TWO YEAR OUTCOME OF PRIMARY PERCUTANEOUS CORONARY IN PAKISTAN NAVAL SHIP SHIFA CARDIAC CENTER

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ABSTRACT

Objective: To determine the in-hospital outcomes of primary percutaneous coronary intervention approach in a tertiary care cardiac center.

Study Design: Retrospective observational descriptive study.

Place and Duration of Study: Pakistan Naval Ship Shifa Hospital, Karachi Pakistan, from Jan 2018 to Dec 2019.

Methodology: A total of 143 consecutive ST-elevation myocardial infarction patients presented to the ER within 24 hours of the onset of chest pain were included in this study. We included patients of both genders, aged >20 years and met the diagnostic criteria of ST-elevation myocardial infarction. Patients with cardiogenic shock, puncture site infection were excluded from the study.

Results: Average age of patients was 54.2 ± 12.7 years (min-max age=24-92 years). Majority 130 (90.9%) of cases were males, while 55 (38.5%) patients had diabetes, 52 (36.4%) were hypertensive, 38 (26.6%) were smokers, family history of CAD was found in 10 (7%) cases and 8 (5.6%) cases had prior percutaneous coronary intervention or coronary artery bypass graft. Mostly 64.3% procedures were performed by trans-radial approach. Mean ± SD door-to-balloon time was 60.31 ± 29.8 minutes. About 72% patients received primary percutaneous coronary intervention within ≤60 min and 40 (28%) cases received primary percutaneous coronary intervention with door-to-balloon time >60 min. This study shown 100% success rate with zero mortality only one patient developed arrhythmia during procedure.

Conclusion: Primary percutaneous coronary intervention through trans-radial approach was safe option with excellent success rates in terms of both morbidity & mortality rates.

Keywords: Primary percutaneous coronary intervention, ST-elevation myocardial infarction, Trans-radial.

INTRODUCTION

The primary goal in the treatment of ST-elevation myocardial infarction (STEMI) is to restore perfusion of the myocardium through the recanalization of the vessel that is blocked. Reperfusion in the early stages has shown to produce better results[1]. For reperfusion, there are various strategies that can be applied, but the most common ones are thrombolytic therapy and primary percutaneous coronary intervention (PPCI)[2,3]. Various studies across different populations have proven that in relation to mortality, stroke, and re-infarction, PPCI is a more successful and efficient method of treatment in comparison to thrombolysis in the treatment of STEMI[4]. Few studies from India including a study by Reddy *et al*, concluded that primary angioplasty is safe and effective with high procedural success (99%) and lower rates of recurrent ischaemic events (5%)[5]. Ranjan *et al*, showed good procedural success rate (98%) even with transradial approach which is technically more demanding[6].

The American Heart Association guidelines suggest PPC) as the preferred treatment for STEMI patients[7]. For non-transfer patients, PPCI should be performed within 90 min of arrival at a hospital.The door to balloon time is strongly associated with the likelihood of survival and is an accepted measure of care quality[8,9]. Since the 2012 European Society of Cardiology guidelines suggested that the goal should be to achieve a doorto balloon time of <60min of presentation in PPCI capable institutions[10], few studies have focused on the effect of <60 min door-to-balloon time on the outcome of STEMI patients. Recently, Wang *et al*, reported that <60min door-to-balloon time is associated with better survival rates in younger STEMI patients undergoing PPCI than in their elderly counterparts[11].

However, recently, some studies have reported that significantly shortened door-to-balloon time may not improve the mortality rate of STEMI patients who are undergoing PPCI[12,13]. This finding raises the question of whether shortening of the door-to-balloon interval is necessary.

This study focused on the difference between door-to-balloon times of <60 min and 60-90 min, which could help to determine whether further shortening of the door-to-balloon time is necessary.

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METHODOLOGY

This retrospective observational descriptive study was conducted in newly developed cardiac center in Pakistan Naval Ship Shifa Hospital, Karachi, from January 2018 and December 2019. A total of 143 consecutive adult STEMI patients presented to the emergency room within 24 hours of the onset of chest pain were included in this study. We included patients of both genders, aged >20 years and met the diagnostic criteria of STEMI {Chest pain (for at least 20 minutes) and electrocardiographic evidence of ST-segment elevation of >1mm in two contiguous leads or new-onset left bundle branch block}and coronary artery disease confirmed by PPCI were included. Furthermore, cases with cardiogenic shock, puncture site infection, and potential for future arteriovenous fistula surgery were excluded from the study.

All selected patients underwent to diagnostic angiogram, which was followed by the PPCI of the culprit artery with or without stenting. A prior informed consent was signed by the all patients regarding procedures and participation in the study. Only the culprit artery was treated, and staged PCI was planned if needed. All PPCI procedures were performed by experienced cardiologists (interventional consultants). Pre, per, and post procedure pharmacological therapywere uniform for all patients according to STEMI guidelines and hospital protocols.

All cases received aspirin 300mg, 600mg loaded dose of clopidogril, β-blockers as per indications and bolus of unfractionated heparin. Glycoprotein (GP) IIb /IIIa antagonist tirofiban/eptifibatide was administered to majority of patients. Patients underwent diagnostic angiogram followed by primary PCI of the infarctrelated artery. All primary PCI were performed through the femoral or redial route. Coronary stenting, intra coronary nitroprusside and adenosine were use at the judgment of the consultants. Stent size selection was primarily based on visual assessment of lesion length and vessel diameter. All patients were prescribed aspirin 75mg daily for indefinite period and clopidogrel 75mg daily for at least one month for bare metal stent and one year for drug eluting stent receiving patients. Post PCI all patients initially remained in coronary care unit and later shifted to coronary step down unit before discharge. Routine follow up was done after one week and four week of discharge.

Patient's demographics (age and gender) and clinical history of diabetes mellitus, hypertension, smoking, family history of CAD, history of CAD and prior PCI or CABG were obtained. Diabetic mellitus was classified positive for patients with glycosylated hemoglobin (HbA1c) >6.5% or those taking any oral hypoglycemic medication for a minimum of 6 months. Similarly, patients on any anti-hypertensive medication for at least six months period were classified as hypertensive. Patients with a history of smoking or currently smoking at least 10 cigarettes a day for at least 6 months duration or equivalent were labeled as smokers. All the included patients were followed during their hospital stay, and in hospital adverse outcomes likedeath, re-infarction, urgent CABG, bleeding and stroke were also noted.

Data was analyzed by using SPSS-21 Age and door to balloon time were presented as means and standard deviations. Categorical variables like gender, co morbidities, accessed site and angioplasty details, procedural success, mortality and outcomes were all reported as percentages. Chi-square test was used to com-pare proportions and t-test was used to compare means. *p*-value ≤0.05 was considered significant.

RESULTS

A total of 143 cases with acute STEMI who underwent PPCI were included in this study. Average age of patients was 54.2 ± 12.7 years (min-max age=24-92 years). Majority 68 (47.55%) of cases had age between 46-60 years. Gender distribution showed male predominance. Out of total, 130 (90.9%) of patients were male while 55 (38.5%) patients had diabetes, 52 (36.4%) were hypertensive, 38 (26.6%) were smokers, family history of CAD was found in 10 (7%) cases and 8 (5.6%) cases had prior PCI or CABG table-I.

Table-I: Baseline characteristics of patients (n=143).

	Frequency	Percentage
Gender		
Male	130	90.9
Female	13	9.1
Age		
≤30	4	2.8
31-45	31	21.68
46-60	68	47.55
>60	40	27.97
Co Morbidities		
Diabetes Mellitus	55	38.5
Hypertensive	52	36.4
Smokers	38	26.6
History of CAD	23	16.1
Family history of CAD	10	7
Prior PCI\CABG	8	5.6

CAD=Coronary Artery Disease, PCI=Percutaneous coronary intervention, CABG=Coronary artery bypass grafting

Mostly procedures were performed by trans-radial approach 92 (64.3%) patients followed by PCI to LAD in 14 (9.8%) cases and multi-vessel PCI was performed in 10 (7%) cases. PCI to RCA angiogram was performed in 33 (23.1%) cases and PCI to LAD was performed in 22 (15.4%) cases table-II. Distribution of door-to-balloon time is shown in figure. Mean ± SD = 60.31 ± 29.8 minutes.

Mean ± SD time was 60.31 ± 29.8 minutes. Out of total, 103 (72%) patients received PPCI with door-to-balloon time ≤60 min and 40 (28%) cases received PPCI with door-to-balloon time >60 min. Table-III showsthe association between door-to-balloon time and baseline demographics & clinical histories. All baseline demographics & clinical characteristics were statistically similar between two groups (*p*-value >0.05).

Table-II: Procedural characteristics (n=143).

		Frequency	Percentage
Access	Radial	92	64.3
	Multi-vessel PCI	10	7
	PCI to LAD	14	9.8
	Others	27	18.9
Angiogram Detail	PCI to LAD	22	15.4
	PCI to RCA	33	23.1
	Others	37	25.9
	Missing	51	35.6

Table-III: Association between door-to-balloon time and baseline characteristics of patients (n=143).

		Door to Balloon Time (minutes), n(%)		*p*-value
		≤60	>60	
Gender	Male	95 (92.2)	35 (87.5)	0.38
	Female	8 (7.8)	5 (12.5)	
Age	≤30	3 (2.9)	1 (2.5)	0.48
	31-45	19 (18.4)	12 (30)	
	46-60	52 (50.5)	16 (40)	
	>60	29 (28.2)	11 (27.5)	
Diabetes Mellitus	Yes	41 (39.8)	14 (35)	0.6
	No	62 (60.2)	26 (65)	
Hypertensive	Yes	38 (36.9)	14 (35)	0.8
	No	65 (63.1)	26 (65)	
Smoker	Yes	28 (27.2)	10 (25)	0.79
	No	75 (72.8)	30 (75)	
History of CAD	Yes	19 (18.4)	4 (10)	0.22
	No	84 (81.6)	36 (90)	
Family history of CAD	Yes	5 (4.9)	5 (12.5)	0.11
	No	98 (95.1)	35 (87.5)	
PCI\CABG	Yes	6 (5.8)	2 (5)	0.85
	No	97 (94.2)	38 (95)	

CAD=Coronary Artery Disease, PCI=Percutaneous coronary intervention, CABG=Coronary artery bypass grafting

DISCUSSION

Primary PCI is widely considered the gold standard of treatment for STEMI. According to some randomized clinical trials primary PCI had superior efficacyand safety over fibrinolysis[10,14]. Both American & European guidelines recommended theprimary PCI is the preferred therapeutic option inpatients with STEMI admitted within 60 min after diagnosis[10]. Primary PCI has become routinepractice in our hospital.

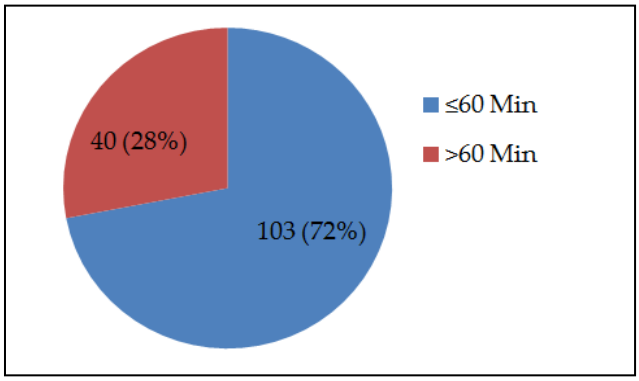

Figure: Distribution of door-to-balloon time (n=143).

In this retrospective study, we aimed to show our outcomes and resultsof primary PCI during two-year period of time inour tertiary hospital. We assessed demographic, angiographic, and procedural characteristics of the patientsand in-hospital adverse cardiovascular outcomes[15]. Another study from Taiwan reported the prevalence of the final TIMI flow <3, advanced congestive heart failure, and 30 days mortality did not differ between patients with ≤60 min door-to-balloon time and those with >60 min door-to-balloon time[16].

Average age of patients in this was 54.2 ± 12.7 years with majority 90.9% of cases were male. Out of total, 38.5% had diabetes, 36.4% were hypertensive, 26.6% were smokers while family history of CAD was found in 7% cases and 5.6% cases had prior PCI or CABG. About 64% procedures were performed by trans-radial approach. Vink *et al*[17], established the safety and feasibility of routine use of trans-radial access for PPCI in patients with STEMI. During the study period, 96.1% of procedures were performed with transradial access as the primary access.

Mean ± SD time was 60.31 ± 29.8 minutes. About 72% patients received PPCI within 60 min door-to-balloon time while 28% patients received PPCI with door-to-balloon time >60 min. Similar results were reported by Chen *et al*, they reported 69.9% patients received PPCI with door-to-balloon times ≤60min and 30.1% patients with door-to-balloon time >60 min[18].

In this study all baseline demographics & clinical characteristics were statistically similar between door-

to-balloon time ≤60 min and door-to-balloon time >60 min groups (*p*-value >0.05). similar results were reported by Chen *et al*[18]. Some studies have reported patient demographic characteristics as predictors of door-to balloon time delay, including the need for hospital transfer, nondaytime presentation, low-volume medical units, olderage, female sex, and race[19,20].

This study shown 100% success rate with zero mortality only one patient developed arrhythmia during procedure but recovered when the procedure completed. Wang *et al*, reported that ≤60 min door-to-balloon time was associated with better survival rates in younger STEMI patients undergoing PPCI than in elderly patients[11]. However, this study excluded patients undergoing PPCI with >90 min door-to-balloon time. Another study demonstrated that the shortening of door-to balloon time to <60 min could improve the post procedural TIMI flow and lower the 30-day recurrent infarction and mortality rates[18]. Mortality rate safter primary PCI varies from center to center; from 3.2%, 21 (4.2%), 224.4%[22,23]. Reasons for zero mortality rates are decreased DTB times, performing procedures by experienced interventional cardiologists, efficacy STEMI treatment protocol in this center.

This study has shown feasibility and efficiency in performing of primary PCI with good outcomes. A single-center experience with a limited number of cases and without a comparative group is the major limitation of this study. Further multicenter and comparative studies will be needed in our population to establish the safety of PPCI of STEMI patients with varying risk levels and lesion complexities.

CONCLUSION

This study demonstrated that primary PCI through trans-radial approach was safe option with excellent success rates in terms of both morbidity & mortality rates. Results of this study were in accordance with the previous researches, and we conclude that the PPCI trans-radial approach can be safeaccess route and given sufficient training and exposure of the consultant.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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