Original research article

Outcomes of Percutaneous coronary intervention in patients with STEMI: A Single-Centre study

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Abstract

Objective: Percutaneous coronary intervention (PCI) is the best-known intervention for reperfusion in patients experiencing ST-elevation myocardial infarction (STEMI). Early intervention improves short- and long-term outcomes of PCI, while a delay may reduce the benefits. This retrospective study was conducted to assess the clinical profile and outcomes in patients presenting with STEMI and undergoing primary PCI at Government Coimbatore medical college hospital, Tamilnadu (India).

Materials and Methods: In this retrospective study, the demographic characteristics, disease presentation, procedural details, and outcomes of 336consecutive patients with STEMI who underwent PCI between 2017 and 2018 at Government Coimbatore medical college hospital , were analyzed. All patients were treated with standard primary PCI protocol

 Results: The mean age of the patients was 55.2±12.6 years. The average duration of chest pain was 230.3±186.2 minutes. Risk factors included previous history of coronary artery disease (CAD; 9.7%), diabetes mellitus (25.5%), hypertension (24.8%), smoking (24.5%) and family history of CAD (4.8%). About half of the patients had anterior wall myocardial infarction (AWMI). The median door to ballooning (DTB) time was 47 minutes. Overall, 16 out of 336 patients developed complications. In total, 2 patients of 336 had died (0.5%).

 Conclusion: Primary PCI is effective in the management of STEMI in the Indian scenario. Despite the delayed presentation of STEMI patients to a cardiac intervention center, recommended DTB can still be achieved, which is important for better intervention outcomes. The study also confirms the younger age of STEMI patients in India, compared with Western population.

 Introduction:

 Coronary artery disease is one of the most common causes of death in the Indian population, with acute STEMI being its most dramatic m a n i f e s t a t i o n , r e s u l t i n g i n h i g h morbidity and mortality. Primary PCI is the standard of care for patients with STEMI. With advancements in procedural techniques, medications, and early intervention, the short- and long-term clinical outcomes of PCI have significantly improved, the number of

patients undergoing primary PCI is increasing owing to the growing economy,cfree schemes of central and state government insurance schemes.

According to the American College of Cardiology and American Heart Association (ACC/AHA) 2013 guidelines, primary PCI is the preferred mode of reperfusion in patients with STEMI with symptom onset within 12 hours. It is also recommended in patients who have STEMI with cardio genic shock or acute severe heart failure, irrespective of the time from onset of myocardial infarction (MI). Primary PCI offers the greatest survival benefits in high-risk patients. A delay in intervention has been shown to reduce the benefits. Evidence on early primary PCI is available from all over the world; however, there is limited data available in the Indian scenario.

Methodology:

This retrospective study was conducted to evaluate the primary PCI results Methodology In this retrospective study, we screened Government Coimbatore medical college hospital, database of consecutive STEMI patients who underwent primary PCI between March 2017 and dec 2018

 The study cohort included a total of 336 patients with STEMI. The primary PCI procedure was performed using the standard protocol by three interventional cardiologists who lived within 3 km of the hospital. The services of the cardiologists were called once the patient arrived, the diagnosis was confirmed and a patient consent was obtained for primary PCI. By the time the cardiologist arrived, the patients were shifted to the cardiac care unit and prepared for primary PCI and the catheterization laboratory team was activated.. Primary PCI was done for culprit artery; a soft wire was crossed across the lesion and flow was assessed. If the flow was established with minimal visible thrombus, direct stenting was done; otherwise thrombosuction was done followed by predilatation, if needed and then the stent was implanted. Post stent dilatation was done with NC balloon if required.

 Results:

Demographics and Clinical Profile and Findings In this study,

the mean age of the patients was 57.2±12.6 years (median: 57 years; range: 23–90 years).

Among these,208 (62%) of the patients were male.

 The average duration of chest pain was 230.3±186.2 minutes

 A previous history of CAD was present in 9.7% of the patients.

 Comorbidities, such as diabetes mellitus, were present in 180(53%) of the patients,

while 24.8% of the patients had hypertension.

one-fourth (24.5%) of the patients were smokers.

 A family history of CAD was reported in 4.8% of the patients.

1. The left ventricular ejection fraction at admission was 41.52±8.72%. Diagnosis
2. About half of the patients196 (58%) had single-vessel disease (SVD),MALE 126 FEMALE 70
3. 122 (36%) of patients had double-vessel disease (DVD)
4. 18 (5.3%)of patients had triple-vessel disease (TVD)
5. About half of the patients (49.35%) had AWMI
6. 36.77% of the patients had inferior wall MI
7. posterior wall MI was noted in 13.87% of patients.

   Procedural details ;

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The median door to ballooning (DTB) time was 47 minutes . All patients underwent PTCA as follows. Three patients required only thrombo suction and angioplasty w i t h o u t   s t e n t   i m pla n t a t i on Two patients required staged CABG for severe disease after culprit vessel angioplasty. Staged PTCA for other nonculprit vessel was performed in 40 (12%) patients before discharge.

In the majority of the patients 307(91.3%), the route of access was the radial artery. right femoral artery,was the route of access in29 (8.6%) of the patients.

Predilatation was performed in 49% of the patients.

Thrombus aspiration was done in 68% of the patients.

Post-dilatation was required in 57% of the patients.

Drug-eluting stents were used in 100% of the patients

Procedural Outcomes/Complications

The majority of the patients (90.61%) did not develop any complication.

Only 29 (9.4%) patients developed complications, the most common b e i n g h y p o t e n s i o n / b r a d y c a r d i a 12

7 patients developed haematoma

5 patients developed dissection of coronary arteries

Pci failure in 14 patients .

two patients developed coronary perforation

12 patients developed cardiogenic shock.

two patients developed stent thrombosis, which was managed with thrombosuction and balloon angioplasty..

Of the 336 patients, 2(0.5%) patients died: 12 patients had cardiogenic shock

Discussion:

In this retrospective study conducted at a single cardiac care center, data from 336 patients with STEMI who underwent primary PCI were analyzed. The mean patient age in this cohort was 57.22 years, which was comparable to that reported (52 years) in a study conducted by Subban et al. This is considerably younger than patients presenting with STEMI in Western

Table 1: Clinical findings Characteristics Frequency (%) / Mean ±SD LVEF (%)

On admission 41.52±8.72 LVEF (%)

On discharge 45.38±10.1

Blood pressure (mmHg)

Systolic 126.51±24.1

Diastolic 76.1±14

Serum creatinine (mg/ dL) 0.93±0.37

Serum lipid profile (mg/dL)

Almost 77% patients were aged less than 65 years of age. This indicates that the STEMI population undergoing primary PCI is younger in India than in Western countries and that males may require more intensive management of cardiovascular (CV) risk factors than females. D i a b e t e s , h y p e r t e n s i o n , a n d smoking were identified to be the major CV risk factors among STEMI patients undergoing primary PCI, in this study. The prevalence of these risk factors was comparatively lower than that reported in another Indian single-

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center studies.. Default strategy of primary PCI was thrombosuction followed by stenting. Later, direct stenting without thrombosuction was also frequently used. Still predilatation was required in 49.% cases. In primary PCI, postdilatation was reserved only for patients with less than acceptable result after stenting because of fear of slow flow/no reflow. Post dilatation was required in 57.% of the patients. In the present study, drug-eluting stents were used in all patients (100)It has been noted that during primary PCI in STEMI, microvascular obstruction persists despite the restoration of epicardial flow, due to atheromatous and thrombotic embolization as well as vasospasm.. In this study, in-hospital mortality w a s 0.5 % c o m p a r e d w i t h 4 . 2 % reported by Subban et al. More than 90% of the patients did not develop any complications. Hypotension/ bradycardia and complete heart block were the most common complications. The average duration of chest pain at the time of arrival was 230.34±186.21 minutes in this study. Early PCI has been associated with reduced complications of STEMI resulting from longer ischemic times or unsuccessful fibrinolytic therapy; it also allows earlier hospital discharge and resumption of daily activities. There is generally a delay in the onset of symptoms of STEMI and the patient reaching hospital for medical care, both of which may be attributed to symptoms other than chest pain, assumption that symptoms are self-limited and not serious, fear of embarrassment in case of false alarm, symptoms assumed to be related to other preexisting conditions, and lack of knowledge of need of rapid action.5 A standard measure for assessing a hospital's capability for managing STEMI with mechanical perfusion is DTB time.2 The importance of shorter DTB time in the management of STEMI has been well recognized. Both ACC and ESC have suggested a DTB time of 90 minutes or a PCI-related delay of 60 minutes as standard. Generally, it includes the time from arrival at the hospital to ECG, the decision of PCI, patient's consent, STEMI team activation, and sheath to balloon time.10 In this study, the median DTB was 47 minutes. In the Indian scenario, a delay on the part of the patient in giving consent and contribute significantly to delay in DTB.11 T h e m a j o r l o g i s t i c p r o b l e m s that hinder the timely availability of primary PCI to patients in India include: mode of transportation to the cardiac care centre, availability of interventional cardiologists,. In India, most of the patients reach the hospital through their own means of transport or 108 ambulance and this delay can have a significant impact on treatment outcomes.. The second logistic problem is the availability of interventional cardiologists. Majority of the hospitals in India do not have on-site interventional cardiologists. However, in our centre, the services of interventional cardiologists are called for as soon as the patient arrives, the diagnosis is confirmed and a patient consent is obtained for primary PCI. The third logistic problem is the financial constraint. Majority of the patients in India are self-paying and are not covered under medical insurance by the government the immediate availability of an interventional cardiologist and a facility to begin the procedure without paying advance deposits may have largely contributed to the improved treatment outcomes in our study. Limitations The main limitations of this study are the relatively smaller sample size and lack of follow-up. Further, these observations are reported from a single center and may not be generalized. However, this study highlights the benefits of early primary PCI in patients with STEMI. Conclusion This study has shown that primary PCI is effective in the management of STEMI in the Indian scenario. Despite logistic problems contributing to late presentation of patients with STEMI in India, it was possible to achieve recommended door to balloon time in our study, since we had an on-site interventional cardiologist available immediately Thus, primary PTCA protocol could be activated in the casualty itself. The study also confirms the younger age of STEMI patients in India, The risk profile of very young STEMI patients in India is similar to that reported in the Western populations.

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12. Clinical Characteristics and Outcomes of Percutaneous Coronary Intervention in Patients with STEMI: A Single-Center Experience Rishi Kumar Gupta1, Simmi Manocha2, Subrat Akhoury3, Umesh Kohli4 Journal of The Association of Physicians of India ■ Vol. 67 ■ January 2019 40-43

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