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Relation between Multiple Factors and Intervention Type Either Culprit or Total Revascularization in NSTEMI Patients

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ABSTRACT

Background: Ischemic heart disease is the number one cause of mortality worldwide resulting in 7 million of the 53 million deaths in reported in 2010. Acute coronary syndrome is divided into ST-elevation myocardial infarction (STEMI), Non ST-elevation myocardial infarction (NSTEMI) and unstable angina. Patients with NSTEMI tend to have more comorbidities than STEMI patients. Most NSTEMI patients tend to have multi-vessel disease with total revascularization causing decrease in long term mortality and despite higher initial (in-hospital) mortality rates, single-stage complete coronary revascularization appears to be superior to culprit vessel–only PCI in terms of long-term mortality rates. **Aim:** To analyze the relation between multiple factors and intervention type either culprit or total revascularization in NSTEMI patients. **Subjects and methods:** This study was a cross-sectional study that included 70 cases. 35 patients underwent total revascularization, and 35 patients underwent culprit-only revascularization. The cases were selected from the department of cardiology at El Sahel Teaching Hospital, during the period from November 2020 to April 2021. Complete history was taken (personal & past & present & family) and complete physical examination (SBP, DBP, HR, RR, Temp and BMI). Analysis of the relation between multiple factors and intervention type either culprit or total revascularization in the included patients was done. Exclusion criteria were (Preexisting HFrEF, STEMI, Cardiogenic shock, HIV patients, Contraindications to DAPT, pregnancy, lactation, or patient refusal). **Results**: The differences in distribution of sex, DM, HTN, smoking status, dyslipidemia, and positive history of coronary artery disease between the intervention groups were not significant ($P > 0.05$). **Conclusion:** The intervention type either culprit or total revascularization in NSTEMI patients must be chosen according to the clinical profile of any patient as alone as we concluded that the studied factors showed insignificant relation with the intervention type among our studied cases.

Keywords: NSTEMI, Revascularization, Culprit, Cardiology.

INTRODUCTION

Ischemic heart disease is the number one cause of mortality worldwide resulting in 7 million of the 53 million deaths in reported in 2010. Acute coronary syndrome is divided into ST-elevation myocardial infarction (STEMI), Non ST-elevation myocardial infarction (NSTEMI) and unstable angina. NSTEMI and unstable angina share similar pathophysiology

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and have similar clinical presentation with the only difference is positive cardiac biomarkers (cardiac Troponins and CK-MB) in the case of NSTEMI.(1)
Wider use of primary preventive therapies (Aspirin, Statins use, smoking cessation) has resulted in fewer cases of STEMI. Aging with higher rates of diabetes and chronic renal diseases have increased the incidence of NSTE-ACS and the use of more sensitive assays (cardiac-specific troponins [cTn]) has resulted in more cases of NSTEMI diagnosed.(2)
Currently, NSTEMI outnumbers STEMI by a ratio of 3:1, with an estimated annual US incidence of around 500,000. Patients with NSTEMI tend to have more comorbidities than STEMI patients. NSTEMI has in-hospital mortality similar to STEMI (9.5% vs 9.7%) but higher 1-year post discharge mortality (18.7% vs. 11.4%).(3)
Most NSTEMI patients tend to have multi-vessel disease with total revascularization causing decrease in long term mortality and despite higher initial (in-hospital) mortality rates, single-stage complete coronary revascularization appears to be superior to culprit vessel–only PCI in terms of long-term mortality rates.(4), (5)

Aim of work

To analyze the relation between multiple factors and intervention type either culprit or total revascularization in NSTEMI patients.

Patients and methods

I. Technical design

This was a cross-sectional study that included 70 cases. 35 patients underwent total revascularization, and 35 patients underwent culprit-only revascularization. The cases were selected from the department of cardiology at El Sahel Teaching Hospital, during the period from November 2020 to April 2021. Complete history was taken (personal & past & present & family) and complete physical examination (SBP, DBP, HR, RR, Temp and BMI). Analysis of the relation between multiple factors and intervention type either culprit or total revascularization in the included patients was done. Exclusion criteria were (Preexisting HFrEF, STEMI, Cardiogenic shock, HIV patients, Contraindications to DAPT, pregnancy, lactation, or patient refusal).
The study was approved by the institutional review board of Faculty of Medicine, Zagazig University and informed written consent was obtained from patients or written assent from a relative.

Statistical analysis

Qualitative data were expressed as frequencies (percentage), while quantitative data were expressed as mean ± standard deviation. Tables and figures were used for data presentation. Chi-square test was used for qualitative data analysis and independent samples t-test was used for quantitative data analysis. For multivariate analysis, linear regression model was used to predict the relationship between the intervention type as an independent variable and the increase in global longitudinal strain as a dependent variable adjusted for age, sex, DM, HTN, dyslipidemia, smoking status, and history of coronary artery disease. SPSS version 25 software and Stata version 15 were used. All tests were conducted at 0.05 level of significance.

Results

Baseline factors	Type of intervention No. (%)		Total	Test value¥	*P* value
	Total	Culprit only			

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	revascularization	revascularization			
Sex (Male)	17 (48.6)	18 (51.4)	35 (50)	0.06	> 0.05
DM	17 (48.6)	14 (40)	31 (44.3)	0.5	> 0.05
HTN	23 (65.7)	18 (51.4)	41 (58.6)	1.47	> 0.05
Smoking	15 (42.9)	21 (60)	36 (51.4)	2.1	> 0.05
Dyslipidemia	28 (80)	22 (62.9)	50 (71.4)	2.5	> 0.05
History of CAD	24 (68.6)	21 (60)	45 (64.3)	0.56	> 0.05

* P-value is significant if less than 0.05, ¥: Chi-Square test.

Table 1: distribution of demographic data and baseline clinical factors between the study groups.

Baseline factors		**Type of intervention**		**Total**	**Test value**	***P* value**
		Total revascularization	Culprit only revascularization			
Age	Mean ± SD	55.5 ± 4.3	57.3 ± 3.8	56.4 ± 4.1	1.8	> 0.05
	Range	48–65	50– 66	48– 66		

SD: standard deviation, *: P-value is significant if less than 0.05, ¥: independent samples t-test test.

Table 2: Analysis of the relation of age and type of intervention between the study groups.

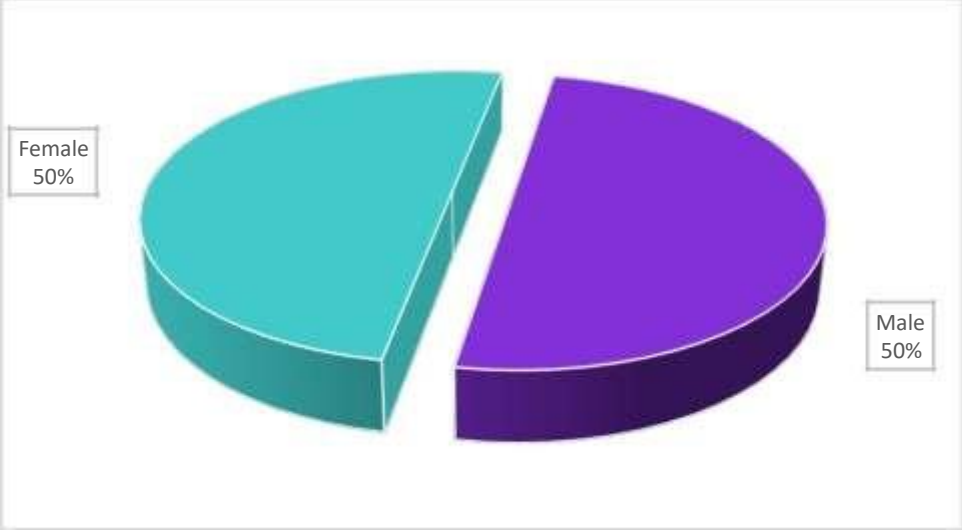

Figure (1): Distribution of males and females among the study patients.

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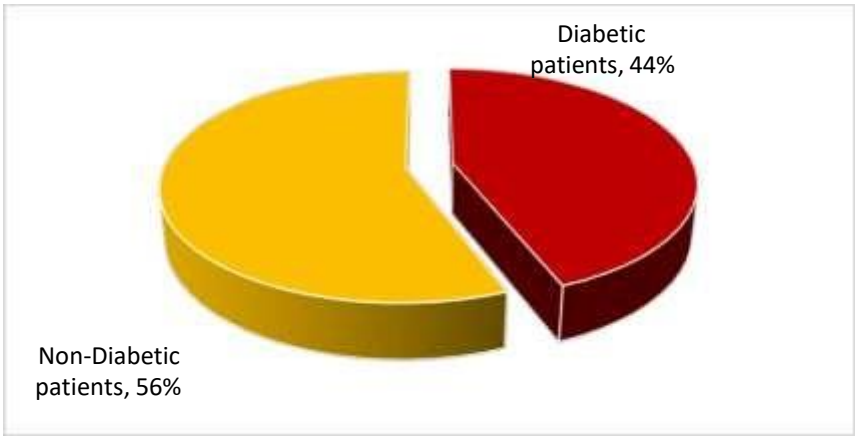

Figure (2): Distribution of diabetes mellitus among the study patients.

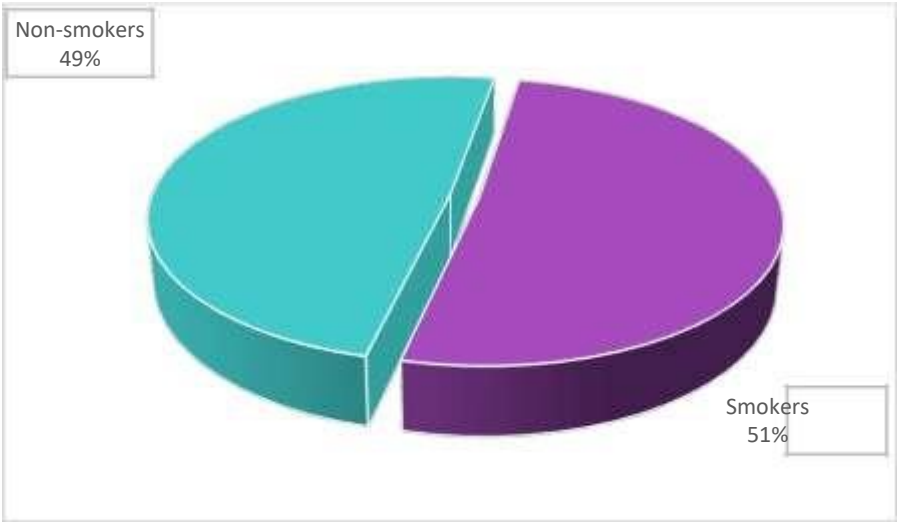

Figure (3): Distribution of smoking status among the study patients.

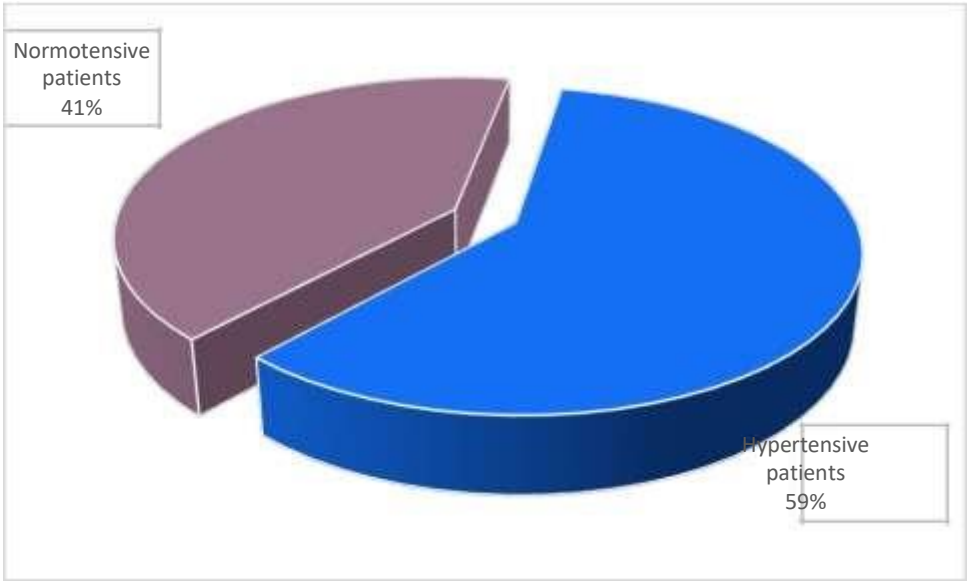

Figure (4): Distribution of hypertension among the study patients.

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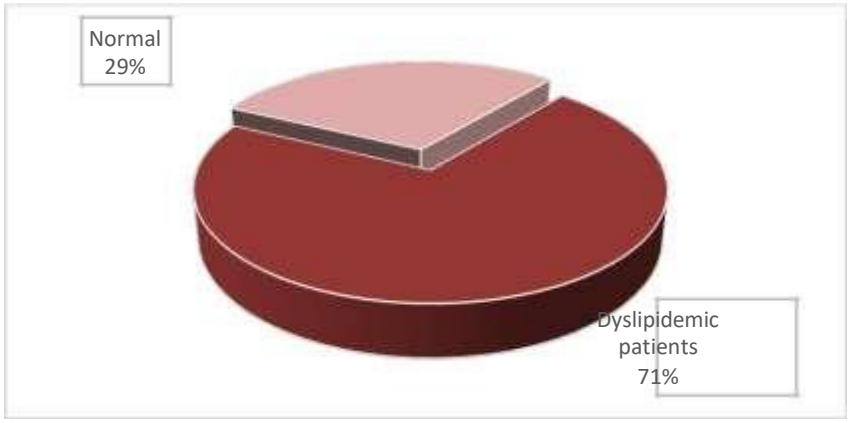

Figure (5): Distribution of dyslipidemia among the study patients.

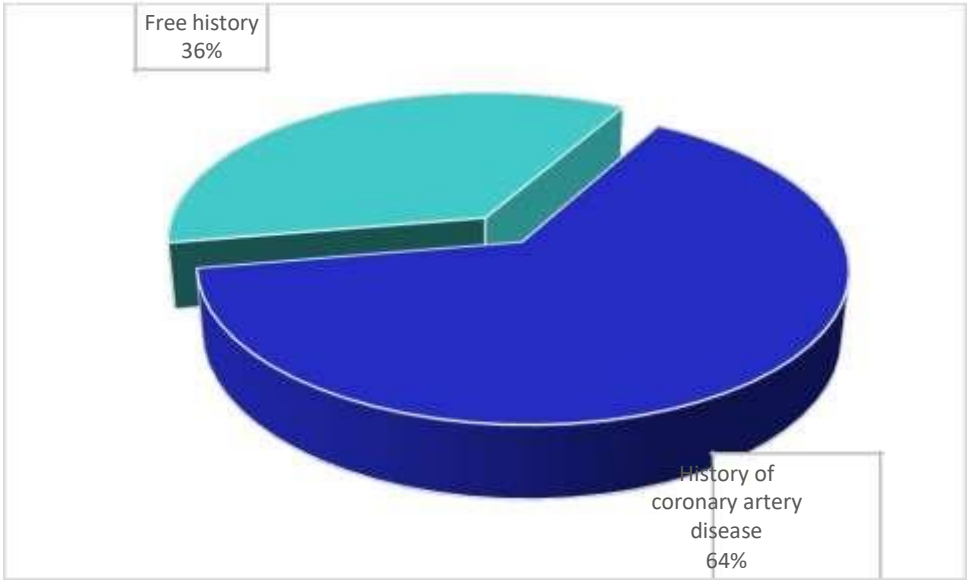

Figure (6): Distribution of history of coronary artery disease among the study patients.

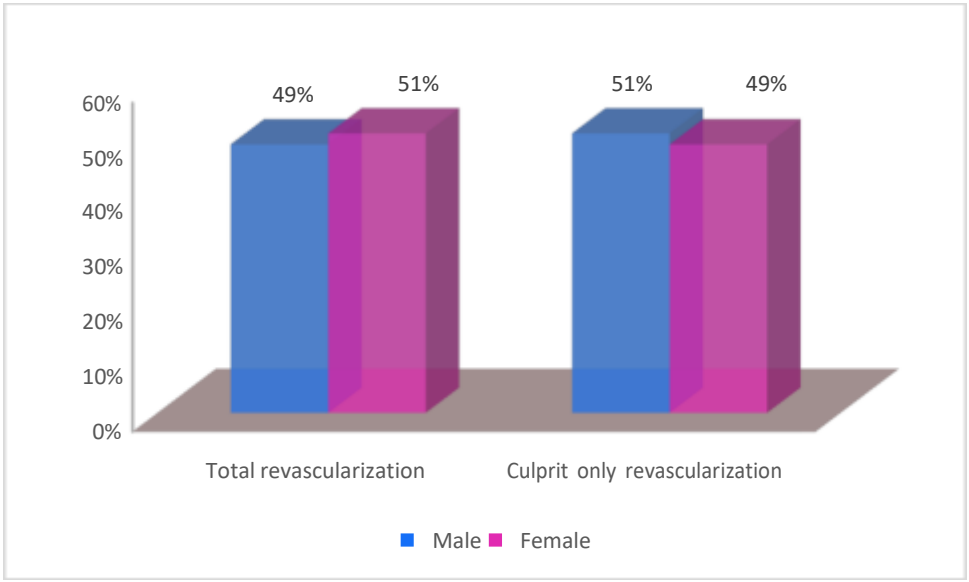

Figure (7): Distribution of males and females according to the intervention type.

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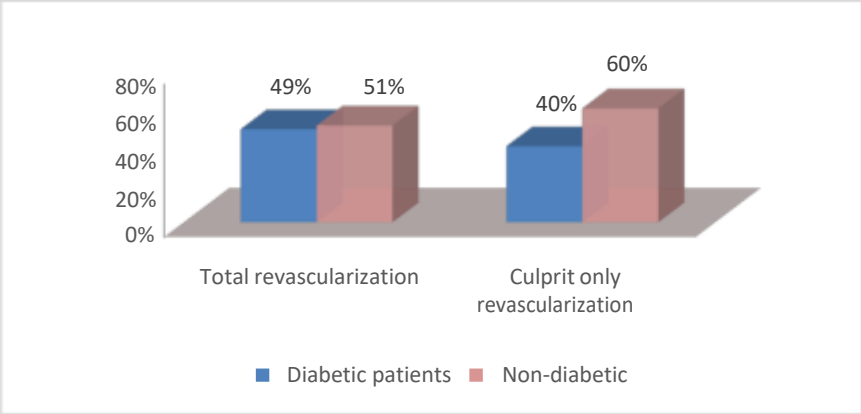

Figure (8): Distribution of diabetes mellitus according to the intervention type.

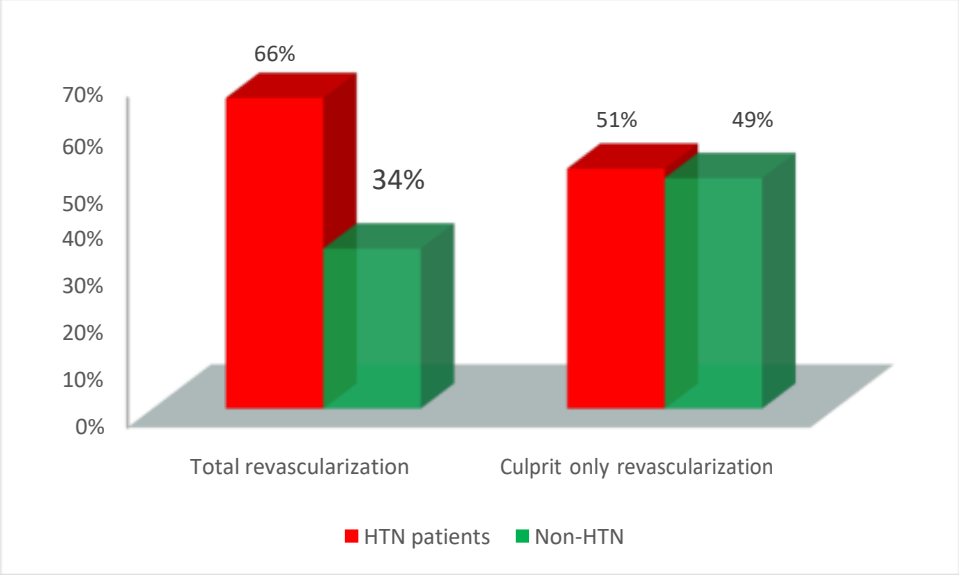

Figure (9): Distribution of hypertension according to the intervention type.

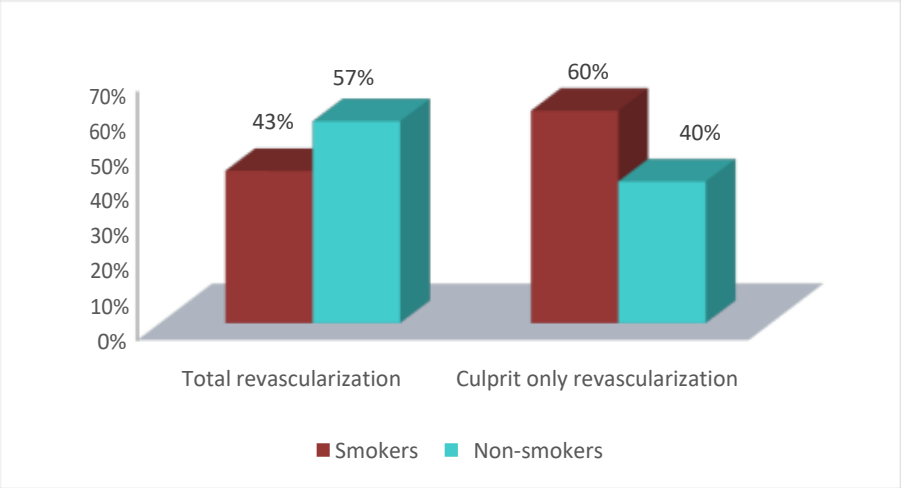

Figure (10): Distribution of smoking status according to the intervention type.

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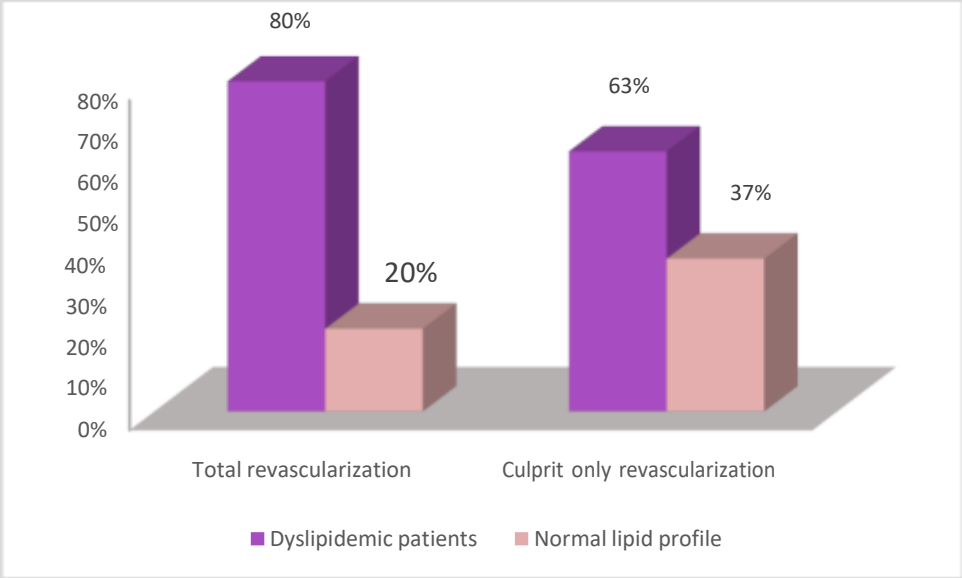

Figure (11): Distribution of dyslipidemia according to the intervention type

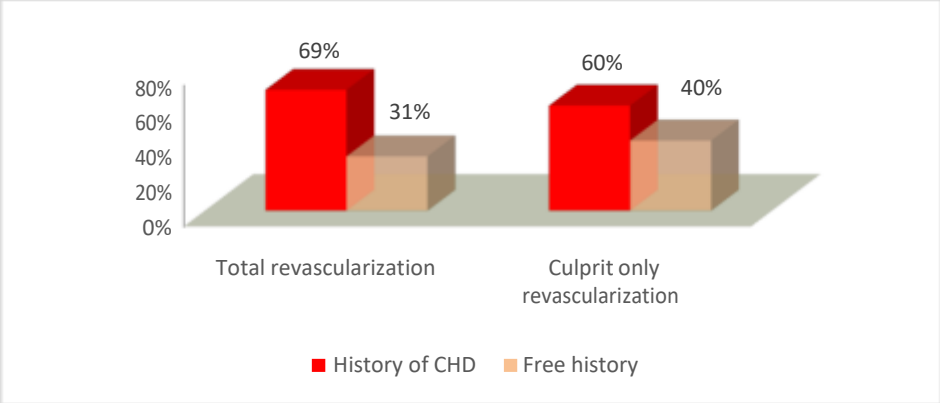

Figure (12): Distribution of history of coronary artery disease according to the intervention type.

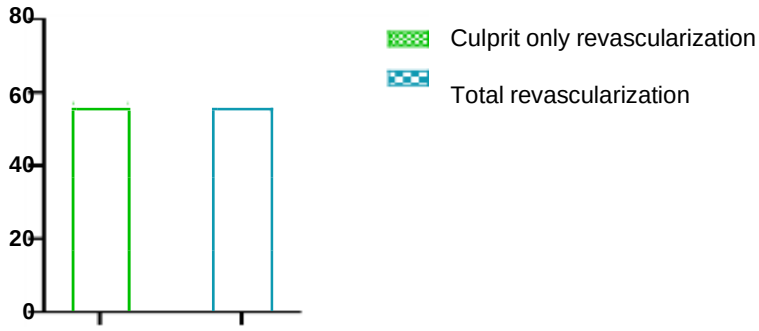

Figure (13): Age of the study patients according to the intervention type (as mean and standard deviation)

Multivariate analysis: multivariate analysis was required to adjust for baseline demographic and clinical factors.

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Independent variables	B	Std. Error	t value	*P* value
(Constant)	8.358	0.917	9.118	< 0.001
Female	-0.202	0.153	-1.321	> 0.05
Age	-0.016	0.016	-0.982	> 0.05
Diabetes	-0.265	0.160	-1.654	> 0.05
Hypertension	-0.156	0.153	-1.017	> 0.05
Smoking	-1.250	0.141	-8.863	< 0.05
Dyslipidemia	0.248	0.148	1.682	> 0.05
Previous history of coronary artery disease	-0.017	0.151	-.111	> 0.05

Table 3: Relationship between improvement in cardiac function after cardiac catheterization and type of the intervention adjusted for baseline demographic and clinical factors.

Discussion

NSTEMI patients tend to be older and with more co-morbidities than STEMI patients, that is why most of them tend to have multi-vessel disease on coronary angiography. NSTEMI patients have impaired systolic function and mostly benefit from myocardial revascularization. There is a debate about the optimal type of intervention regarding restoring or improving myocardial function.(6)

The aim of this study was to analyze the relation between multiple factors and intervention type either culprit or total revascularization in NSTEMI patients.

This was a prospective study that was conducted in El-Sahel Teaching hospital and Zagazig university hospital that included 70 cases. 35 patients with NSTEM in the total revascularization arm (17 males and 18 females aged 55.5 ± 4.3) and 35 patients as the culprit-only arm (18 males and 17 females aged 57.3 ± 3.8). Complete history was taken (personal,past, present & family) and complete physical examination (SBP, DBP, HR, RR and Temp.) In our study the differences in distribution of sex, DM, HTN, smoking status, dyslipidemia,and positive history of coronary artery disease between the intervention groups were notsignificant (P > 0.05). Among patients treated with total revascularization, males were 17patients (48.6 %), and females were 18 patients (51.4 %), while patients treated with culpritonly revascularization were 18 males (51.4 %) and 17 females (48.6 %), diabetic patientswere 17 cases (48.6 %) and 14 cases (40%) in the total revascularization and the culprit onlyrevascularization groups respectively, hypertensive patients were 23 cases (65.7 %) and 18cases (51.4 %) in the two groups respectively, smokers were 15 cases (42.9 %) in totalrevascularization group and 21 cases (60%) in culprit only revascularization group,dyslipidemic patients were 28 cases (80%) and 22 cases (62.9 %) in the two groupsrespectively, and the patients had a history of coronary artery disease were 24 cases (68.6%)in total revascularization group and 21 cases (60 %) in culprit only revascularization group.

Our results also demonstrated that the difference in mean age between the intervention groups was not significant (P > 0.05), where patients treated with total revascularization had

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mean age 55.5 years and patients treated with culprit only revascularization had mean age 57.3 years.

A similar study, conducted by Correia and colleagues consisted of 202 patients with NSTE-ACS and multivessel CAD. Mean age was 65.3±12.5 years and 77.2% were male. Regarding cardiovascular risk factors, 34.7% had diabetes, 71.3% hypertension, 59.4% dyslipidemia, 23.3% were current smokers and 22.3% former smokers. With regard to history, 16.3% reported a previous history of MI, 20.3% angina and 12.4% PCI. Patients who underwent multivessel revascularization tended to be younger than those who underwent culprit-only revascularization, with no statistically significant difference (p=0.639).[7]

Conclusion

The intervention type either culprit or total revascularization in NSTEMI patients must be chosen according to the clinical profile of any patient as alone as we concluded that the studied factors showed insignificant relation with the intervention type among our studied cases.

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