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Pattern of risk factors and Short Term Outcome in Patients Undergoing Primary Percutaneous Coronary Intervention for Acute ST Elevation Myocardial Infarction

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Abstract

Background: Coronary Artery disease (CAD) is the leading cause of death globally. The classic presentation of worsening angina culminating acute coronary syndrome (ACS) is rare in younger patients but the first onset of angina that rapidly progresses to fully evolved myocardial infarction (MI) is often the case. The aim of this work was to study the short term outcome in patients undergoing primary percutaneous coronary intervention for acute ST elevation myocardial infarction. Methods: This was study a prospective, cross-sectional study carried out between July2020 to July 2021. The patients underwent coronary angiography at the National Heart Institute and cardiology department of Benha university hospitals. The patients were classified into two groups: - Group1: comprised 100 patients with coronary artery disease (CAD) aged <45 years old. Group2: comprised 100 patients with CAD aged ≥45 years old. Results: The rate of success of primary intervention was comparable between the two study groups 95% in young group vs 90% in older group. Conclusion: Acute STEMI in young Egyptians was predominantly observed in men, MACE was less frequent in Young age group.

Key words: Primary Percutaneous Coronary Intervention, Acute ST-elevation myocardial infarction, STEMI.

1. Introduction

Coronary artery disease is the leading cause of morbidity and mortality worldwide both in developing as well as developed countries and is responsible for one third or more of all deaths in individuals greater than 35 years of age [1].

There are limited data on the incidence of MI in young patients. The Framingham Heart Study's 10- year follow-up data showed that the annular incidence of MI was 12.9, 38.2, and 71.2 per 1000 in men and 2.2, 5.2, and 13.0 per 1000 in women in the age groups of 30 to 34, 35 to 44, and 45 to 54 years, respectively [2].

Coronary artery disease (CAD) occurring below the age of 45 years is termed as young CAD, which gained importance due to increased prevalence in this age group over last few decades, with varying risk factor profiles and difference in prognosis as well as longevity after an acute coronary episode [3].

Percutaneous coronary intervention (PCI) limits infarct size, improve outcome in patients with acute myocardial infarction and was found to be superior to fibrinolytic therapy in immediate restoration of normal coronary flow in the IRA and reduction of recurrent ischemia or reinfarction [4].

The aim of this work is to study the short term outcome in patients undergoing primary percutaneous coronary intervention for acute ST elevation myocardial infarction.

2. Patients and Methods

Patients population:

The present study is a prospective, cross sectional study carried out between July 2020 to July 2021 included two hundred patients presented with ST segment elevation acute myocardial infarction and treated by primary PCI recruited from Cardiology department at Benha University Hospitals and National Heart Institute.

Duration of the study:

This study was done in a period of one year starting from July 2020 to July 2021.

Inclusion criteria:

All patients recruited into the study met the following criteria:

1. Patients presenting with acute persistent chest pain more than 20 minutes.
2. Patient presenting with ECG showing persistent ST-elevation for more than 20 minutes [5].

Exclusion criteria:

1. Patients with acute pericarditis or myocarditis.
2. Patients with valvular heart diseases.
3. Patients with aortic dissection.
4. Patients with previous coronary intervention.

Methods:

All recruited patients subjected to:

1-**An informed consent** was obtained from all participants in the research.

History taking:

Full history was taken with special emphasis on.

Personal history: Age, Menstrual history for females, habits of medical importance e.g., smoking and drug addiction. detailed history about illicit drug abuse.

History of present illness: Full analysis of chest pain especially

- Duration of chest pain (pain to first medical contact time).
- Time of start of chest pain.

Past history:

- Diabetes mellitus (DM) (defined as patients having HbA1c >6.5% or fasting plasma glucose ≥126 mg/dl and/or postprandial plasma glucose ≥200 mg/dl or a past history of DM and/or taking hypoglycemic drugs) [(6)].
- Hypertension (HTN) (defined as systolic blood pressure (SBP) ≥140 and/or diastolic ≥90 mmHg and/or on anti‑hypertensive treatment) [7].

- Hypercholesterolemia (defined as serum cholesterol of ≥200 mg/dl or triglyceride >150 mg/dl or low-density lipoprotein >130 mg/dl or high-density lipoprotein-cholesterol (HDL-C) <50 mg/dl for female and <40 mg/dl for male or known cases of dyslipidemia and/or those on medication for dyslipidemia) [8].
- Previous myocardial infarction, coronary revascularization procedures.
- Symptoms suggestive of congestive heart failure or significant arrhythmias e.g., atrial fibrillation.
- Chronic kidney disease.
- Symptoms suggestive of peripheral vascular disease.
- Previous cerebrovascular stroke.

Family history:

Family history of premature coronary artery disease (< 55 years in first-degree male relatives and < 65 years in female relatives) [9].

Drug history:

Including anti-ischemic treatment, antihypertensive treatment, and antidiabetic drugs.

Clinical examination:

- Targeted general examination was done that included heart rate, arterial BP, JVP and chest examination for basal rales.
- Cardiac auscultation with special emphasis on 3rd sounds and mechanical complications of AMI like acute ventricular septal rupture or acute valvular regurgitation due to papillary rupture.

Investigations: all patients were subjected to the following:

- **12 lead surface ECG:** A 12-lead ECG was performed at ER before the intervention, 1 h post-intervention at a paper speed of 25 mm/second and amplification of 10 mm/mv.
- STEMI was diagnosed according to the following: New ST segment elevation at J-point in ≥ 2 contiguous leads of ≥ 1 mm in leads V2 and V3 and ≥ 1 mm in all other leads. ST-segment depression ≥ 1mm in leads V1 to V3, consistent with a posterior STEMI, was considered as ST-segment elevation. (10), sum of ST segment elevation, measured 20 ms after the J point. The height (in mm) of ST segment elevations was measured in leads I, aVL, and V1 through V6 for anterior infarction; leads II, III, aVF for inferior infarction and leads V5to V6 for lateral (11)
- **Laboratory investigations:** which included troponin, serial cardiac biomarkers (CK total, CKMB), complete blood count, kidney function tests, liver function tests, serum electrolytes, blood sugar, HbA1c and lipid profile.
- **Transthoracic Echocardiography:** all patients underwent focused echocardiographic study after the Primary PCI procedure. All images and measurements were acquired from the standard views, according to the guidelines of the American Society of Echocardiography using GE vivid echocardiography machines (12). This focused study included the evaluation of residual resting segmental wall motion abnormalities, estimated EF using Simpson's method and to exclude procedural or infarct related complications. And assessment of presence and severity of Mitral Regurgitation

3. Results

The average of SBP was significantly higher in group B (148.60±25.51) compared to group A (135.40±25.36) for the Group A, with p-value <0.001.

While, there was no statistically significance difference between groups regarding Heart rate, DBP and Killip class, with p-value (p>0.05 NS). These data were shown in table (1).

Table (1): Comparison between two groups according to clinical data**.**

Clinical data	Group A: ≤45 years (n=100)	Group B: >45 years (n=100)	Total (n=200)	Test value	p-value
Heart rate					
Mean±SD	98.70±12.09	101.40±12.39	100.05±12.29	t=-1.559	0.121
Range	70-130	80-140	70-140		
SBP					
Mean±SD	135.40±25.36	148.60±25.51	142.00±26.22	t=-3.670	<0.001**
Range	80-190	100-200	80-200		
DBP					
Mean±SD	84.00±16.70	87.40±14.83	86.70±15.98	t=1.522	0.130
Range	60-110	50-120	50-120		
Killip class					
Class I	76 (76.0%)	68 (68.0%)	144 (72.0%)	x^2=1.968	0.579
Class II	18 (18.0%)	24 (24.0%)	42 (21.0%)		
Class III	2 (2.0%)	4 (4.0%)	6 (3.0%)		
Class IV	4 (4.0%)	4 (4.0%)	8 (4.0%)		

Using: t-Independent Sample t-test; x^2: Chi-square test;
p-value >0.05 NS; *p-value <0.05 S; **p-value <0.001 HS

4. Discussion

In the present study, the rate of total occlusion of culprit lesion was high at both old and young patients. This finding is opposite to what was explained by **Bauer and Zeymer,** [13] who stated that the pathophysiology of ACS is different in the elderly as compared to a younger cohort. In younger patients, there was high rate of rupture/dissection and culprit lesions contain more thrombus. On the other hand, the lesions in older age group are predominantly calcified with less positive remodeling. This discrepancy between both studies (ours and the other) could be explained by the high prevalence of smoking among both old and young Egyptians as shown in our work and supported by [14].

In the present work, the Left anterior descending artery (LAD) was the culprit vessel in almost two thirds of patients in both age groups. This finding is supported by **Shehata et al.,** who reported that the LAD was the most common involved vessel and distribution of coronary lesions was not age dependent [15].

The treatment of young patients with MI should follow the current guidelines directed medical management and coronary revascularization, similar to treatment for older individuals [2].

In the present study, the rate of success of primary intervention was comparable between the two study groups 95% in young group vs 90% in older group. This finding is supported by the study of **Cantarelli et al.,** [16] who found similar rates of success of PPCI in young and older group of patients with AMI.

5. Conclusion

Acute STEMI in young Egyptians was predominantly observed in men; in hospital MACE was less frequent in Young age group.

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