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Immediate Result and Long Term Follow-up in Patients Going Under Primary Percutaneous Intervention for ST-Elevation Myocardial Infarction

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Background: Primary percutaneous intervention (PCI) is the choice of reperfusion therapy and is significantly superior to thrombolysis in acute ST-elevation myocardial infarction (MI).

Objectives: We did design this study to evaluate the successful rate, early complication and late follow-up of the patients with acute myocardial infarction who referred to Razavi Hospital.

Patients and Methods: In this study, 68 consecutive patients who were admitted by diagnosis of acute coronary myocardial infarction and ST-elevation change in ECG underwent primary PCI by a single high volume operator from March, 2008 to March, 2011. The successful rate, incidence of in Hospital's main adverse cardiac effects (MACE) and main adverse non-cardiac effects (MANE) and also their impact on one- year cardiac mortality and morbidity were estimated.

Results: The successful rate of primary PCI in this study was estimated to be 100%. MACE occurred in 4 patients (5.8%) (2 deaths and 2 myocardial infarctions) and MANE occurred in 8 patients (11.8%) (7 cases with major or minor bleeding and one with contrast nephropathy). In one- year follow-up of patients who included in the study, surveillance rate was 91.2 % (62 of 68), 13 patients had persistent cardiac symptoms (19.1%), 3 of them were admitted to the hospital with coronary syndromes (4.4%) and just one patients underwent target vessel revascularization (1.5%). 3 patients had to do CABG in the first year (4.4%). Studying the long term MACE and stent type (drug eluting stents vs. bare metal stents) revealed: death; 1 (3.6%) vs. 6 (11.5%), persistent cardiac symp; 3 (10.7) vs. 11 (21.2%), hospitalization; no patient vs. 4 (7.7%) and no TVR in drug eluting stents (DES) group vs. 1 (1.9%) in bare metal stents (BMS) group.

Conclusions: This study confirms that Primary PCI revascularization is the best treatment for the acute ST elevation MI with brilliant acute result and one- year high survival and acceptable cardiac and non-cardiac complications. Studying the effects of using DES and BMS on long term cardiac mortality, morbidity and need to target vessels revascularization (TVR) shows that performing the PCI in the golden time is very important and type of stent is not much important. By reducing the expenses of this procedure through using BMS, we can give this chance to more patients.

Keywords: Acute ST Elevation MI; Bare Metal Stents; Drug Eluting Stents

1. Background

Myocardial infarction (MI) is a common presentation of ischemic coronary artery disease (CAD). The incidence of Acute MI varies in different countries which are usually reported by regional registries. As there is no reliable registry system in most Middle East countries as well as Iran, the incidence of AMI is not clear. Isfahan Cohort Study confirms 57 cases of Acute MI in men and 32 in women among 427 new cases of cardiovascular events (1). There is some data supporting the high prevalence of CAD risk factors and metabolic syndrome among adult Iranians (2, 3) and the CAD associated mortality is one of the most health problems in Iran (4).

We have no data about the mortality rate of AMI in Iran, but World Health Organization accounts Acute MI for 12.2% of worldwide deaths in 2004 (5). The high prevalence of CAD in Iran and the high mortality rate of AMI and its related very high long term morbidity and disability could imply the importance of early medical interventions. Among different therapeutic methods, percutaneous coronary intervention (PCI) is the choice of reperfusion therapy in patients with Acute MI who refer to the hospital during the early hours or have contra indications for thrombolysis. Primary PCI could be life-saving in some patients, particularly those who with cardiogenic shock or cardiac arrest. The superiority of primary PCI over thrombolysis seems to be relevant in patients who refer to the hospital in 3 to 12 hours after onset of chest pain, but studies show that the major cardiac adverse events (MACE) could increase with increasing time to presentation (6, 7).

Different centers in Iran have described the results of their primary PCI and most of them support the efficacy of this method (8, 9). Razavi Hospital is one of the most equipped therapeutic centers in the region providing the best therapeutic facilities for its patient.

2. Objectives

The aim of this study was to determine the successful rate of primary PCI and its related cardiac and non-cardiac adverse effects (MACE & MANE) in order to determine the best therapeutic line for acute MI in this hospital.

3. Patients and Methods

In this study, 68 consecutive patients who were admitted to Razavi Hospital from March, 2008 to March, 2011 due to the diagnosis of acute coronary myocardial infarction and ST-Elevation change in ECG during the first 6 hours of symptoms onset underwent primary PCI by a single high volume operator. Our well experienced dedicated cardiac ward staff did monitor each patient during firs 24h and register every detail about the MANE and MACE occurrences according to the hospital database which is a domestic registry form influenced by ACC and AHA guidelines, confirmed and accepted by the cardiology board of the hospital. We also planned a telephone interview for all patients one year after their procedure. It was done by a group of research general practitioners asking about death, persistent cardiac symptoms, hospitalization and target vessel revascularization.

Statistical analysis was conducted using SPSS version 11.5 and the results were expressed as mean ± SD. Chi square test and Fisher's exact test were used to access the relation between quantities' variables. Also in this analysis, the P-value of less than 0.5 was considered as significant.

4. Results

The mean age of 68 patients underwent primary PCI at Razavi Hospital by single high volume operator was 60.31 ± 13.16 years (the youngest patient was 36 years and the oldest was 89 years). The prevalence of Diabetes Mellitus was 66.6% (22 of 33), hypertension 50% (32 of 64), Dyslipidemia 22% (9 of 41) and smoking 54.5% (18 of 33).

The target vessel was; the left anterior descending artery (LAD) in 34 (50%), right coronary artery (RCA) in 22 (32.3%), left circumflex artery (LCX) in 7 (10.2%), obtuse marginal (OM) 2 (3%), Single Vessel Graft (SVG) 2 (3%) and simultaneous PCI on LAD and RCA 1 (1.5%) of cases.

Immediate procedural successful rate of primary PCI in this study was estimated to be 100%.

During the first 24 hours after procedure, MACE occurred in 4 patients (5.8%); 2 myocardial infarctions on target vessel and 2 deaths were reported. Also MANE occurred in 8 patients (11.8%); 7 major and minor cases of bleeding and 1 contrast nephropathy were reported (Table 1).

In one year follow up of patients who included in the study, surveillance rate was 91.2%, 13 patients had persistent cardiac symptoms, 3 of them were admitted to hospital with coronary syndromes. During the first year after primary PCI; just one patient underwent target vessel revascularization and 3 patients needed to do CABG (Table 2). In this study, we also compared the effect of using drug eluting stents (DES) and bare metal stents (BMS) on one year mortality and morbidity (Table 3).

Table 1. Correlation Between MANE and MACE and Primary PCI [a, b, c]

	Results
No complication	56 (82.4)
MACE	4 (5.8)
MANE	8 (11.8)

[a] Abbreviations: MACE, main adverse cardiac effects; MANE, main adverse non-cardiac effects; PCI, primary percutaneous intervention.
[b] Data are presented as No. (%).
[c] P value = 0.791.

Table 2. One Year Follow up in Patients Who Had Primary PCI [a, b]

One Year Follow up	Yes	No
Death	6 (8.8)	62 (91.2)
Persistent Cardiac Syn	13 (19.1)	55 (80.9)
Hospitalization	3 (4.4)	65 (95.6)
TVR	1 (1.5)	67 (98.5)
CABG	3 (4.4)	65 (95.6)

[a] Abbreviations: TVR, target vessels revascularization.
[b] Data are presented as No. (%).

Table 3. Correlation Between one Year Follow up and Using DES Versus BMS in Patients Who Had Primary PCI [a, b]

Type of Stent One Year Follow up	DES	BMS	P Value
Death	1 (3.6)	6 (11.5)	0.412
Persistent cardiac syn	3 (10.7)	11 (21.2)	0.357
Hospitalization	-	4 (7.7)	0.292
TVR	-	1 (1.9)	> 0.999

[a] Abbreviations: BMS, bare metal stents; DES, drug eluting stents.
[b] Data are presented as No. (%).

5. Discussion

Treatment of ST-elevation MI has a broad medical and reperfusion basis. Nowadays, primary PCI is the choice of reperfusion therapy, particularly in patients with the symptoms onset less than 12 hours or within the early 12 to 24 hours and even more, if there is clinical or electro cardiogram (ECG) evidences of ongoing ischemia .Also primary PCI should be done in patients with cardiogenic shock or acute sever heart failure irrespective of their symptoms onset.

This study confirms that primary PCI revascularization is the best treatment for the acute ST elevation MI with brilliant acute result and one- year high survival and acceptable cardiac and non-cardiac complications. There is some data supporting that BMS is more effective than simple balloon angioplasty in primary PCI, but unlike

elective PCI, the effectiveness of DES is not much clear (10, 11). Studying the effects of using DES and BMS on long term cardiac mortality, morbidity and need to TVR shows that the performing the PCI in the golden time is very important and type of stent is not much important. By reducing the expenses of this procedure with using BMS, we can give this chance to more patients.

Authors' Contributions

Mahmood Dargahi developed the original idea and Sarah Tayebi developed the protocol, abstracted and wrote the manuscript; Maryam Razavi and Maryam Mirsaeeidi contributed to data collection and Jamshid Jamali did statistical analysis.

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