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Original Research Article

"Study of Clinical Profile and Outcomes of Percutaneous Coronary Intervention in ST Elevation Myocardial Infraction"

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Abstract

Background: Percutaneous Coronary Intervention (PCI) is the preferred method of revascularization in Acute ST Elevation Myocardial Infarction (STEMI). ***Aim:*** Our aim was to study the clinical profile and outcomes of patients who underwent PCI for STEMI at tertiary cardiac centre of Bangladesh. ***Methods:*** It is a retrospective, single centre study, performed at Bangabandu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. All patients who underwent PCI for STEMI from November 2017 to July 2019 were enrolled in this study. All the data were collected from hospital registry and cath lab records. ***Results:*** The Study showed that out of 232 patients who presented with STEMI, 74.5% were male with average age of 57.39 years. The mean time of presentation after onset of symptom/s was 17.5 hours. About 66% patients presented in less than 12 hours of symptoms onset, 21% presented at 12-24 hours of symptoms onset and 13% patients presented late. Primary PCI was done in 87% of patients. Almost all patients (98.2%) underwent coronary artery stenting with drug eluting stents. Multivessel PCI during index procedure was done in 7 patients. TIMI III flow following PCI was achieved in 97% cases. Average LVEF at discharge was 44.73%. There were 8 deaths, all after Primary PCI. In-hospital mortality rates for patients presenting with and without cardiogenic shock were 38.46% and 1.59% respectively. The overall mortality rate was 3.98%. ***Conclusion:*** This study has reemphasized that PCI is effective in the management of STEMI cases in Bangladesh with improving mortality rates and decreasing complications. Minimizing the delayed presentation after the onset of symptoms should be one of the prime focuses for effective management of STEMI.

Keywords: Coronary Artery Disease, Percutaneous Intervention, ST elevation Myocardial infarction.

INTRODUCTION

Ischemic Heart Disease (IHD) is the leading cause of mortality and morbidity in the world [1]. In Bangladesh, IHD was the number 1 killer in year 2017 and will most probably remain so for at least few years to come [2]. IHD may present as stable IHD or Acute coronary syndromes (ACS). Among the ACS, the mortality rate is highest for ST Elevation Myocardial Infarction (STEMI) [3]. Primary Percutaneous Coronary Intervention has emerged as the therapy of choice in STEMI and selected cases of Non-ST Elevation Myocardial Infarction (NSTEMI) [4-8]. As Percutaneous coronary intervention (PCI) enters its fourth decade of use, it is now the most commonly performed revascularization therapy worldwide. With the development of drug-eluting stents, clinical outcomes have improved significantly. The prevalence of cardiovascular disease is expected to rise and as a result, will pose a significant challenge and burden to the local health system. Previous cardiovascular studies have shown that elderly patients were less likely to receive evidence-based therapies and had higher

mortality rate [17,19].There was also marked variation in the clinical care of the elderly with acute coronary syndromes (ACS) [17,18]. In addition, limited data are available on the delivery of health care and clinical outcomes of elderly patients with cardiovascular disease in the South-East Asia region. We therefore sought to evaluate the clinical characteristics and in-hospital outcomes of our cohort of elderly South-East Asian patients undergoing primary percutaneous coronary intervention (PPCI) for ST-elevation myocardial infarction (STEMI) in "real world" clinical practice.

METHODS

It is a retrospective single centre study, performed at Bangabandu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. All patients who underwent PCI for STEMI from November 2017 to July 2019 were enrolled in this study. All the data were collected from hospital records and cath lab records. Two cardiac interventionists who were trained in interventional cardiology performed all procedures.

Inclusion criteria

a) STEMI.
b) Less than 12 hours.
c) Cardiogenic shock or acute severe heart failure irrespective of time delay.
d) Evidence of ongoing ischemia 12-24 hours after symptom onset.

Exclusion criteria

Patient who underwent thrombolysis or medical management for STEMI and those who did not provide written consent. All patients presenting with Acute STEMI were counseled about the treatment modalities in emergency (ER). As most of the patents now can afford Primary PCI under the coverage of funds provided by the Government of Bangladesh and our centre, and with clear outcome benefits of Primary PCI over thrombolysis, almost all patients presenting with STEMI were taken for Primary PCI if indicated. Those who did not give written informed consent for Primary PCI or chose medical management or thrombolysis were excluded from this study. Those patients presenting late were taken for elective PCI after hospital admission. For Primary PCI, patients were given loading doses of Asprin (300 mg), Clopidogrel (600mg) and Rosuvastatin (20 mg) at ER. At cath lab, access for PCI was determined by the primary operator. Most of the cases were successfully performed via radial approach. Intravenous IV Unfractionated Heparin 10000 units was given after diagnostic CAG to maintain ACT of more than 300 seconds during procedure. Temporary pacemaker was inserted via femoral route whenever indicated. Thrombosuction was done in cases with high thrombus burden. Predilatation with a non complaint balloon was done for most of the cases followed by stenting. Only Drug Eluting Stents (DES) was used. In cases where stenting was not feasible, plain balloon angioplasty was done. Post dilatation with a non-compliant balloon was done as a routine unless stents were deployed with high pressure with no obvious unexpanded stent struts were visible. After PCI, all patients were transferred to cardiac care unit (CCU).

RESULTS

Total of 232 patients meeting the inclusion criteria were included in the study from November 2017 to July 2019. The average age was 57.39 yrs with youngest patient being 24 years old and oldest being 86 years old. About 12% (28) were less than 40 years of age. Most of the patients were male (74.5%). The commonest symptom was chest pain, present in 97% cases. The average time of presentation after symptom onset was 17.5 hours, earliest being 15 minutes. About 66% patients presented in less than 12 hours of symptoms onset, 21% presented 12-24 hours of symptoms onset and 13% patients presented late. Among the traditional cardiovascular risk factors, smoking was the commonest. Nearly 50% of the patients smoked while 35% were hypertensive, 28.2% diabetic, 2.6% had known dyslipidemia and 3.6% had family history of MI.

Table-1: Baseline Characteristics, Diagnosis and Management Strategies.

Age (years)	**57.39±12.97**
Sex	
Male	173 (74.5%)
Female	59 (25.5%)
Duration of symptom/s	17.5 hrs (15min-7days)
Less than 12 hours	153 (66%)
12 to 24 hours	49 (21%)
More than 24 hours	30 (13%)
Risk factors	
Diabetes Mellitus	28.2%
Hypertension	35%
Smoking	50.4%
Dyslipidemia	2.6%
Family h/o of CAD	3.6%
Presenting symptom/s:	
Chest pain	97%
Shortness of breath	20%
Nausea/vomiting	28%
Abdominal pain	7.5%
Near syncope/syncope	6%
Killip class	
Class I	88.4%
Class II	5%
Class III	1%
Class IV	5.6%
Diagnosis:	
Anterior wall STEMI	53%
Inferior wall STEMI	41.8%
Posterior wall STEMI	3.4%
Lateral wall STEMI	1.7%
Procedure:	
Primary PCI (PPCI)	202 (87%)
Elective PCI	30 (13%)
LVEF at discharge	44.73%
Duration of hospital stay (days)	7.6

88.4% of patients presented in Killip class I while 5.6% patients presented in Killip class IV. Anterior wall STEMI was commonest accounting for 53% followed by Inferior wall, 41.8%. Angiography revealed SVD in 35%, DVD in 33.3%, TVD in 29.1%. Left Main Coronary Artery involvement was seen in 5 cases and 1, Left Main angioplasty was done.

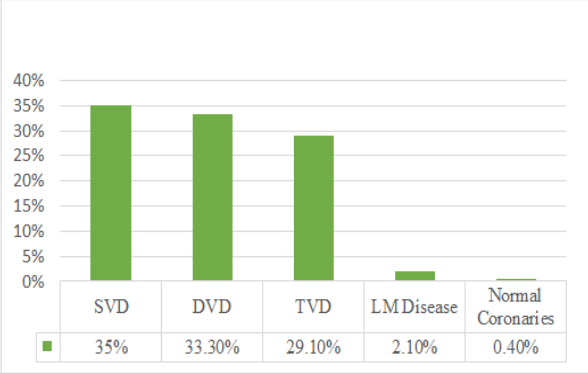

Fig-1: Diagnosis by Number of Vessels Involved.

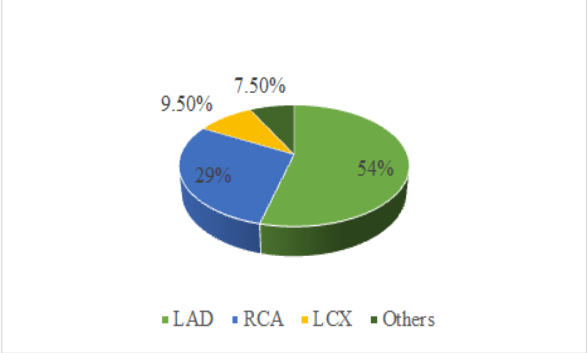

Fig-2: Culprit Vessel for STEMI.

In all cases, wire could be crossed over the lesion. Only 4 cases out of 232 cases underwent plain balloon angioplasty due to the nature of lesion and vessels. While in all other cases, except for 1 patient with normal coronary arteries, DES was deployed. Thrombosuction because of excess thrombus burden was done in 45(19.5%) cases. TIMI III flow was reestablished in 97% cases and TIMI II in 3% cases.

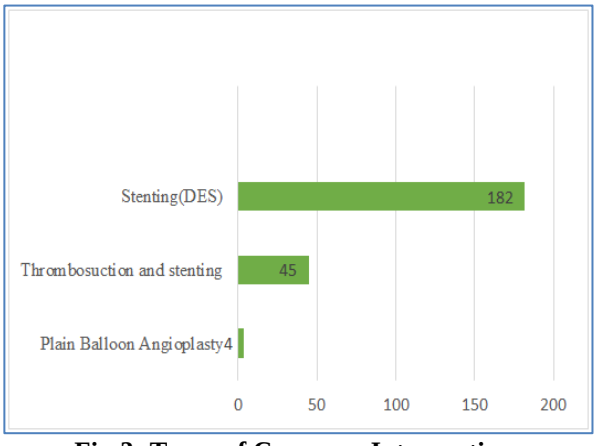

Fig-3: Types of Coronary Intervention.

There were total of 8 deaths all during or after Primary PCI. 13 patients presented in cardiogenic shock, out of which 5 died. The commonest complication after PPCI was heart failure, occurring in 20 cases. The second most common complication was heart block requiring temporary pacemaker insertion in 18 cases. 1 patient needed a permanent pacemaker for persistent complete heart block. Post MI pericarditis/pericardial effusion developed in 11 patients, all of which resolved with conservative management. 3 patients developed access site complications in the forms of hematoma, AV fistula and pseudoaneurysm respectively. There were 4 cases of Transient ischemic stroke after PPCI, all the patients recovered their neurological function. VT/VF was encountered in 9 cases during hospital stay. 6 patients had developed LV apical clot in follow up, all had anterior wall MI. There were 2 cases of coronary artery dissection caused by guiding catheter which were managed immediately with stenting. 1 patient presented with subacute stent thrombosis in follow up. Acute Kidney Injury (Pre-renal and Contrast Induced Nephropathy) was seen in 11 cases (4.7%) but none of the patients required hemodialysis after PPCI. Average hospital stay was 7.6 days. Average LVEF at discharge was 44.73%.

Table-2: Complications and In-Hospital Mortality Rates after PCI.

Heart failure	**20**
Heart block	18
Post MI pericarditis/ pericardial	11
effusion	
Ventricular arrhythmias	9
LV clot	6
TIA/stroke	4
Access site complication	3
Radial artery	1
AV fistula	1
Femoral artery	4
Pseudoaneurysm	1
Hematoma	1
Bleeding (retroperitoneal)	2
Coronary Artery Dissection (iatro- genic)	2
Permanent Pacemaker Insertion	1
Stent thrombosis (subacute)	1
In hospital mortality	
Primary PCI	8
Cardiogenic shock	5
Non-cardiogenic shock	3
Elective PCI	0

DISCUSSION

PCI was a therapeutic option far from reach to general population till recent past in our country. But now, with the development of health infrastructures, trained manpower and health awareness among the general population, it has become feasible for most of the patients in the country. In our study, all patients

were taken for PPCI rather than thrombolysis because of the superiority in outcomes with PPCI. In this study, average age of patients was 57.39 years. This finding is similar to the previous studies done in our country [9, 10]. About 12% of cases were below 40 years of age, youngest patient being 24 years of age. As with other studies, STEMI was more common in males (74.5%). The traditional cardiovascular risk factors like hypertension, diabetes and smoking were dominant in our country as well. The percentage of patients diagnosed as hypertensive was lower (35%) than other studies in our country. The percentage of diabetes (28.2%) was similar to other studies. While 50% of our patients were current or former smoker, this varied from 34% to 76.47% in other studies [9-11]. One of the major determinants of outcome in MI is the time interval between onsets of symptom to revascularization. In our study, the average time of presentation was 17.5 hours after the symptom onset. While the average time for patients taken for PPCI was 7.6 hours. In the previous study, this was about 8 hours [11]. Our study showed that nearly 34% of our patients presented after 12 hours of symptoms onset. The reasons for this may be due to delay in diagnosis, the time lost during referral from non-PCI capable centres, time delay in transport which is inevitable owing to the poor infrastructure and geographical condition of the country and lack of awareness in general population about the benefits of early revascularization in STEMI. Of these 34% patients, 21% patients underwent PPCI, as per recommendations in guidelines [12]. Anterior wall STEMI was commonest accounting for 53% followed by Inferior wall, 41.81%. 13 patients (5.6%) had presented in cardiogenic shock. LAD was the commonest culprit vessel as in other studies. Multivessel disease was present in 64.6% cases, consistent with international data [13]. Radial artery was preferred choice of vascular access for PPCI i.e nearly 85%. This was in vast contrast to previous study performed in our centre in which only femoral access was used [11]. Radial access was associated with lower access site complications, more patient comfort after the procedure and early mobilization. Only 1 patient had developed AV fistula in radial group while 1 patient had groin site hematoma, 1 had femoral artery pseudoaneurysm and 2 had retroperitoneal bleed in femoral access group. There were 8 mortalities, all in Primary PCI group. In-hospital mortality rates for patients presenting with and without cardiogenic shock were 38.46% and 1.59% respectively. The overall mortality rate was 3.98%.The mortality rate of cardiogenic shock patients is comparable to the previous study done at SGNHC, Bangladesh [2]. The mortality rate in patients without cardiogenic shock and overall mortality rate are similar to the studies conducted in Nepal [9-11], India [14, 15] and international registry [16, 17].

CONCLUSION AND LIMITATIONS

This study has reemphasized that PCI is effective in the management of STEMI cases in Bangladesh with improving mortality rates and decreasing complications. Minimizing the delayed presentation after the onset of symptoms should be one of the prime focuses for effective management of STEMI. There are few limitations of this study. First, it is a single centre retrospective study. And second is the lack of data on long term outcomes.

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