

## Original Paper

# Primary Percutaneous Coronary Intervention in Acute ST Elevation Myocardial Infarction: A Single Centre Experience

Mushtaq T. Al-Hassnawi<sup>1</sup>, Ahmed Hussein AL- Mayali<sup>2\*</sup>

<sup>1</sup>Karbala cardiac center, Kerbala, Iraq.

<sup>2</sup>College of medicine, University of Kerbala, Kerbala, Iraq.

## Abstract

**B**ackground Early revascularization is critically important in the management of patients presenting with acute myocardial infarction.

**Aim** To assess the benefit of early primary percutaneous coronary intervention in patients with acute ST elevation myocardial infarction.

**Methods** This study include 51 patients with acute STEMI they were selected from those who were admitted to the coronary care unit of Karbala cardiac center in Karbala-Iraq during a period between January 2017 and February 2018. Detailed history and thorough physical examination was done. Investigations done for each patient in form of ECG, cardiac troponin, blood urea, serum creatinine, and complete blood picture.

**Results & discussion** percutaneous coronary intervention only, using one stent, two stent, three stent, aspiration catheter, CABG & medical treatment, 7 (13.7%), 25(49%), 8(15.6%), none , 4(7.8%), 4(7.8%), 4(7.8%), 3(5.8%) respectively).

Infarct related artery, LAD, LCX, RCA & LMS (30(58.8%), 4(7.8%), 6(11.7%), 2(3.9%) respectively, and the number of diseased vessels , single vessel, two vessels, three vessels & LMS which was (20(39.2%), 13(25.4%), 14(27.4%) respectively.

Inhospital outcome, which include the following:- favorable outcome, period of hospitalization, access site bleeding, contrast induced nephropathy, death, respectively. Which were (96%, < 1day 38(74.5%), >1day 13(25.5), 3.9%, 5.8%, 3.9% respectively)

**Conclusion** in case of ST elevation myocardial infarction, left anterior descending artery is most culprit vessel to be involved, one quarter of patient needs one stent & carry favorable out comes in form of less complications and also decrease the period of hospitalization.

**Keywords:** primary PCI, acute MI

## Introduction

Despite major advances in therapy, cardiovascular diseases are still the leading cause of death worldwide, ischemic heart disease is responsible for over 7 million deaths annually <sup>(1)</sup>

Coronary heart disease is the leading cause of death in the United States, with myocardial infarction a common manifestation of this disease. In 2006, approximately 1.2 million Americans sustained a myocardial infarction. Of these, one quarter to one third had a

myocardial infarction with ST-segment elevation <sup>(2)</sup>

According to the European guidelines primary PCI is ecommended in STEMI as soon as possible in patients who present within 12 hours after pain onset <sup>(3,4).</sup>

By using a well-functioning network based on pre-hospital diagnosis, the patient must be transported to the closest available primary-PCI capable centre as soon as possible and PCI must be performed within 90 minutes from the first medical contact. In early presenters and high risk

\*for correspondence email: ahmedmyalipci@gmail.com

cases, PCI must be performed within 60 minutes from the first medical contact<sup>(5)</sup>.

Besides pharmacotherapy consisting of heparin, aspirin and an ADP-receptor blocker, standard therapy includes stenting of the infarct-related artery. Stenting of the infarct related lesion has proved to reduce the need for repeat revascularization and decrease hospitalization. In patients with acute ST elevation myocardial infarction (STEMI) or a myocardial infarction (MI) with a new or presumably new left bundle branch block (LBBB) or a true acute posterior MI, early reperfusion with primary percutaneous coronary intervention (PCI) or thrombolytic therapy improves outcomes<sup>(6)</sup>.

Although it usually takes a longer time to perform primary PCI than to give thrombolytic therapy, primary PCI is regarded as the therapy of choice, if performed in a timely manner. Normalization of blood flow in coronary vessels, as assessed by the thrombolysis In Myocardial Infarction flow grade, occurs in 93 to 96% of STEMI patients who undergo primary PCI, in contrast to 50 to 60% following thrombolytic therapy<sup>(7,8)</sup>.

Moreover, primary PCI was shown to be superior to thrombolytic therapy in reducing the rates of death, reinfarction, recurrent ischaemia, reocclusion of the same artery, and stroke<sup>(9)</sup>.

When performed timely, primary-PCI is superior in terms of mortality and morbidity to fibrinolytic therapy. In the guidelines, primary-PCI now holds Class 1, level of Evidence A in the management of STEMI<sup>(10)</sup>.

However this superiority is not uniform in all patients with STEMI. The spectrum extends from maximum superiority in cases of cardiogenic shock, to almost equal benefit from both reperfusion mortalities in low risk patients with small STEMI, early presentation, and good left ventricular (LV) function. In contrast, diabetic patients overall draw greater benefit from primary-PCI than thrombolysis.<sup>(11)</sup>

Trials investigating both fibrinolysis and primary-PCI have consistently emphasized the crucial factor of time. The difference is most pronounced in the early hours of the infarction process. It has been amply demonstrated that the outcome from reperfusion therapy delivered, 2 hours from onset of chest pain was markedly different from those who presented. 4 hours<sup>(12)</sup>.

This difference not only affected the in-hospital and 30-day mortality, but the survival curves continued to diverge over the long term<sup>(13)</sup>.

## Patient and methods

This prospective study include 51 patients with acute STEMI they were selected from those who had admitted to the coronary care unit of Karbala cardiac center in Karbala-Iraq during a period between january 2017 and february 2018. Detailed history and thorough physical examination with measuring the height in meter and body weight in kilogram had been performed for each patient included in this study. Investigations done for each patient in form of ECG, cardiac troponin, blood urea, serum creatinine, and complete blood picture.

Percutaneous coronary angioplasty done to all culprit arteries, and stenting done to most culprit one by using drug eluting stents (DES).

Statistical analysis had been done using student's t-test. P-value less than 0.05 had statistical significance

## Results

This study include 51 patients with acute STEMI they were selected from those who were admitted to the coronary care unit of Karbala cardiac center in Karbala-Iraq during a period between January 2017 and February 2018

Table (1) show the demographic characteristic of the studied group

Age of male patients had range between 31-77 years, while for females range

between 33 and 70 years mean 53 years and the mean age was (52.7±9.5 (31-77) and 53.07±8.7 (33-70) respectively.

Regarding the gender, 70.4% were male while 29.6% were female.

39% had HT, 33.3% had DM, 33.3% are smokers, 47% had two risk factors, while 25.4% had more than two risk factors.

Table2 show the modalities of treatment among the studied group

PTCA only, using one stent, two stent, three stent, aspiration catheter, CABG & medical treatment, 7 (13.7%), 25(49%), 8(15.6%), none, 4(7.8%), 4(7.8%), 4(7.8%), 3(5.8%) respectively).

Table3 show the distribution of studied group according to infarct related artery, LAD, LCX, RCA & LMS (30(58.8%), 4(7.8%), 6(11.7%), 2(3.9%) respectively, and the number of diseased vessels , single vessel, two vessels, three vessels & LMS which was 20(39.2%), 13(25.4%), 14(27.4%) respectively

Table 4 show the in hospital outcome, which include the following:- favorable outcome, period of hospitalization, access site bleeding, contrast induced

nephropathy, death, respectively which were (96%, <1day 38(74.5%), >1day 13(25.5), 3.9%, 5.8%, 3.9% respectively)

## Discussion

This is the first report on the implementation and performance of primary PCI for STEMI in a regional hospital in middle Euphrates that study some important variable (local vascular complications, inhospital stay & number of stent/s used) up to the best of our knowledge.

When primary-PCI is successful, the average stay of STEMI patients will be reduced by at least 2 days. Early, or even next day, discharge of STEMI patients who received primary-PCI has been shown to be feasible and safe, at least in uncomplicated patients<sup>(14)</sup>

The reduced need for re-admission because of recurrent symptoms has also been shown to be another advantage of primary-PCI over fibrinolytic therapy.

**Table 1.** Dermographic characteristics of the studied group

variables	Male No=36 (70.4%)	Female No=15 (29.6%)	All patients No=51 (100%)
Mean ± SD range	52.7±9.5 (31-77)	53.07±8.7 (33-70)	
Cardiogenic shock	1(1.9%)	2(3.9%)	3(5.8%)
DM	13(25.4%)	4(7.8%)	17(33.3%)
HT	12(23.5%)	8(15.6%)	20(39%)
Smoking	10(19.6%)	7(13.7%)	17(33.3%)
Two risk factors	20(39.2%)	4(7.8%)	24(47%)
More than 2 RF	9(17.6%)	4(7.8%)	13(25.4%)

**Table 2.** Modalities of treatment of studied group

PTCA only	One stent	Two stents	Three stents	Aspiration catheter	CABG	Medical RX
7(13.7%)	25(49%)	8(15.6%)	none	4(7.8%)	4(7.8%)	3(5.8%)

**Table 3.** Distribution of studied group according to infarct related artery.

Infarcted vessel				No. of vessels			
LAD	LCX	RCA	LMS	Single vessel	Two vessels	Three vessels	LMS
30(58.8%)	4(7.8%)	6(11.7%)	2(3.9%)	20(39.2%)	13(25.4%)	14(27.4%)	4(7.8%)

**Table 4.** Inhospital outcome of the studied group

Favorable outcome	Hospitalization (days) < 1day		Access site bleeding	CIN*	death
	>1day				
49(96%)	38(74.5%)	13(25.5)	2(3.9%)	3(5.8%)	2(3.9%)

\*Contrast induced nephropathy

Patients in the latter group are more likely to need re-admission because of incomplete recanalization or re-occlusion after fibrinolysis<sup>(15)</sup>.

Survival rate at hospital discharge is consistent with previous studies, thus making the case for primary PCI in selected nonagenarian patients presenting with STEMI.

Helft et al recently reported a 24.9% mortality rate in a cohort of 418 nonagenarians with STEMI and in-hospital follow-up only, very close to the 24% mortality rate that we noticed<sup>(16)</sup>.

Regarding the IRA, the current study showed that LAD is the most involved vessel followed by LCX, RCA and LMS (respectively), these results were discordant with LCX & RCA<sup>(17,18)</sup>

Regarding in-hospital stay, our results were in agreement with local study done in Ibn al Nafees hospital, Baghdad, Iraq<sup>(17)</sup>, and with other studies<sup>18, (19)</sup>

Access site bleeding was similar to a study done by Manuel Pererira et al<sup>(20)</sup>.

Favorable outcome is better in the current study, compared with other studies<sup>(16,17,18, 19)</sup>.

No comparable studies whether local, national or international studies that focused on the number of stents used in PPCI up to the best of our knowledge.

Conclusion: in case of ST elevation myocardial infarction, left anterior descending artery is most culprit vessel to be involved, primary percutaneous intervention is most effective that one quarter of patient needs one stent & carry favorable outcomes in form of less complications and also decrease the period of hospitalization.

## Conclusion

In case of ST elevation myocardial infarction, left anterior descending artery is most culprit vessel to be involved, one quarter of patient needs one stent & carry favorable outcomes in form of less

complications and also decrease the period of hospitalization

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