Study on Primary Percutaneous Coronary Intervention (PCI) in Patient with Acute Myocardial Infarction: in-hospital and 30-days Survival Outcome

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Keywords:
Primary PCI, STEMI.

Abstract:

Objective: *Aim of our study was to evaluate the safety and survival outcome of Primary PCI (pPCI) in patients with Acute Myocardial infarction in our hospital setting.*

Methods: *Total 30 (Female 5; Male 25) patients were enrolled in this study who were brought in to our hospital with STEMI. Average age was, Male 56, Female 52. Primary PCI was performed after transferring patient from Emergency Department (ED) to Cardiac Catheterization laboratory. Cardiovascular risk factors among the studied population were Dyslipidemia, Diabetes Mellitus, Hypertension, Smoking and Family History.*

Results: *Primary PCI either with Bare Metal Stent (BMS) or Drug Eluting Stent (Sirolimus-eluting stent or Paclitaxel stent) were performed in total 13 LAD lesion and 15 RCA lesion and 2 LCX lesion. BMS used were 66.7%, Sirolimus 20% and Paclitaxel-eluting stent 13.3%. Total 2 patients expired but due to hemorrhagic CVA and refractory heart failure. At presentation, ECG evidenced diagnosis were Acute Anterior Wall MI : 12 (40%), Inferior MI: 16 (53%), Infero-Posterior MI: 2 (6.7%). Our study showed that Primary PCI increases the higher survival outcome 28 (93.3%) out of 30 patients with acute MI.*

Conclusion: *Our present study revealed that revascularization by Primary PCI showed safety and better percentage of In-hospital and 30-days survival outcome in patients with Acute myocardial infarction in our hospital setting.*

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Introduction:

Primary Percutaneous coronary intervention (pPCI) is considered to be superior to thrombolytic treatment for ST elevation acute myocardial infarction (STEMI) especially, in a hospital with angioplasty facilities.[1-3]

It has been established by several investigators that the achievement of useful means of successful reperfusion was superior in pPCI than compared with thrombolytic therapy.[4-5] Door to balloon time,[6-7] is an important key factor in the success of pPCI. Many have demonstrated that patients, who had pPCI within 2 hrs of symptoms onset had lower mortality and greater myocardial salvage after pPCI and higher rates of complete reperfusion.[8] Aim of our study was to evaluate safety and the survival out come and benefits of pPCI in our hospital.

Patient Population:

Patients were randomized from the cases who presented to our ED with the onset of chest pain outside hospital of any age for at least 30 minutes but less than 12hrs in duration. ECG criteria were associated with ST elevation at least 0.1mV in 2 or more ECG leads who underwent pPCI at this hospital. Prior to pPCI, informed written consent were taken from the patient or guardians.

Methods:

Patients were treated with the loading doses of 300mg Aspirin and 600mg Clopidegrol in hospital emergency. With Diagnostic Coronary angiography was done before Percutaneous Coronary Intervention (PCI) to locate culprit infarct related territory or artery. After thrombus suction from the occluded site by a thrombuster sucker if

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indicated, balloon dilatations done in all cases, followed by stenting in the culprit lesion. Further smoothening was done by post-dilatation whenever required. Successful PCI was defined as a visually assessed 20-30% residual stenosis with TIMI III distal flow. IVUS was not available. Before PCI, IV heparin bolus of 7000 IU was given. Platelet glycoprotein IIb/IIIa-receptor blockers were administered at the discretion of the physicians. All patients were routinely underwent 12-lead ECG before and after the PCI to detect the procedure related ischaemic changes and or the presence of new pathologic Q waves. Blood sample for Cardiac CK-MB was measured at arrival into our hospital.

Primary Survival outcomes or end-points: The predicted endpoints were 30-day all-cause mortality and re-infarction or disabling stroke or LVEF<30%. Clinical reinfarction was diagnosed as any new infarction occurring after index infarct and unrelated to PCI or CABG with raised CK-MB above its previous nadir and history of chest discomfort or ECG changes.

Statistical analysis -Data were presented as Mean ±SD and percentage.

Results:
Primary PCI were performed in total 30 patients (Male 25, Female 5). Table I Shows the profile and clinical data of studied population. Male are older than female. Both systolic and Diastolic BP was higher in female than male. Cardiac CK-MB was higher in male than female. No differences were observed on average no of CAD risk factors in either group. Both SBP and DBP (recorded on arrival to ER) were higher in female than compared to male (126.7 ± 40.4 V.S 125.0 ± 26.0; 80 ± 26.5 V.S 77.7 ± 13.9). Cardiac CK-MB were raised in both groups (Male: 57.2 ± 65.3, Female 77.9 ±76.0). Door-to-balloon time in female was: 58.5 ± 29.8 versus male: 125.7 ± 54.3. The distribution of Cardiovascular risk factors were Dyslipidemia 26 (86.7%), Hypertension 19 (63.3%), Diabetes Mellitus 12 (40%) and smoking 11 (36.7%)of all male patient in the studied population.

PCI to LAD in 13 patients (43.3%), PCI to RCA in 15 patients (50%) and PCI to LCX in 2 patient (6.7%) were done (Table II).

Average stent size required was almost same in both LAD, LCX and RCA. ECG evidenced diagnosis on arrival at ED with the Anterior MI 12 (40%), Inferior MI 16 (53%), Infero-post MI 2 (6.7%) respectively (Table III). Total 2 patients with Anterior MI had subsequent cardiogenic shock due to their disease ailment.

Table-I

Demographic profile and clinical data of patients.

	Male	Female
Number	25 (75%)	5(25%)
Age (yrs)	56.0±9.7	52.0±9.1
SBP(mmHg)	125.0±26.0	126.7±40.4
DBP(mmHg)	77.7±13.9	80.0±26.5
CK-MB (U/L)	57.2±65.3	77.9±76.0
Trop-I (U/L)	6.74±16.6	7.4±12.4
No of CAD Risk Factor	2.6±1.0	2.5±0.6
Door-to-Balloon Time (Min)	125.7±54.3	58.5±29.8

Data were presented as Mean ± SD

Table-II

Average size of stents used with inflation pressure

	No(%)	Length (mm)	Diameter (mm)	Inflation Pressure(ATM)
LAD	13(43.3%)	21.5±7.3	3.2±0.5	15.1±4.1
LCX	2(6.7%)	23±5.0	3.0±0.2	16±1.4
RCA	15(50%)	21.7±0.6	3.5±0.3	15.5±2.3

Data were presented as Mean ± SD

Table III
Mode of presentation in our hospital

		Cardiogenic Shock	IABP
Acute Ant MI	12 (40%)	2 (6.7%)	
Ac. Inferior MI	16(53%)		2(11.7%)
Ac. Inf.-Post MI	2(6.7%)		

BMS was used in 66.7 % cases followed by Sirolimus Eluting stent in 205 patients and Paclitaxel eluting stent in 13.3% patients (Fig 1).

Total in-hospital and 30-days survival outcome were 28 (93.3%). Total 2 (6.7%) patient expired because of CVA with intracerebral hemorrhage in 1 patients and 1patient due to pump failure. All 28 (93.3%) those survived after Primary PCI were discharged in a stable haemodynamic condition and being followed-up at an interval of 1 month, 6 month and 9 month time in our Cardiac OPD.

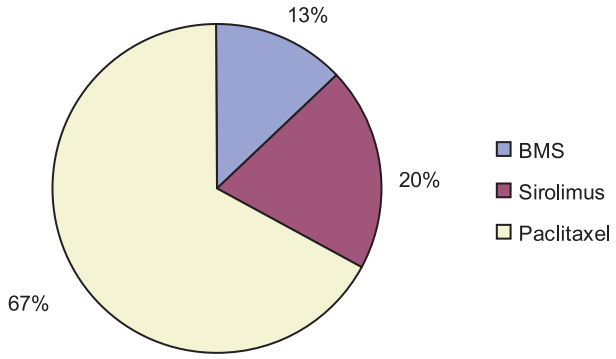

Fig 1: *Pie graph showing the percentage of stent used .*

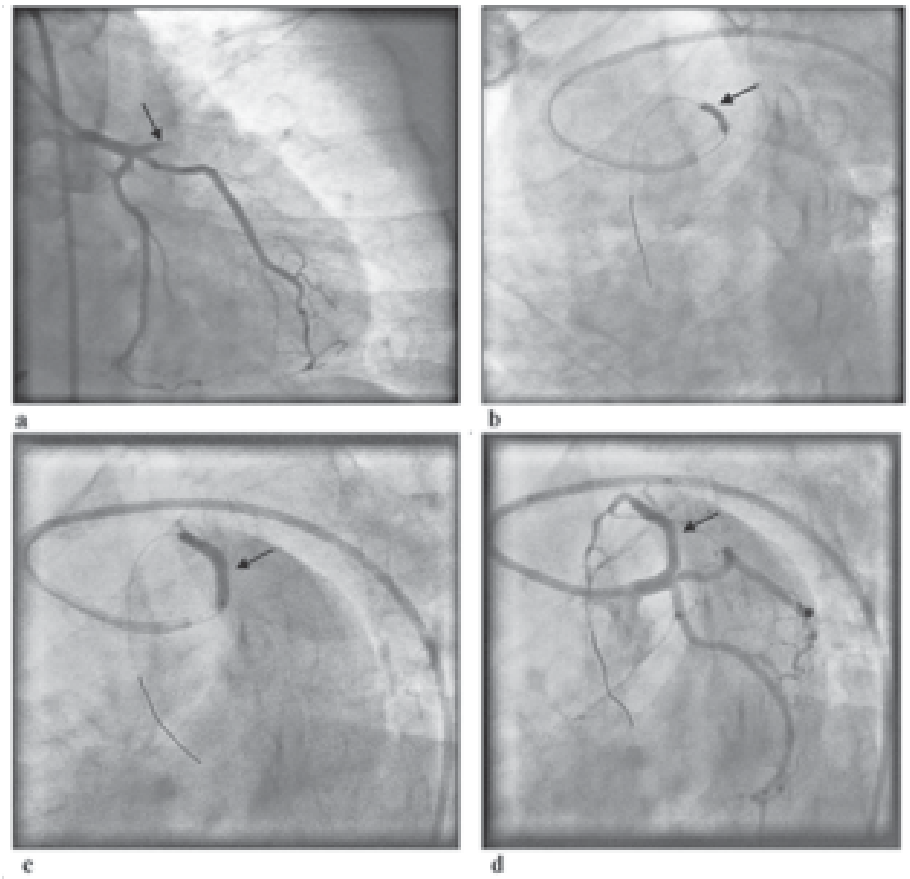

Fig.2 Primary PCI in Proximal LAD in a patient with acute Anterior Myocardial Infarction. *2a. Occluded proximal LAD (arrow), 2b: Ballooning (arrow), 2c: Stenting,2d: Post PCI TIMI III distal flow.*

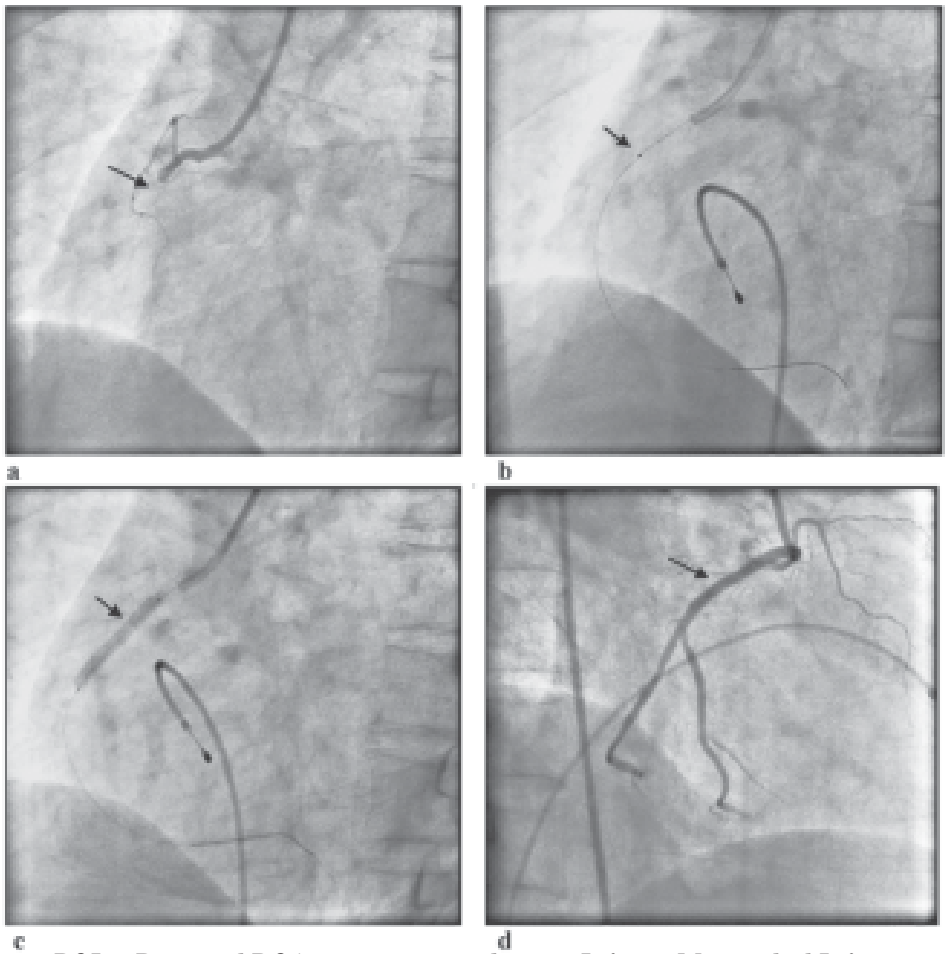

Fig.-3: *Primary PCI in Proximal RCA in a patient with acute Inferior Myocardial Infarction. 3a. Occluded proximal RCA (arrow), 3b: Thrombus suction (arrow), 3c: Stenting,3d: Post PCI TIMI III distal flow*

Discussion:

The advent of thrombolytic therapy in the treatment of AMI patient in late 1980s improved survival outcome, recurrent ischaemic events continued to occur unpredictably in the post MI period. Later, invention of PTCA and PCI, has improved a lot in the stent era. Advances in stent implantation technique derived from intravascular ultrasounds imaging [9] and recognition of adequate plaque burden,[10] the incidences of sub-acute stent thrombosis has fallen in complex subsets.[11] With the comparison of PTCA, the implantation of stents in the elective setting has been shown to reduce angiographic restenosis and improve late clinical outcomes.[12-13] survival outcome on pPCI has established that the benefits of pPCI in patients with acute myocardial infarction is superior to the befits of thrombolytic therapy.[14,16]

Stone et al, has documented that Primary stenting is safe, feasible in the majority of patients with acute myocardial infarction and results in excellent short-term outcomes.[17]

In our present study, we used mainly Bare metal stent (BMS) and Drug Eluting Stents (DES) - Sirolimus and Paclitaxel-eluting stent. Although, the use of DES and its roll on acute stent thrombosis is still debatable, majority are using BMS. Our patient, treated with DES has no documented acute stent thrombosis.

Our present study had shown the increases in primary endpoint of 28(93.3%). 2 patient died (1 patient had CVA and 1 patient refractory heart failure), does also implicating procedural success of pPCI. Although, lacking of IVUS facilities, we are unable to get optimal result. Visual <20% residual stenosis was considered as successful pPCI in this study. None of the patient had procedure related complications like haematoma at puncture site, acute or 30 day stent thrombosis.[18]

Also, we found that female patients are developing CAD leading to AMI and undergone subsequent pPCI with better in-hospital and 30-days survival out come than male subset of our patient population. This was probably due to the lower (average 58 minutes) door-to-balloon time in female patient than compare to male patients (average 125 minutes). The possible explanation is, in case of female patient, husband and or family member's are the key person responsible to give consent at earliest time, thus reducing the door-to-balloon time. On the other hand, in case of male patient, the reason behind the delayed or prolonged door-to-balloon time was due to the delayed consent from patient himself, as he is the decision maker. Marked increase of Cardiac CK-MB in both male and female indicates increase area of myocardial tissue damage and may be an important predictor of survival.

The main benefits of pPCI over thrombolysis is the achievements of a higher rate of coronary recanalization with a lower risk of intracranial bleeding and Left ventricular free wall rupture.[4,19-20] Although, 1 patient had intracranial bleeding in post pPCI stay at hour hospital.

In patient undergoing pPCI, procedural success provides significant prognostic value. Procedural success, primary endpoint and survival out come of our present study is consistent with PAMI stent pilot trial.[17] Several trials on facilitated primary angioplasty in whom early pharmacological reperfusion before pPCI may further improves outcomes in AMI. [14-15]

Study Limitation:

Door-to-balloon time was exactly not possible because of lacking of expression of exact onset time and consent for pPCI either by the patient or attendants. Future needs are to record exact time of onset of chest pain and getting immediate consent on arrival at Emergency Department. Lack of availability of IVUS was also a drawback for us to see intravascular thrombus burden and exact stent implantation.

Conclusion:

We found that Primary PCI is safe and increase the in-hospital and 30-days survival outcome in patient with acute myocardial infarction. Our future perspective is to established the comparison of survival outcome in pPCI versus fibrinolytic therapy in our patient populations, reducing the door-to-balloon time below two hours, benefits of pPCI in NSTEMI the assessment of it's primary benefits.

Conflict of interest- None.

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