Registry of Ischemic Heart Disease Patients In The Region of Mid Delta, EgyptData Base and Quality Initiative Project

ABSTRACT

Background: Cardiovascular diseases are significant contributors to global increased mortality rates. CORONARY ARTREY DISEASE (CAD) is the most common cause of heart disease globally.
Aims: Detection of the characteristics [clinical , electrocardiographic , echocardiographic and coronary angiographic] of ischemic heart disease patients in Med Delta region in Egypt and also their management plan.
Methodology: The registry included 1000 patients of ischemic heart disease (IDH) at Med Delta Region .All patients underwent full medical history, full cardiac examination, detection of ECG changes , cardiac enzymes , other labs , Echocardiography and coronary angiography
Results:
Out of 1000 patients studied 72.1% had chronic coronary syndromes and 27.9% had acute coronary syndrome..Seven hundreds and sixty-seven (76.7%) were known to have hypertension and 725 (72.5%) patients were smokers. left anterior descending artery (LAD) was diseased in 54.9 % of the patients . single vessel disease was affected in 61.7% , 21.5% had double vessel disease and about 16.8 % had multi vessel disease .
Conclusion: Chronic coronary syndrome was the most common presentation in the studied patients with hypertension being the most prevalent risk factor and LAD was the mostly affected vessel .

Keywords: Registry, *MID-DELTA, IHD*

1. INTRODUCTION

Cardiovascular illnesses are typically divided into three groups: electrical, circulatory, and structural.[1].The most prevalent type of cardiovascular disorders is coronary artery disease (CAD), a circulatory-related condition that affects the coronary circulation. [2]Cardiovascular diseases are significant contributors to global increased mortality rates.[3]According to the World Health Organization (WHO), 32% of all deaths worldwide in 2019 were attributable to CVD, killing an estimated 17.9 million individuals (WHO, 2021).[4]CAD is caused by atherosclerosis, which occurs within the walls of the coronary arteries as a result of cholesterol deposits (plaque) in the arteries. The atheromatous plaque grows gradually, leading to the narrowing of the arterial lumen. Atherosclerosis progresses slowly, causing the intima to thicken gradually. [5]There are two types of CAD risk factors: modifiable and non-modifiable. The modifiable factors are obesity, hypertension, diabetes, dyslipidemia, smoking, and physical inactivity that can all be modified and managed. [6]CAD can be diagnosed in patients using invasive and non-invasive techniques. Invasive coronary angiography is the gold standard in the diagnosis of CAD patients.Technology advancements have made it possible for us to non-invasively see coronary calcification .[7]

2. METHODOLOGY

Patient population

This study was carried out at Tanta Health Insurance Hospital, Tanta Cardiovascular department, Tanta university and also at different centers at the Mid-Delta region including Benha University Hospitals Mansoura University Hospitals Menofia University Hospitals and Al Mahalla cardiology center

. The duration of the study was one year, starting from 1st of March 2021 to 28th of February 2022. this study was a registry study and was conducted on (1000) patients with Ischemic heart diseases.

Inclusion criteria

All patients presented with ischemic heart disease .

Exclusion criteria

Patients refused coronary angiography.

Patients who were unfit for coronary angiography **.**

Methods

All patients were subjected to the following:

I. Full history taking with particular emphasis to age, sex, medical history, and family history with careful evaluation of complaint and common presenting symptoms (onset & duration), and focused on traditional risk factors such as hypertension, diabetes mellitus, and smoking.

II. Laboratory investigations as, complete blood count, Na, K, serum creatinine, liver enzymes, lipid profile and cardiac enzymes.

III. Well standardized12-leads resting electrocardiogram (ECG) was done for all patients with special emphasis on heart rate, cardiac rhythm, QRS duration, conduction abnormalities, ST segment deviation, T-wave changes and ischemic changes were considered when there was primary ST-segment deviation , T-wave changes and (or) pathological Q-wave in contagious leads.

IV. Echocardiography was done for assessment of Ejection fraction (EF) and resting wall motion abnormalities and any other abnormal findings

V. Coronary angiography was done for all patients.

2.5. Statistical analysis

Statistical analysis was performed using was calculated by SPSS version 25. The qualitative parameters were described by number of frequency and percentage while the quantitative variables were described by mean, standard deviation and range. Continuous variables were summarized using means or medians based on the normality; normally distributed variables were summarized using the mean and standard deviation (SD), while the non-normally distributed variables were summarized using the median. Categorical data were summarized as the frequency and percentage

3. RESULTS AND DISCUSSION

This registry was carried out on 1000 patients all from Mid delta region. The main bulk of our patients were recruited from Tanta Health Insurance Hospital. The rest of the centers are shown in **table 1**.

Distribution of the studied cases according to demographic data

Men constituted the main bulk of our patients as 710/1000 of all patients were males (71%) versus females who were 290 (29%) (table2)

Distribution of clinical risk factors and associated comorbidities for the included populations

Seven hundreds and sixty-seven (76.7%) of our enrolled patients were known to have hypertension which represented the most prevalent risk factor in our study, followed by smoking as the second most common risk factor with 725 (72.5%) patients were smokers. (table3)

Distribution of the studied cases according to medical history

According to medical history of ischemic heart disease**,** we found 217 (21.7%) of patients had previous ACS, 225 (22.5%) had previous CABG and 528 (52.8%) had prior PCI. (table4)

Distribution of the studied cases according to patient's presentation

The majority of our patients, seven hundreds and twenty-one (72.1%) had chronic coronary syndrome. About 190(19%) of patients presented with STEMI and 89(8.9%) had NSTEMI. The most common presenting symptom was chest pain with percentage of 79%. (table5)

Distribution of the studied cases according to ECG findings upon admission and changes during patients' hospital stay

All enrolled patients had 12 leads ECG only 186(18.6) of all patients had normal ECG. Ischemic changes presented in most patients in 814(81.4%) patients. (table6)

Distribution of the studied cases according to different Echocardiographic parameters

Also all population had complete transthoracic echocardiography assessment. Three-hundreds and forty-one (34.1%) of the studied population had preserved ejection fraction while 322 (32.2%) were not preserved the rest of the population 337 (37.3%) had mid-range. From all these population 740 (74%) patients showed abnormal wall motion hypokinesia at rest. (table7)

None invasive tests before coronary angiography in patients subjected to elective coronary angiography

From the chronic patients enrolled with us we found patients with previous non-invasive coronary testing and they were as following, stress ECG in 240 (24%) of all patients, MPI in 270 (27%) of total population enrolled during our study, and 47 (4.7) underwent CT-Coronary angiography. (table8)

Distribution of the studied cases according to different parameters of coronary vessels affected according to results of coronary angiography

According to the results of coronary angiography that was done to all population about 617 (61.7) ofthe patients had single vessel disease, while 215 (21.5%) had double vessel disease and 168 (16.8%) had multi vessels disease. (table9)

Distribution of the studied cases according to decision of management after coronary angiography

Regarding the decision that was taken for the patients' management, 602 (60.2%) of patient underwent PCI while, 298 of all patients referred for surgical consultation and only 100 (1%) of the patients were advised to stay on medical treatment. (table10)

Distribution of the studied cases according to the site of lesion in coronary arteries

Regarding the site of lesions, we noticed that 63 (6.3%) of patients had left main coronary artery disease, 549 of the studied population had left anterior descending coronary artery lesions that accounted the most frequent affected vessel. (table11)

Table 1: Distribution of the studied cases according to the number of cases in hospitals

Hospital name	Number of cases	%
Tanta Health Insurance hospital	558	55.8%
Benha University Hospitals	108	10.8 %
Tanta university hospitals	101	10.1%
Mansoura University Hospitals	92	9.2%
Al Mahalla cardiology center	72	7.2%
Menofia University Hospitals	69	6.9%

Table 2: Distribution of the studied cases according to demographic data:

	No.	**%**

Age		
Min-max	30-78	
mean± sd	57.98±10.23	
Median	54	
Gender		
Male	710	71
Female	290	29
Occupation		
Working	390	39
Retired	450	45
Disabled	160	16
Marital status		
Single	140	14
Married	560	56
Widow	240	24
Divorced	60	6
Residency		
Rural	245	24.5
Urban	755	75.5
Educational level		
Illiterate	70	7
High school	357	35.7
University graduate	573	57.3

Table 3: Distribution of clinical risk factors and associated comorbidities for the included populations:

Medical history and risk factors	No.	%
Hypertension	767	76.7%
Dyslipidaemia	518	51.8%
CKD	300	30%
Diabetes	660	66%
PAD	175	17.5%
Family history for IHD	475	47.5%
BMI		
18.5-24.9	365	36.5%
25-29.9	200	20%
30 or higher	435	43.5%

Smoking	725	72.5%

CKD …, PAD….,BMI….

Table 4 : Distribution of the studied cases according to medical history:

	NO.	%
Previous ACS	217	21.7%
Prior CABG	225	22.5%
Prior PCI	528	52.8%

Table 5: Distribution of the studied cases according to patient's presentation:

Presentation of IHD	No.	%
Acute coronary syndrome		
STEMI	190	19%
NSTEMI	89	8.9%

Chronic coronary syndrome with unstable angina	721	72.1%
Main presenting symptoms		
Chest pain	790	79%
Breathlessness	290	29%
Other symptoms as fatigue and sweating .	389	38.9%

STEMI (st-segment elevation myocardial infarction),NSTEMI(non-(st-segment elevation myocardial infarction)

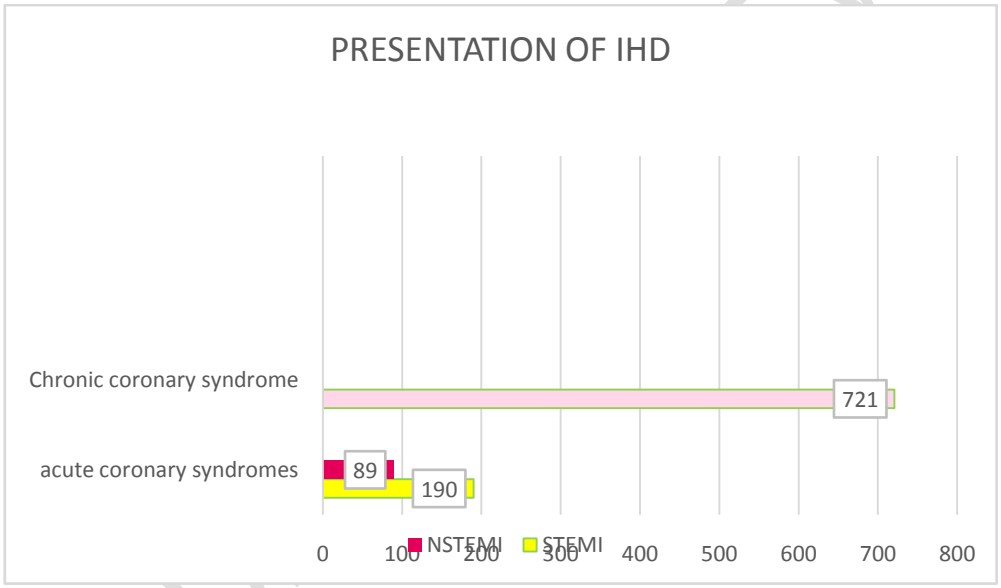

FIG (1) Presentation of IHD during the registry:

STEMI(ST- elevation myocardial infarction) NSTEMI (NON-ST elevation myocardial infarction)

Table 6: Distribution of the studied cases according to ECG findings upon admission and changes during patients' hospital stay:

Ecg findings	NO.	%
Normal ECG	186	18.6%
Ischemic changes	814	81.4%
Sinus rhythm	724	72.4%
AF	276	27.6%
LBBB	326	32.6%

AF, LBBB

Table 7: Distribution of the studied cases according to different Echocardiographic parameters

	No.	%
Wall motion hypokinesia	740	74%
EF		
Preserved EF (>50%)	341	34.1%
Mid-range EF(40-50%)	337	33.7%
Impaired EF(<40%)	322	32.2%

EF (Ejection Fraction)

Table 8- None invasive tests before coronary angiography in patients subjected to elective coronary angiography

Test	Stable coronary syndrome	
	No.	%

Stress exercise ECG	**240**	**24%**
CT Coronary angiography	**47**	**4.7%**
Myocardial Perfusion Imaging	**270**	**27%**
Total	**557**	**55.7%**

ECG(Electocardiogram),CT(Computed Tomography)

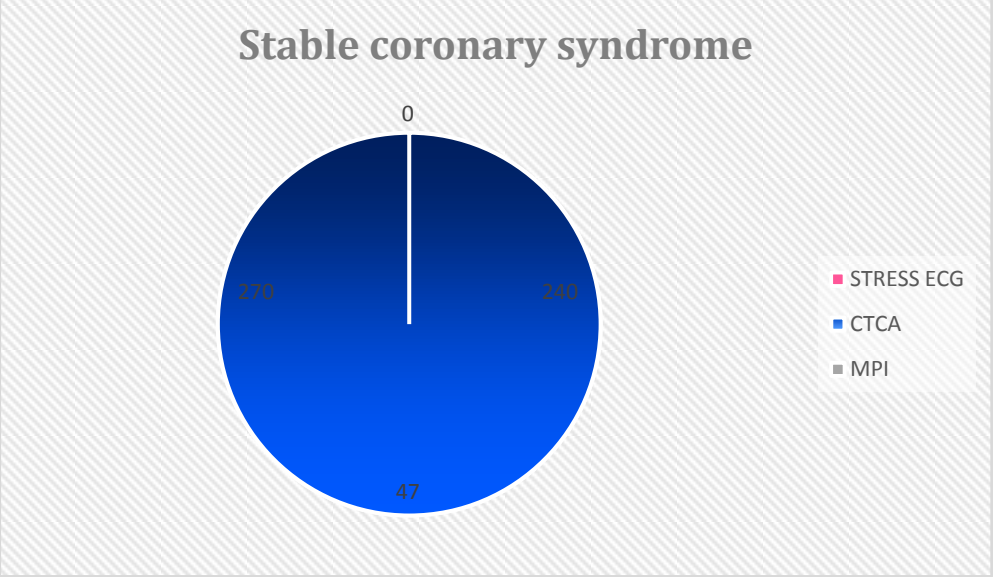

Fig (2) pre-tests which were done during the registry

Table 9-Distribution of the studied cases according to different parameters of coronary vessels affected according to results of coronary angiography:

	No.	%
Single vessel disease	617	61.7%
Two vessel disease	215	21.5%

Multi vessel disease	168	16.8%

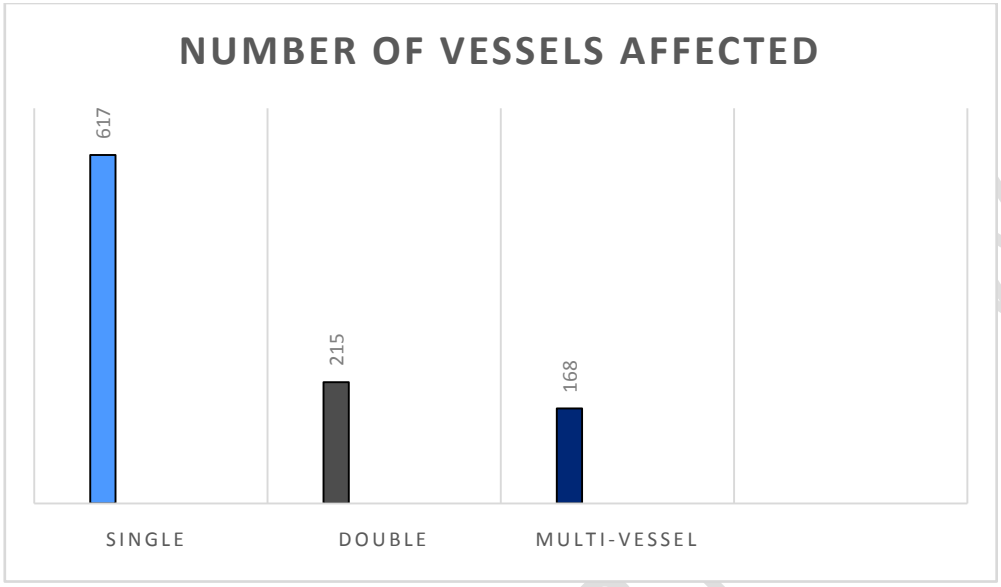

Fig (3) Distribution of number of vessel affected in the study population

Table10-Distribution of the studied cases according to decision of management after coronary angiography:

	No.	%
PCI	602	60.2%
Surgical refer	298	29.8%

Medical treatment	100	1%

PCI (percutaneous intervention)

Table 11- Distribution of the studied cases according to the site of lesion in coronary arteries:

	No.	%
LM	**63**	**6.3%**
LAD	**549**	**54.9 %**
LCX	**334**	**33.4 %**
RAM	**90**	**9%**
RCA	**313**	**31.3 %**

LM(left main coronary artery) LAD (left anterior descending artery) LCX(left circumflex coronary artery) RAM(ramus coronary artery) RCA (right coronary artery)

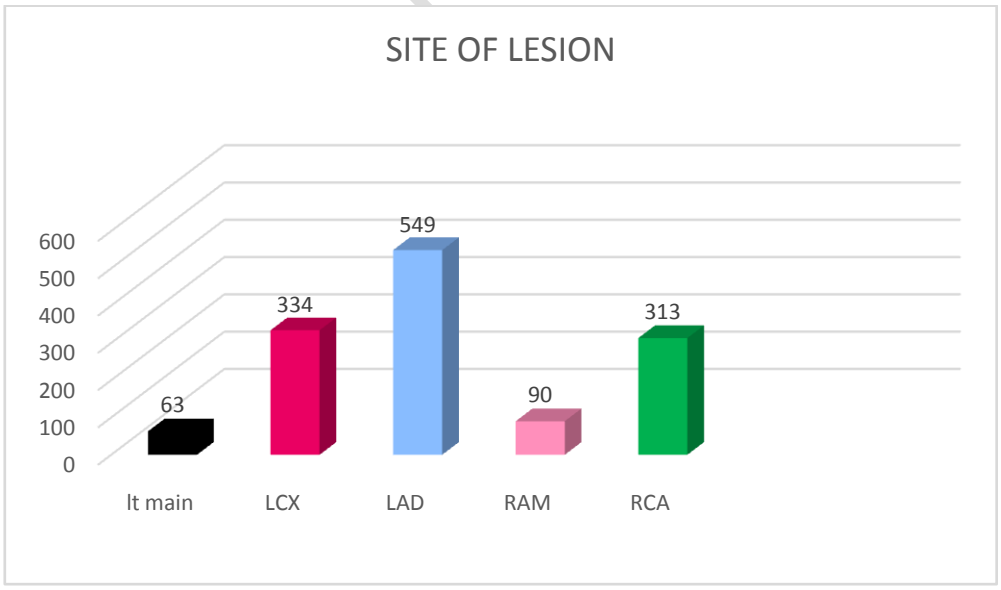

FIG (4) Distribution of sites of lesions
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Discussion

The current registry reported general characteristics, demographics, clinical picture and management in 1000 patients with IHD in the Egyptian mid-delta region . In the following discussion, we also would try to compare our overall results with the available national, regional and international data.

Regarding the socio-demographic data, we reported that 45% of the studied populations were retired, 16% were disabled and 39% were regularly working before the admission. about 56% of our patients were married ,14% were single, 7% were divorced and 24% were widows. Patients from urban areas were more commonly found as compared to those from rural areas. We also noted that the previous history of CABG accounted for 22.5%, prior PCI 52.8% and prior ACS 21.7%.

The study done by **Doll** et al., who reported that 65.8% of their studied patients were married ,7.9% were widow ,6.9% were single 17.3% were divorced or separated and 2% did not answer, about the educational status, 1.5% had elementary or middle school, 8.4% had some high school, 36.9% college graduated. regarding the employment status, the retired patients were 43.8% while not working patients were 14.3%. prior to PCI was detected in 33%, prior MI in 31.5% and Prior CABG in 22.2%. **(8)**

In contrary, the study performed by **Maddox** et al., who noted that prior PCI was detected in 29.5%, prior CABG in 1.4% and prior ACS in 18.9%. **(9)**

This contrast may be explained by different number of studied population , different period and geographical distribution of population .

As regarding age, the mean age in our study population was 54.

Parallel to this study, the study done by **Kinsara., et al** who revealed that the mean age was 56.7 ± 10.4. **(10)** As regard sex, there were 73% males and 27% females, agreeing with our study, the study which was done by **Guo.,** et al which revealed that males approximately were 77% while females were 23%. Also a similar study done by **Chiha.,** et al that detected males were 67.7% while females were 32.3%. **(11) (12)** Explaining that IHD is more common in males because men's coping with stressful events may be less adaptive physiologically, behaviorally and emotionally. also, estrogens have a protective effect on the cardiovascular system, such a situation makes women who suffer from coronary heart disease show the effects about 10 years later than do men. Therefore, postmenopausal women are considered to be at high risk of cardiovascular disease. Further, a reduction in ovarian function and a reduction in the level of estrogens during menopause induce accelerated aging of the vascular system. The effects include endothelial dysfunction and stiffening of the walls of the large arteries via an unspecified mechanism. Hence, there is a higher incidence of cardiovascular disease in women who have experienced premature menopause, independent of other risk factors such as hypertension, obesity and smoking.(13) (14)Regarding the risk factors, hypertension presented in 76.7%, smoking presented in 72.5% of all patients, obesity in 43.5%, diabetes in 66%, dyslipidemia in 51.8% and family history presented in 47.5% of the study population. So, the most frequent risk factor was hypertension followed by smoking, diabetes and dyslipidemia.Concordant to our study, the study of **Ntalla.**, et al who revealed that the most common risk factor was hypertension followed by smoking and dyslipidemia. **(15)**An Egyptian study which was done by **Ellian.,** et al at Menofia university revealed the following, 64% of patients were obese (64%). Fifty-four percent had hypertension (54%). Thirty-four percent had diabetes (34%). Smoking was documented in (64%) of patients. Positive family history of premature CHD was present in (43%) of the participants. **(16)**Discordant to this study, the cohort study of **Zeitouni.**, et al who detected that Past or current smoking was the most frequent cardiovascular factor (60.8%), followed by hypertension (52.8%) and family history of CAD (39.8%). **(17)**This discrepancy may be due to a complex interplay between genetic and environmental factors. Several risk factors such as increasing age in our study that may be associated with increased incidence of hypertension. Also family history, obesity, high sodium diets (greater than 3g/day), physical inactivity, have strong and independent correlations with the development of hypertension.The non-invasive tests before coronary angiography in stable coronary syndrome patients involved were stress exercise ECG in 24% of patients, CT angiography in 4.7% and MPI in 27% with total noninvasive pretesting representing 55.7%In agreement with our study, the study by **Bing**.,et al which detected that the total pre-tests which were done to 43% of all study populations .**(18)**Disagree with our study the study which was done by **Reeh** et al., which detected that the MPI was done in 62%, stress

exercise ECG was in 35% while patients underwent CT angiography were 83%. [19]The discrepancy in pre-tests investigations may be due to different hospitals, economic control and different hypothesis of its importance.As regard the symptoms at time of admission, the most presented symptom was chest pain with percentage of 79% followed by dyspnea with percentage of 29% while other symptoms like numbness and fatigue presented by 38.9%.Similarly, in the study performed by **Robson** et al., all patients presented by chest pain, 19.8% presented by dyspnea. [20]Another study done by **Mieres** et al., demonstrated that chest pain was in 90.5%, dyspnea in 9.5% while combined symptoms were in 51.5%. [21] Regarding ECG changes as (ST-segment deviation >1 mm, inverted T wave, hyper acute T wave in two or more contagious leads, and new-onset left bundle branch block [LBBB]) (Ischemic evidence) About 81.4% of our studied population had ischemic changes. 32.6% had left bundle branch block and 27.6% of the patients had atrial fibrillation.Parallel study by **Simkhada** et el., who revealed that total (83.12%) patients had significant ischemic changes. [22]In contrast to our study, the study performed by **Moisi** et al., who detected that left bundle branch block and QS waves were mostly present. [23]We noticed about 18.6 % of population had completely normal ECG results may consider a good evidence that normal ECG never excludes coronary artery disease as long as symptoms are present.The different ECG results might be due to different study populations as regard number, risk factors and presentations, also the type of studies differ.According to the number of vessels affected, we found that the majority of patients accounted for 61.7% of patients had single vessel disease, 21.5% of them had double vessel disease while only 16.8% of all study population had multi-vessel disease. these results were detected after coronary angiography applied to all patients. Also according to the results of coronary angiography, detected sites of lesions of coronaries were as the following, the most frequent affected vessel was left anterior descending artery with a percentage of 54.9% followed by left circumflex by about 33.4% then right coronary artery 31.3%. the least affected artery was left main coronary artery.Similar results of the study done by **Motloch** et al., who detected that the percentage of LAD was 52.3% while RCA was 36.9%. this study also reported that about 27.4% had One-vessel affected, 25.2% had two vessels while 47.3% had MVD. [24]The Egyptian study performed by **El-Dosouky** et al., who reported that 32.6% of the patients had single vessel disease,40.3% had double vessel disease and they also reported LAD was the most presented 69.2% followed by RCA 55.7% and that the least presented one was Left main by percentage of 9.6% also has results similar to our study. [25]As regard the strategy of treatment, our patients were divided into three groups according to the decision of management, the first who underwent PCI, the second who were referred to CABG, the third group who had non-significant lesion and were prescribed medical treatment.In our study, the patients who underwent PCI were 63.2%, the patients who referred to surgical consultation were 26.8% and who received medical treatment were 1%.In the study done by **Doll** et al., who detected that the patients who underwent PCI were 56.4%, medical treatment in 20.2% and CABG in 23.4%.[8]

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4. CONCLUSION

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ETHICAL APPROVAL

1. An informed consent was obtained from all participants in this research. 2. Any unexpected risks appear during the course of their search will be cleared to participants and the ethical committee on time. 3. Adequate provision to maintain privacy of participants and confidently of the data will be maintained as all patients will be numbered and these numbers will be used instead of names and also all data will be for this research only. 4. Results of our research was only for academic interest to keep the confidentiality of the data.

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