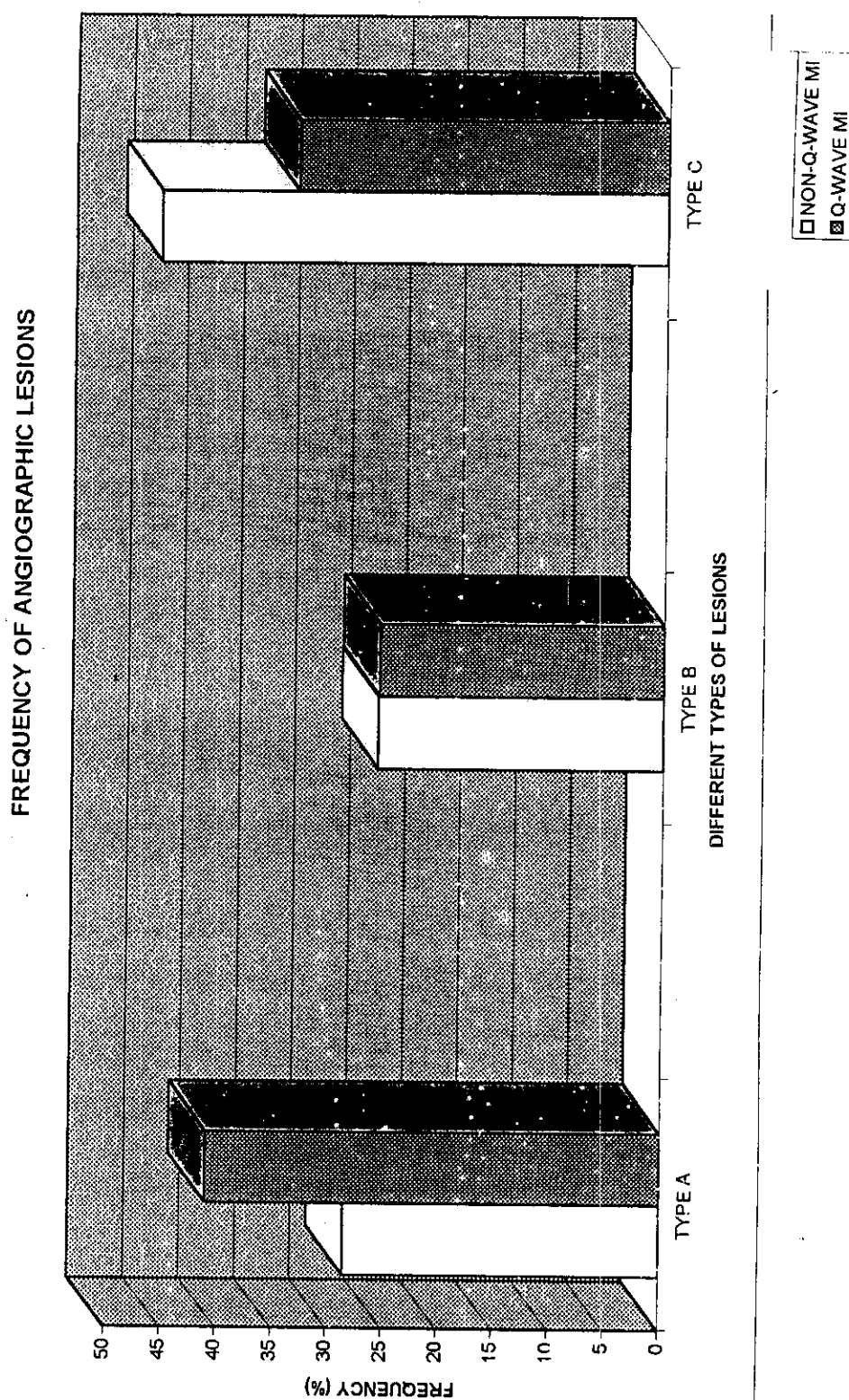
Table (6): Overall coronary angiographic findings according to infarction type

angiographic findings	Non-Q-wave MI (n=25)	Q-wave MI (n=24)	P value
<b>No. of diseased vessels</b>			
single	17/25(68%)	15/24 (62.5%)	>0.05
double	5/25 (20%)	4/24 (16.6%)	>0.05
three-vessels	3/25 (12%)	5/24 (20.8%)	>0.05
Totally occluded artery	13/34 (38.2%)	10/39 (25.6%)	>0.05
Subtotal occluded artery	8/34 (23.5%)	9/39 (23%)	>0.05
<b>Severity of lesions,</b>			
mean $\pm$ SD	90 $\pm$ 3%	83.6 $\pm$ 5%	>0.05
<b>Type of lesion*</b>			
A	10/34 (29.4%)	16/39 (41%)*	<0.05
B	9/34 (26.4%)	10/39 (25.6%)	>0.05
C	15/34 (44.1%)	13/39 (33.3%)	>0.05

\* Significant ( $p<0.05$ ), Z' test for proportion was calculate, \* type according to ACC/AHA

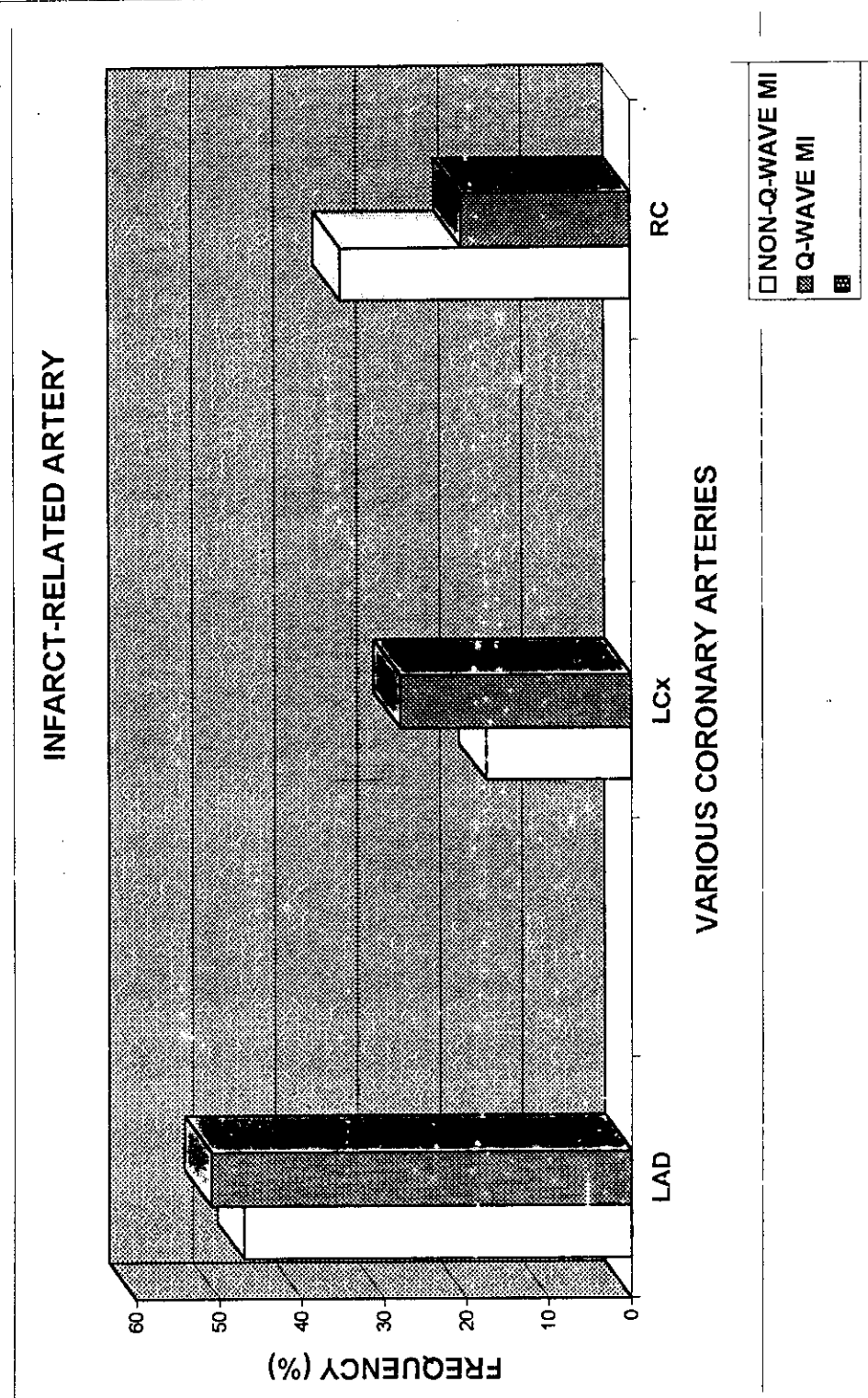


**Fig. (2): Histogram shows the frequency of diseased vessels in non-Q-wave versus Q-wave myocardial infarction.**



**Fig. (3): Histogram shows the frequency of types of angiographic lesions in non-Q-wave versus Q-wave myocardial infarction.**





**Fig. (4): Histogram shows the infarct-related artery among non-Q-wave versus Q-wave MI patients**

Table (7): overall coronary angiographic findings according to infarction type

angiographic findings	Non-Q-wave MI	Q-wave MI	P value
Number of patients	25	24	
Number of lesions	34	39	
<b>IRA</b>			
LAD	11/25 (47%)	12/24 (50%)	>0.05
LCx	4/25 (16%)	7/24 (28.2%)	>0.05
RCA	8/25 (36%)	5/24 (20.5%)	>0.05
<b>Proximal location</b>			
within IRA	14/34 (41.1%)	16/39 (41%)	>0.05
<b>TIMI flow grade in IRA</b>			
grade 0	12/34 (35.2%)	12/39 (30.7%)	>0.05
grade 1	5/34 (14.7%)	4/39 (10.2%)	>0.05
grade 2	7/34 (20.5%)	12/39 (30.7%)	>0.05
grade 3	10/34 (29.4%)	11/39 (28.2%)	>0.05
<b>Collateral to IRA</b>			
grade 1	27/34 (79.4%)	33/39 (84.6%)	>0.05
grade 2	2/34 (5.8%)	3/39 (7.7%)	>0.05
grade 3	5/34 (14.7%)	3/39 (7.7%)*	<0.05

IRA= infarct related artery with significant occlusion

LAD= left anterior descending artery; LCx= left circumflex artery; RC= right coronary artery

TIMI= thrombolysis in myocardial infarction

**Coronary angiography findings in left main artery and left anterior descending artery (LAD):**

The percent of angiographic lesions affecting left main and left anterior descending arteries in patients with non-Q-wave infarction was less than in whom with Q-wave infarction (64% versus 83.3%). (Table, 8 )

There were insignificant differences in overall distribution of lesions along LAD and its branches, severity of stenosis, type of lesion, total or subtotal occlusive lesions between both non-Q-wave versus Q-wave myocardial infarction.(Table, 8)& (Fig. 5& 6)

TIMI flow grade I was significantly more in non-Q-wave versus Q-wave MI group (18.75% versus 5%,  $p<0.05$ ). (Table, 8 )

However, TIMI flow grade II was significantly more in Q-wave infarction group (6.25% versus 30%,  $p<0.05$ ) (Table, 8 )

Complete patency (TIMI flow grade III) as well as identifiable collaterals to LAD did not show any significant differences between both groups of infarction.(Table, 8 ) (Fig. 5 & 6)

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**Coronary angiography findings in left circumflex artery (LCx):**

The number of angiographic lesions in LCx artery was less in non-Q-wave compared to Q-wave MI group. (6/25 versus 11/24) **(Table, 9)**

There were no statistically difference in distribution of lesions between both types of myocardial infarction along LCx artery course, however, the totally occlusive lesions appeared significantly higher in non-Q-wave MI versus Q-wave MI group (50% versus 9%,  $p<0.001$ ). **(Table, 9)**

Type A angiographic lesions was significantly lower in non-Q-wave MI group (16.6% versus 54.4%,  $p<0.05$ ). On there hand, type C lesions was more in non-Q-wave MI group (66.6% versus 18%,  $p<0.05$ ). **(Table, 9)**

Poststenotic TIMI flow grade III was significantly higher in Q-wave compared to non-Q-wave myocardial infarction group (0% versus 27.7%,  $p<0.001$ ). **(Table, 9) (Fig. 7& 8).**

Collaterals to LCx were absent between both groups of MI.

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**Coronary angiography findings in right coronary artery (RCA):**

Number of angiographic lesions in RCA were more higher in patients with non-Q-wave MI compared to Q-wave infarction groups (12/25 versus 8/24). **(Table, 10)**

However, there weren't significant differences in site, severity, angiographic type of lesions between both types of infarction. **(Table, 10)**

The percentage of subtotally occluded lesions appeared significantly higher in non-Q-wave compared to Q-wave MI groups (33.3% versus 12.5%,  $p<0.05$ ). **(Table, 10)**

Complete TIMI flow to the distal segments were significantly more in Q-wave MI, however collaterals grade 2 was significantly more common in non-Q-wave MI group. **(Table, 10) & (Fig. 9)**

**Table (8): coronary angiographic findings in left main artery and left anterior descending (LAD) artery**

angiographic findings	Non-Q-wave MI	Q-wave MI	P value
Number of patients	25	24	
Number of lesions	16/25 (64%)	20/24 (83.3%)	
Site			
Left main	1/16 (6.25%)	0/20 (0%)	>0.05
ostial	1/16 (6.25%)	0/20 (0%)	>0.05
proximal	8 /16 (50%)	10/20 (50%)	>0.05
mid	6/16 (37.5%)	7/20 (40%)	>0.05
diagonal	0/16 ( 0%)	2/20 (10%)	>0.05
Total occluded	5/16 (31.25%)	6/20 (30%)	>0.05
Subtotal occluded	3/16 (18.75%)	4/20 (20%)	>0.05
Severity			
range	(61-100)	(50-100)	
mean±SD	80 ± 19.8	75 ± 24.8	>0.05
Type of lesion*			
A	6/16 (37.5%)	9/20 (45%)	>0.05
B	4/16 (25%)	4/20 (20%)	>0.05
C	6/16 (37.5%)	6/20 (35%)	>0.05
TIMI flow grade			
grade 0	5/16 (37.5%)	8/20 (40%)	>0.05
grade 1	3/16 (18.75%)	1/20 (5%)	<0.05
grade 2	1/16 (6.25%)	6/20 (30%)	<0.05
grade 3	7/16 (43.75%)	5/20 (25%)	>0.05
Collateral to LAD			
grade 1	13/16 (81.25%)	16/20 (80%)	>0.05
grade 2	0/16 (0%)	2/20 (10%)	>0.05
grade 3	3/16 (18.75%)	2/20 (10%)	>0.05

IRA= infarct related artery

TIMI= thrombolysis in myocardial infarction

Table (9): coronary angiographic findings in left circumflex (LCx) artery

angiographic findings	Non-Q-wave MI	Q-wave MI	P value
Number of patients	25	24	
Number of lesions	6/25 (24%)	11/24(46%)	
Site			
proximal	2/6 (33.3%)	4/11 (36.3%)	>0.05
mid	3/6 (50%)	6/11 (54.5%)	>0.05
distal	1/6 (16.6%)	1/11 (9%)	>0.05
Total occluded	3/6 (50%)	1/11 (9%)	<0.05
Subtotal occluded	1/6 (16.6%)	4/11 (36.3)	>0.05
Severity			
range	(80,100)	(45,100)	
mean $\pm$ SD	93 $\pm$ 7	81.6 $\pm$ 17.2	>0.05
Type of lesion♣			
A	1/6 (16.6%)	6/11 (54.4%)	<0.05
B	1/6 (16.6%)	3/11 (27.7%)	>0.05
C	4/6 (66.6%)	2/11 (18%)	<0.05
TIMI flow grade			
grade 0	3/6 (50%)	1/11 (9%)	<0.05
grade 1	1/6 (16.6%)	2/11 (18%)	>0.05
grade 2	2/6 (33.3%)	5/11 (45.5%)	>0.05
grade 3	0/6 (0%)	3/11 (27.7%)	<0.05
Collateral to LCx			
grade 1	6/6 (100%)	10/11 (90.9%)	>0.05
grade 2	0/6 (0%)	0/11 (0%)	—
grade 3	0/6 (0%)	1/11 (9%)	>0.05

IRA= infarct related artery

TIMI= thrombolysis in myocardial infarction

\* Significant ( $p < 0.05$ )

Z test for proportion was calculated

♣type according to ACC/AHA

Table (10): coronary angiographic findings in right coronary (RCA) artery

angiographic findings	Non-Q-wave MI	Q-wave MI	P value
Number of patients	25	24	
Number of lesions	12/25 (48%)	8/24 (33.3%)	
location			
proximal	5/12 (41.6%)	2/8 (25%)	>0.05
mid	3/12 (25%)	4/8 (50%)	>0.05
distal	4/12 (33.3%)	2/8 (25%)	>0.05
Total occluded	5/12 (41.6%)	3/8 (37.5%)	>0.05
Subtotal occluded	4/12 (33.3%)	1/8 (12.5%)	<0.05
Severity			
range	(54.5,100)	(46,100)	
mean±SD	91 ± 9	80 ±21.9	>0.05
Type of lesion♣			
A	2/12 (16.6%)	1/8 (12.5%)	>0.05
B	4/12 (33.3%)	3/8 (37.5%)	>0.05
C	6/12 (50%)	4/8 (50%)	>0.05
TIMI flow grade			
grade 0	5/12 (41.6%)	3/8 (37.5%)	>0.05
grade 1	2/12 (16.6%)	1/8 (12.5%)	>0.05
grade 2	3/12 (25%)	1/8 (12.5%)	>0.05
grade 3	2/12 (16.6%)	3/8 (37.5%)	<0.05
Collateral to RCA			
grade 1	8/12 (66.6%)	7/8 (87.5%)	>0.05
grade 2	2/12 (16.6%)	0/8 (0%)	<0.05
grade 3	2/12 (16.6%)	1/8 (12.5%)	>0.05

IRA= infarct related artery

TIMI= thrombolysis in myocardial infarction

\* Significant (  $p<0.05$  )

Z test for proportion was calculated

♣type according to ACC/AHA



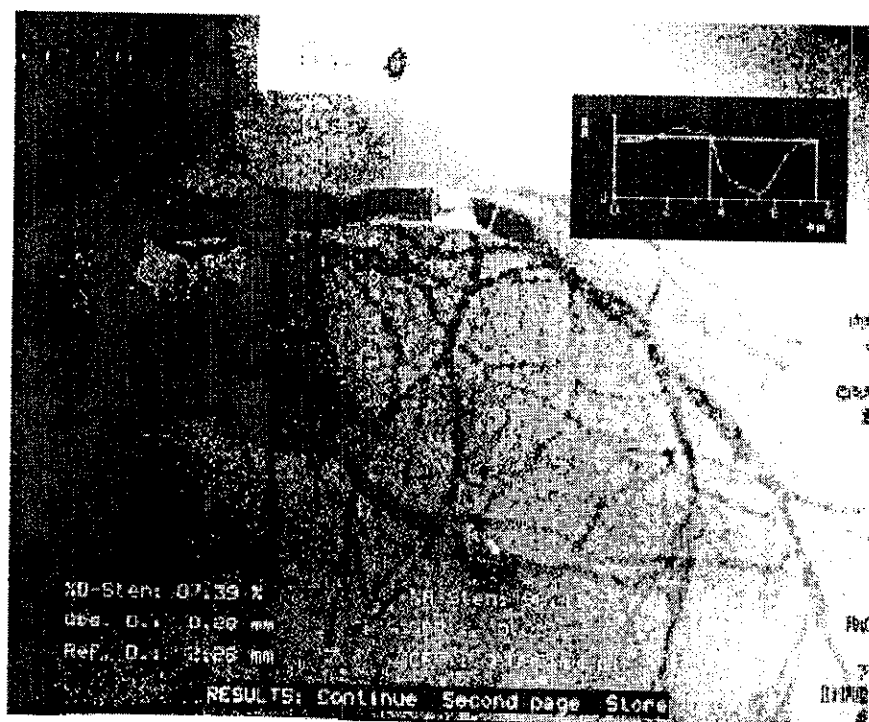
### **Left ventriculogram findings**

Global left ventricular ejection fraction percentage (EF%) was higher in non-Q-wave infarct group compared to Q-wave infarct group ( $54 \pm 9.4\%$  versus  $46 \pm 12\%$ ) (Table, 11).

Regional shortening of radii in the various left ventricle zones were non-significantly differ among non-Q-wave infarct or Q-wave infarct patients.(Table, 11) (Figure, 10&11).

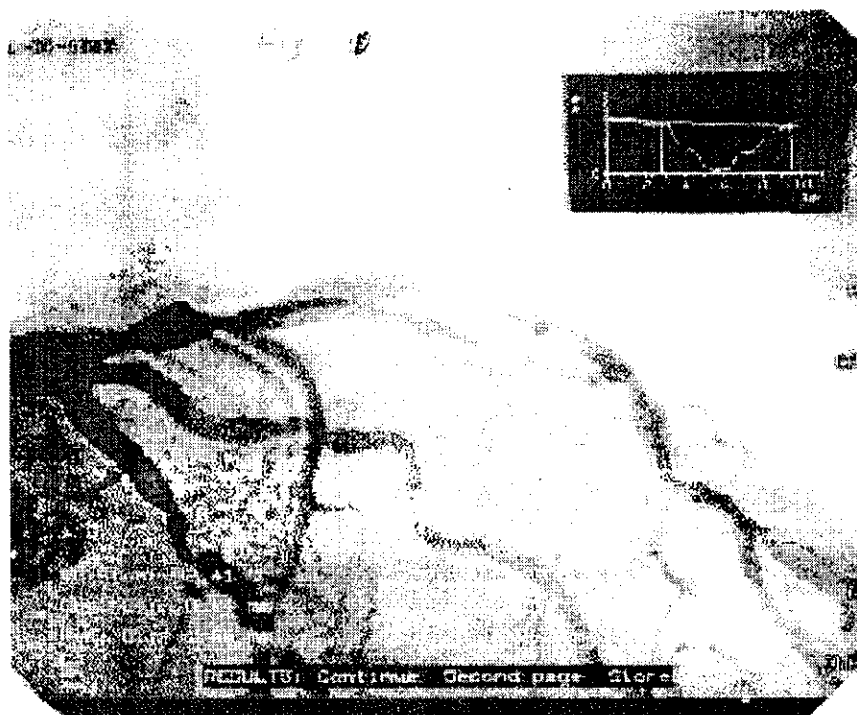
Severe left ventricular dysfunction (i.e. ejection fraction  $\leq 35\%$ ) had a greater percentage between patients evolving Q-wave infarct (20.8% versus 0%;  $p < 0.001$ ). Furthermore, left ventricular ejection fraction  $\geq 55\%$  was significantly higher in non-Q-wave infarct compared to Q-wave infarct patient (44% versus 33.3%) (Table, 11) (Figure, 10&11). Aneurysm was seen in only one patient of non-Q-wave infarct group.





**Fig. (5): Right anterior oblique arteriogram of patient with a concentric stenotic lesion of 87% in the left anterior descending coronary artery in the midsegment with good distal run off.**

Patient's No. 11 (non-Q-wave MI group)

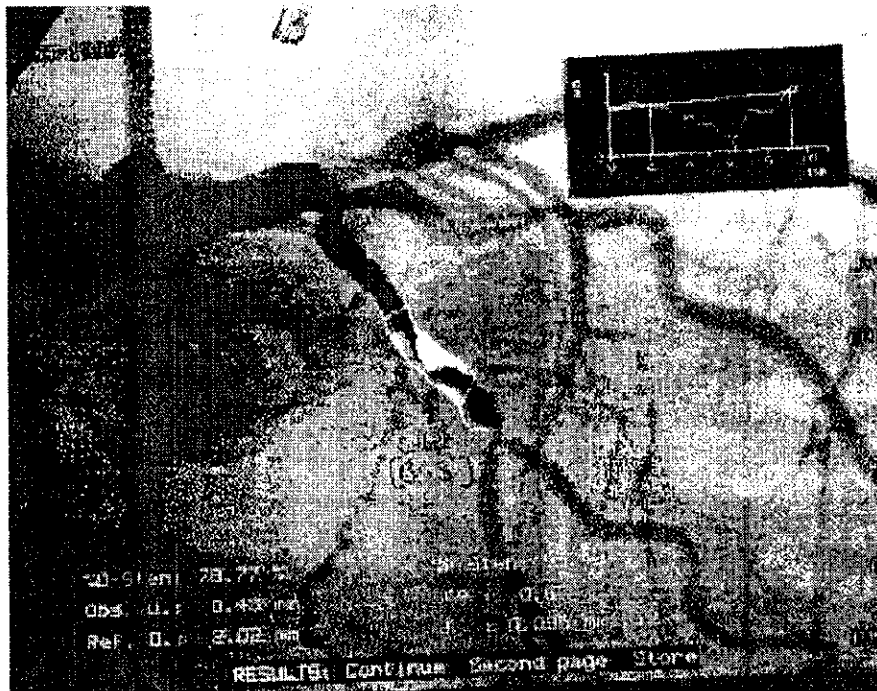


**Fig. (6): Right anterior oblique arteriogram of patient with total occlusive lesion in left anterior descending coronary artery showing collateral flow from the right coronary system to the distal branches of left anterior descending coronary artery .**

**Patient's No. 21 (Q-wave MI group)**

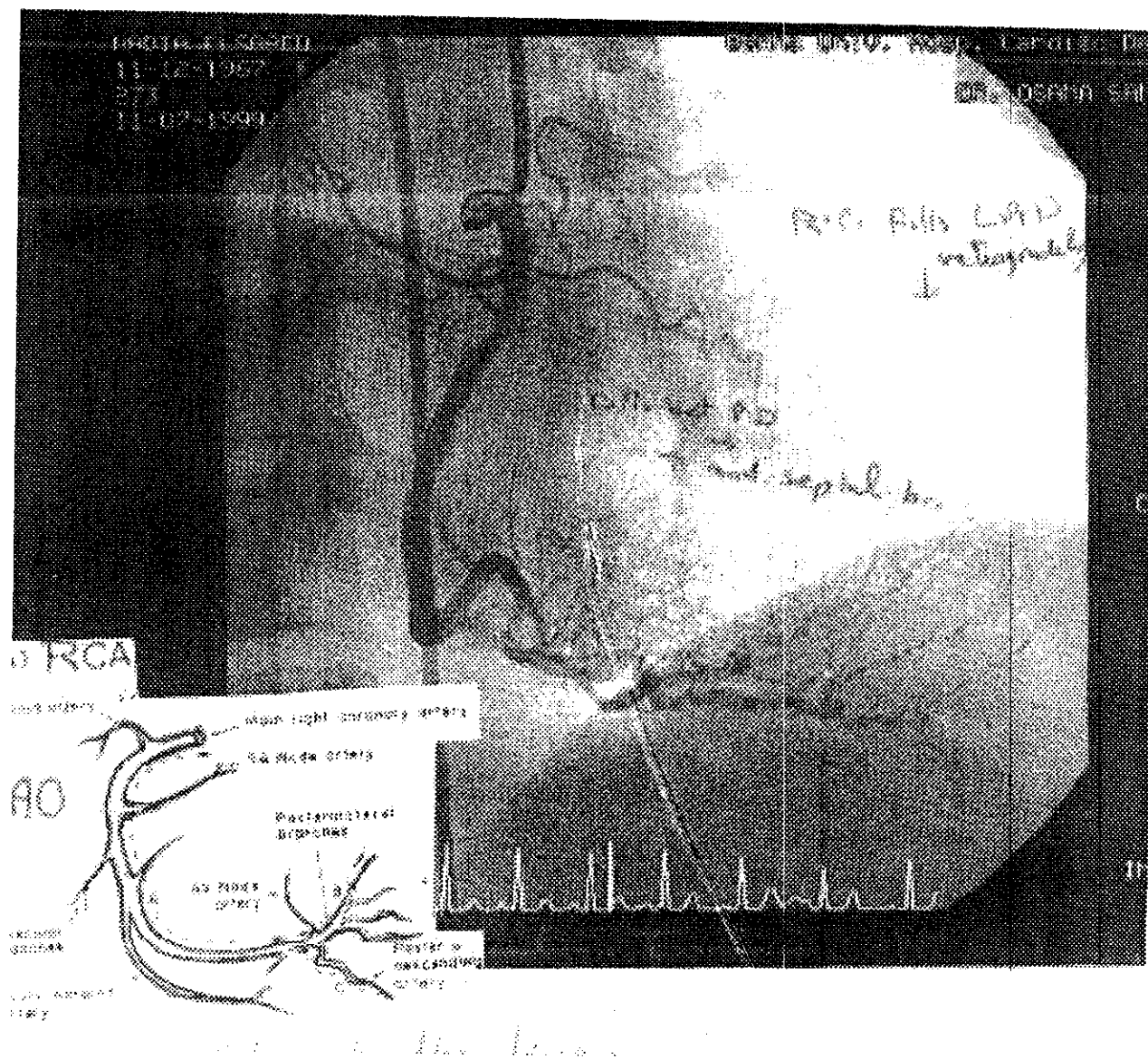


**Fig. (7): Right anterior oblique arteriogram of patient with concentric stenotic lesion of 60% in the left circumflex coronary artery in the midsegment with good distal run off.**  
Patient's No. 21 (non-Q-wave MI group)



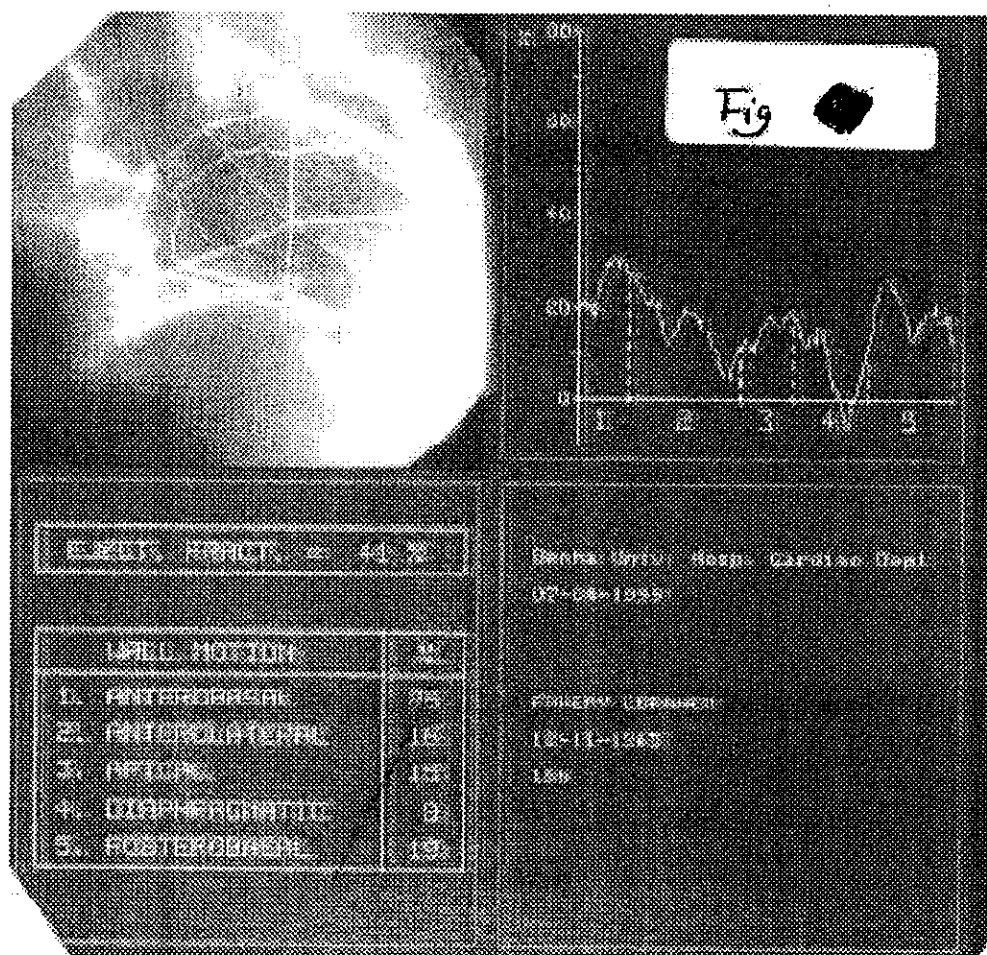
**Fig. (8): Right anterior oblique arteriogram of patient with eccentric stenotic lesion of 78% in left circumflex coronary artery in the midsegment with good distal run off.**

Patient's No. 9 (Q-wave MI group)



**Fig. (9): Right anterior oblique arteriogram of eccentric stenotic lesion of 70% in right coronary artery in the midsegment with good distal run off.**

Patient's No. 17 (non-Q-wave MI group)



**Fig. 10: Left ventriculogram in patient with myocardial infarction showing global and segmental ejection fraction**

Patient's No. 20 (Q-wave MI group)



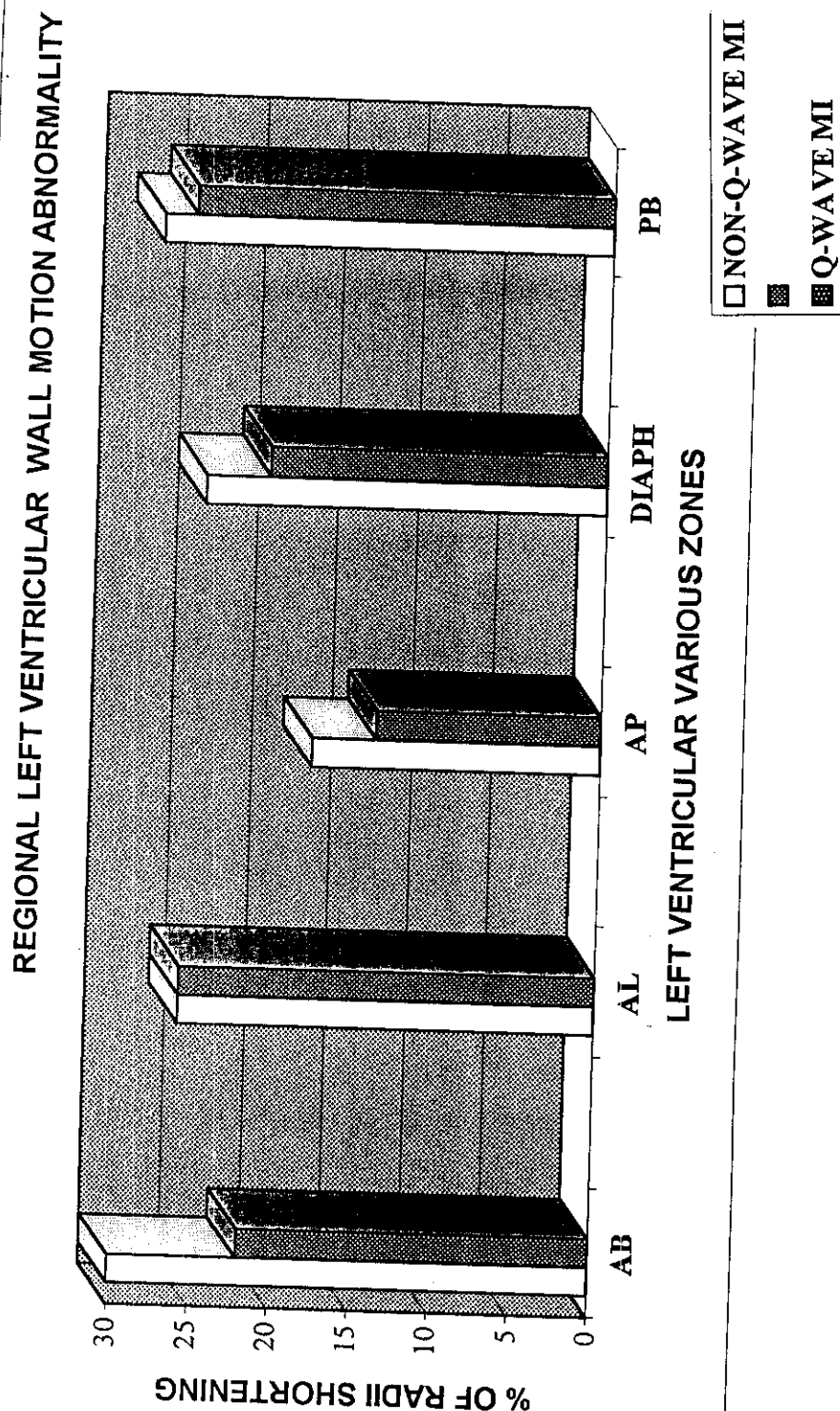


Fig. 11 : Histogram shows regional Left ventricular wall motion abnormalities in various zones in both types of infarction.

Q-WAVE MI GROUP															
case no	coronary lesion analysis						collateral	TIMI	pattern	Left ventriculography analysis					
	dis.ves.	site	%severit	type	#vessel	AB				AL	Ap	diaph	Pb	global	
1	lad	prox	81	B	2	1	2	ANTE	42	24	14	9	52	55	
	LCx	mid	58	A		1	3	ANTE							
2	RC	prox	100	C	1	1	0		16	32	6	26	21	49	
3	lad	prox	82.6	A	1	1	2	ANTE	30	50	24	32	33	66	
4	lad	mid	71.8	A	3	2	3	ANTE	42	14	11	31	38	44	
	Diag	prox	70	A		1	3	ANTE							
	RC	mid	100	C		2	0	RETRO							
5	lad	prox	59	A	4	1	2	ANTE	32	30	30	11	30	61	
	Diag	prox	62.8	A		1	3	ANTE							
	LCx	mid	91	A		1	2	ANTE							
	RC	mid	46.7	B		1	3	ANTE							
6	LCx	mid	80	A	1	1	3	ANTE	9	7	7	3	8	22	
7	lad	prox	90.6	C	1	1	2	ANTE	16	15	14	4	21	42	
8	lad	mid	62.5	A	1	1	3	ANTE	19	30	18	43	32	57	
9	LCx	mid	79.6	B	1	1	2	ANTE	26	22	23	33	37	59	
10	lad	mid	88.3	B	1	1	2	ANRE	21	33	13	36	15	48	
11	lad	prox	100	C	2	2	0	RETRO	26	23	31	33	18	55	
	LCx	mid	100	C		1	0								
12	lad	mid	100	C	1	1	0		37	34	11	39	37	62	
13	LCx	mid	83	C	1	1	2	ANTE	26	34	20	26	29	54	
14	lad	prox	100	C	3	1	0		10	7	10	9	15	33	
	LCx	mid	45	B		1	3	ANTE							
	RC	dist	54	C		1	3	ANTE							
15	LCx	prox	83	A	2	1	2	ANTE	23	18	4	8	17	31	
	RC	dist	77.5	B		1	2	ANTE							
16	lad	prox	50	B	1	1	3	ANTE	14	19	15	24	29	45	
17	lad	prox	99.5	A	3	1	0		24						
	LCx	prox	95	B		3	1	ANTE							
	RC	mid	96	A		1	1	ANTE							
18	lad	mid	100	C	1	1	0		27	40	21	31	35	62	
19	Lad	prox	87.5	A	1	1	1	ANTE	10	9	-3	25	40	38	
20	LCx	mid	98	A	1	1	1	ANTE	25	16	15	8	19	41	
21	lad	prox	100	C	1	3	0	RETRO	11	12	4	12	18	29	
22	lad	mid	97	A	2	3	0	RETRO	26	33	18	28	29	53	
	LCx	dist	85	A		1	2	ANTE							
23	RC	prox	100	C	1	1	0		26	17	12	5	7	42	
24	lad	mid	86	B	3	1	2	ANTE	10	17	17	20	14	37	
	LCx	prox	70	A		1	3	ANTE							
	RC	mid	67.8	B		1	3	ANTE							

NON-Q-WAVE MI GROUP														
case no	coronary lesion analysis					collateral	TIMI	pattern	Left ventriculography analysis					global
	dis. ves.	site	%severit	type	#vessel				AB	AL	Ap	diaph	Pb	
1	lad	mid	61.2	A	1	1	3	ANTE	28	19	17	33	37	51
2	lad	prox	100	C	1	1	0		27	45	26	22	24	61
3	lad	mid	92.7	B	1	1	1	ANTE	46	43	15	44	34	66
4	lad	prox	100	C	1	1	0		32	21	12	24	46	53
5	lad	prox	77.3	B	1	1	3	ANTE	40	43	25	36	45	73
6	lad	prox	100	C	2	1	0		21	22	12	34	22	49
7	RC	prox	90	C		1	2	ANTE						
8	RC	dist	96	B	1	1	2	ANTE	32	27	23	25	14	54
9	LCx	mid	82.3	A	2	1	2	ANTE	31	23	29	21	30	59
10	RC	mid	100	C		2	0	RETRO						
11	lad	mid	98.4	A	2	3	0	RETRO	10	14	7	10	26	38
12	RC	prox	97.6	A		1	1	RETRO						
13	RC	dist	97.4	A	1	1	1	ANTE	33	18	24	9	31	55
14	lad	mid	80	B	1	1	3	ANTE	44	30	21	29	47	48
15	lad	mid	90.7	C	2	3	1	ANTE	30	20	16	29	24	52
16	LCx	mid	100	C		1	0							
17	RC	dist	88.6	B	1	1	2	ANTE	30	19	10	16	26	48
18	RC	prox	100	C	1	2	0	RETRO	33	43	28	20	23	84
19	lad	prox	100	C	2	3	0	RETRO	30	19	16	26	22	41
20	l. main		78	C		1	3	ANTE						
21	RC	mid	100	C	1	3	0	RETRO	23	22	24	26	15	50
22	lad	ost	84.7	B	3	1	2	ANTE	32	21	16	31	19	48
23	LCx	prox	89.4	C		1	1	ANTE						
24	RC	mid	89.4	B		1	3	ANTE						
25	LCx	dist	100	C	1	1	0		36	30	21	36	31	60
26	lad	mid	66	A	2	1	3	ANTE	11	23	18	10	12	38
27	RC	dist	100	C		1	0							
28	lad	mid	73	A	3	1	3	ANTE	35	17	13	42	17	44
29	LCx	prox	100	C		1	0	RETRO						
30	RC	prox	54.5	B		1	3	ANTE						
31	LCx	mid	60	B	1	1	2	ANTE	42	31	22	20	30	61
32	lad	prox	96.4	A	1	1	1	ANTE	31	39	22	41	34	63
33	lad	prox	100	C	1	1	0	RETRO	32	35	20	23	41	67
34	RC	prox	100	C	1	3	0	RETRO	28	15	18	14	21	44
35	lad	prox	80	A	1	1	3	ANTE	33	12	14	22	27	48