Myocardial Infarction

PRIMARY PCI IN ST ELEVATION MYOCARDIAL INFARCTION : AN EXPERIENCE AT AFIC/NIHD RAWALPINDI

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ABSTRACT

Objective: To evaluate the practicability, safety, and efficacy of primary percutaneous coronary intervention as a therapeutic option in acute ST elevation Myocardial Infarction (STEMI).

Study Design: Descriptive study.

Place and Duration of Study: The study was carried out in Armed Forces Institute of Cardiology– National Institute of Heart Diseases (AFIC-NIHD) from 18th October 2011 to 30th November 2011.

Patients and Methods: All patients presenting with acute STEMI were offered primary PCI. Patients who chose primary PCI as a mode of reperfusion were included in the study. Informed consent was taken and detailed questionnaire was filled for those patients who fulfilled the study criteria.

Results: Our initial experience of primary PCI in 33 patients with ST elevation MI has revealed some favourable statistics. Only 01 (3.0%) patient died during hospital stay following the procedure. Thirty two (97%) patients had an uneventful recovery and were successfully discharged 48-72 hours following PCI.

Conclusion: We have shown that primary PCI is a viable therapeutic option and can be performed in public sector tertiary care hospitals with excellent immediate, short and long term outcomes despite relatively long symptom onset to emergency room and door-to-balloon times.

Keywords: Primary PCI, Coronary stenting, Radial Artery.

INTRODUCTION

Percutaneous Coronary Intervention (PCI) in patients with acute ST elevation myocardial infarction (STEMI) is an established and preferable method of revascularization. Considerable body of evidence now suggests that revascularization with primary PCI provides better outcome as compared to pharmacological treatment[1]. Primary PCI significantly reduces mortality, re-infarction and stroke rates[2]. This is true not only for patients admitted to PCI centres but also for patients transferred from non PCI centers[3]. Despite this fact among the third world nations, this mode of treatment has not been widely adopted yet as a first line treatment particularly in public sector hospitals. This is mainly due to financial reasons as the state funding for health sector is very minimal and patients have to bear most of the expenses.

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Therefore, it is not surprising if the data is scarcely available from the developing nations including indo-Pak subcontinent.

Primary PCI is preferred if a skilled interventional cardiologist and catheterization laboratory with surgical backup are available and if the procedure can be performed preferably within 90 minutes after initial medical contact with the patient[4]. Primary PCI for ST elevation myocardial infarction has been recently introduced as a treatment modality at AFIC/NIHD. We studied our experience of primary PCI for ST elevation myocardial infarction in first 33 cases.

STUDY DESIGN AND METHODS

This study was conducted at the Armed Forces Institute of Cardiology/National Institute Heart Diseases, Rawalpindi from 18th October 2011 to 30th November 2011. All patients presenting with acute STEMI were offered Primary PCI.

Patients who chose primary PCI as a mode of reperfusion were included in the study.

Informed consent was taken and detailed questionnaire was filled for those patients who fulfilled the following inclusion criteria: (1) chest pain lasting > 30 minutes with (2) an ST elevation of > 1 mm in > 2 contiguous leads and (3) time from symptom-onset to presentation < 12 hours.

Patients who received thrombolytic therapy within 24 hours of hospital admission, those who were diagnosed as Non ST elevation Myocardial infarction (NSTEMI), those presenting beyond 12 hours with resolved symptoms, those with known pregnancy and those unwilling to undergo PCI were excluded from the analysis.

Procedure

Primary PCI of the infarct related artery was performed in standard fashion using a variety of guiding catheters, coronary wires, balloons and stents. The majority of interventions were performed via the radial artery route. All patients received 7,500 units of intravenous unfractionated heparin, aspirin 300 mg, clopidogrel 600 mg (loading dose) or Prasugrel (60 mg). Thrombus extraction catheter, nitroprusside, and adenosine use were at the discretion of operators. All patients were prescribed aspirin 300 mg, clopidogrel 75 mg and atorvastatin 20-40 mg daily at the time of discharge from the hospital.

Data Collection and Analysis

The prospective information on variables including age, gender, history of diabetes (defined as fasting glucose >126 mg/dl or on treatment), hypertension (systolic blood pressure >140/90 mm Hg or on treatment), hyperlipidaemia (fasting cholesterol >190 mg/dl or on treatment), smoking, prior history of PCI or coronary artery bypass grafting (CABG), need of intra-aotic balloon pump (IABP) and temporary pacemaker, angiographic and procedural details (culprit vessel, number of diseased vessels, use of stents, GP IIb/IIIa inhibitors, thrombolysis in myocardial infarction [TIMI] flow, stent (type and size) used and electrocardiogram (ECG) findings were recorded. Timing variables were documented as follows: (1) Symptom onset to

emergency room time (door time) was defined as the time interval between the onset of symptoms, as obtained from the history, and the time of presentation to the ER. (2) Door-to-balloon time was defined as the time taken for the first

Table-1: Description of demographic and clinical characteristics (n=33).

Baseline demographic and clinical characteristics	Frequency (%)
Gender	
Male	31 (93.9%)
Female	2 (6.1%)
Past Medical History	
Diabetes Mellitis	11 (33.3%)
Hypertension	10 (30.3%)
Smoking	14 (42.4%)
Dyslipidemia	06 (18.2%)
Family history of CAD	04 (12.1%)
Past history of CAD	06 (18.2%)
Admission characteristics	
Killips class	
I	21 (63.6%)
II	11 (33.3%)
III	01 (3.0%)
Anterior wall MI	13 (39.4%)
Inferior wall MI	08 (24.2%)
Inferior wall MI with RV	06 (18.2%)
extension	03 (9.1%)
Inferoposterior wall MI	01 (3.0%)
Lateral wall MI	02 (6.1%)
Anterolateral wall MI	
Timing variables	
Onset of pain to ER time mins (mean)	170
Door to balloon time mins (mean)	42.5
Inhospital Events	
Death on table	0
In-hospital death	01 (3.0%)
In-hospital CABG	0
Stent thrombosis	0
Contrast induced nephropathy	02 (6.1%)

ballooning from the point of entry to the ER. TIMI flow, and ST resolution (on 12- lead ECG strips) were visually determined and documented by two independent observers before and after PCI. PCI success was defined as

achievement of vessel patency with TIMI III flow. SPSS version 17.0 was used to record, analyse and interpret the data.

RESULTS

Overall 33 patients had primary PCI during the study period. The mean age of the patients was 56.4 years with range of 43 years to 80 years. The baseline and demographic characteristics are shown in table-1. The commonest MI seen in the study was anterior wall MI comprising 39.4% of all cases followed by acute inferior wall MI with 24.2%. The mean door to balloon time was 42.5 min and mean onset pain to ER time was 170 mins. Only one patient died during hospital stay post stenting and 2 patients had transient contrast induced nephropathy.

The angiographic and procedural details are shown in table 2. Most of the cases (90.1%) were approached through the radial access. Left anterior descending and the right coronary artery were the commonest culprit vessels comprising 45.4% and 42.4% of the cases.

DISCUSSION

Our initial experience of primary PCI in 33 patients with ST elevation MI has revealed some favourable statistics. Only 01 patient died during hospital stay following the procedure, 32 patients had an uneventful recovery and were successfully discharged 48-72 hours following PCI. The main reason for this high success rate is probably the less door to balloon time. The mean door to balloon time in our study was 42.5 minutes. The reason for the shorter door to balloon time was early and prompt diagnosis at ER, easy and quick transport to the cath lab and prompt availability of an experienced interventional cardiologist. Studies have shown that door to balloon time less than 90 minutes is associated with favourable outcome in terms of morbidity and mortality[5].

Only 1 case of no reflow during the PCI was noted. In all other cases no such complication was seen. Similarly no case of acute stent thrombosis was reported during the inhospital stay. The main reason for this favourable result was

judicious and prompts use of antiplatelet drugs

Table-2: Angiographic and procedural details (n=33).

Angiographic and Procedural Details	Frequency (%)
Access	
Radial	30 (90.9%)
Femoral	02 (6.1%)
Brachial	01 (3%)
Culprit Vessel	
Left anterior descending artery (LAD)	15 (45.4%)
Left circumflex artery (LCX)	04 (12.1%)
Right coronary artery (RCA)	14 (42.4%)
Multi vessel CAD	09 (27.3%)
TIMI Flow	
Pre procedure	
0	(20) 60.6%
I	(10) 3.3%
II	(03) 9.1%
Post procedure	
0	0 (0%)
I	0 (0%)
II	0 (0%)
III	33 (100%)
Visible thrombus	15 (45.4%)
Bifurcating lesion	0 (0%)
Balloon only (POBA)	0 (0%)
Thrombus aspiration	5 (15.2%)
GpIIb/IIIa inhibitor use	
Pre procedure	0 (0%)
During procedure	28 (84.8%)
Post procedure	7 (21.2%)
Use of Stent	
BMS	31 (93.9%)
DES	02 (6.1%)
Dysrhythmias	
Heart block	
I/II degree	04 (12.1%)
Complete	02 (6.1%)
Idioventricular	03 (9.1%)
VT	02 (6.1%)
VF	0 (0%)
Use of temporary pacemaker	02 (6.1%)
DC Cardioversion	02 (6.1%)
No reflow	01 (3%)
Cause	Distal thrombus embolization

and group IIb/IIIa inhibitors. Thrombus aspiration was done in cases of heavy thrombus burden. Bare metal stents were used in majority of the patients to reduce the financial burden on the patients with main aim being saving the myocardium. No statistically significant

difference in terms of stent thrombosis and 30 day mortality has been observed when comparing DES with BMS in primary PCI[6].

CONCLUSION

We have shown that primary PCI is a viable therapeutic option and can be performed in public sector tertiary care hospitals with excellent immediate, short and long term outcomes despite relatively long symptom onset to ER and door-to-balloon times. As South-East Asia faces a cardiovascular epidemic, it is obvious that acute STEMI will continue to suffer the productive lives. Even in our study mean age was just under 52 years and 80% of our patient population was having age of < 60 years. Left anterior descending artery was the culprit in majority (~ 63%) of them. This predicts the danger to our workforce. Although thrombolytic therapy (Streptokinase) is widely available in urban Pakistan, the efficacy of this treatment in achieving TIMI 3 flow is around 50% at best. Therefore our population equally deserves widespread availability of this expensive primary PCI treatment to save our young productive workforce. Whether the state will be ready to fund such an expensive primary PCI programmes in public sector hospital is not evident. Cost can be reduced by using cheap stents, equipments and resterilized materials. Hands on training of the operators to perform primary PCI in other community hospitals should be the integral part of such programmes. Above all strong commitment is needed to promote and establish this mode of therapy as a first choice for most of the patients if not all.

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