

Matter of Time: Early Versus Late Percutaneous Coronary Intervention in Acute Coronary Syndrome

Early VS Late
Coronary
Intervention in
MI

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ABSTRACT

Objective: To find the outcomes of patients undergoing early versus late percutaneous coronary intervention after Acute Myocardial Infarction.

Study Design: Cross sectional Study

Place and Duration of Study: This study was conducted at Cardiology Unit of Qazi Hussain Ahmed Medical Institute, Nowshera from January 2021 to June 2021 for a period of six months.

Materials and Methods: Study included 200 patients including 120 males. Mean age was 55±5.60 years. Patients presented with acute myocardial infarction, undergoing percutaneous coronary intervention were included. Patients were divided into two groups on the basis of time to intervention. Group 1 comprised of patients in which intervention was done in 24hr to 72 hrs, while Group 2 consisted of patients with intervention done after 7 days of presentation. Patients were then followed to look for primary outcomes like Myocardial infarction (STEMI, NSTEMI), cardiac death and angina in 6 months. Student t test and Chi Square used for analysis.

Results: About 58.60% patients presented with STEMI while 41.40 % with NSTEMI. Group 1 consisted of 90 patients and Group 2 consisted of 110 patients. Mean EF of patients was 43.8±9%. Mean stent diameter was significantly smaller in group 1 (2.7±0.31 vs. 3.2±0.41 mm, p=0.04) while stent length was more in Group 2 (p=0.05). In total 12.5% patients had primary adverse events with cardiac mortality of 2.5%. On compilation, 13.33% of patients in the Group 1 and 15.45 % of patients in Group 2 suffered from primary adverse outcomes (p=0.11). Mortality rate was found not much different between the 2 groups (p=0.14).

Conclusion: Percutaneous coronary intervention has no doubt greater benefit in patients with acute myocardial infarction but timings of intervention after 24hr of presentation especially in stable patients does not differ much.

Key Words: Percutaneous Coronary Intervention (PCI), ST Elevation Myocardial Infarction (STEMI), Non ST Elevation Myocardial Infarction (NSTEMI), Recurrent Angina (RA)

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INTRODUCTION

Coronary intervention (PCI) as a treatment for ST-segment-elevation myocardial infarction (STEMI) reduces mortality compared to other strategies like fibrinolysis.^{1,2}

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With the passage of time a number of technical and pharmacological advances have evolved. These advancements have resulted in improvement in cardiac patients with complex coronary disease³.

It remains controversial about PCI resulting in reducing mortality in other forms of coronary artery disease (CAD) like stable ischemic heart disease. There are some patients undergoing successful primary PCI but still having residual coronary lesions. Some of the patients suffer an acute coronary syndrome without ST-segment elevation (NSTEMI). Some patients suffer from acute myocardial infarction (MI) but without immediate revascularization, however this category of patients is less frequently encountered. Another category of patients is those who are diagnosed as stable CAD.⁴

Although PCI is indicated urgently for ACS patients but most of the intervention is done for stable CAD⁵. Numerous clinical trials have investigated the merits of medical therapy vs PCI in stable CAD⁶⁻⁸. Some authors have defined stable CAD as unvascularized post-MI state but recent studies have changed this concept. This

became controversial after publication of trials like the COMPLETE trial (PCI for multi-vessel disease following STEMI) and ISCHEMIA trial, (PCI for stable CAD).⁹

The results of COURAGE have defined the “role of PCI in stable CAD more precisely”¹⁰. This trial suggested that intervention in combination with medical therapy has no significant effect in stable ACS patients¹². Although a recent Japanese study on stable angina pectoris concluded PCI superiority to medical therapy alone¹³.

Therefore, we aim at determining the outcomes in patients having early intervention as compared to late intervention presented with acute coronary syndrome and are clinically stable.

MATERIALS AND METHODS

This was a prospective observational study conducted at Cardiology Unit, Lady Reading Hospital Peshawar. Between 1st January 2021 to 30th June, 2021, consecutive patients of acute coronary syndrome (STEMI, NSTEMI and Unstable Angina) aged between 30-70 years, undergoing PCI, presenting to cardiology unit, were enrolled. The study was approved by the hospital ethical committee. Informed consent was taken from the patients before enrollment.

Study subjects with prior MI with complications like cardiogenic shock, cardiomyopathies, prior revascularization were excluded. Patients with valvular and congenital heart disease, deranged RFTS (serum creatinine >2mg/dl) and bleeding issues were also excluded. Study subjects were divided into two groups on the basis of time to intervention. Group I comprised of patients in which intervention was done in 24hr to 7 days, while Group 2 consisted of patients in whom intervention was done after a month.

Patients characteristics, risk factors, and Echo details were recorded. Coronary angiography was performed from right femoral as well as radial approach. All patients were given standard loading doses of dual antiplatelet therapy(DAPT) before procedure as well afterwards. Patients were then followed up for 6 months to look for primary outcomes like Major Myocardial infarction (STEMI, NSTEMI), cardiac death and angina.

Data was analyzed on SPSS version 17 (SPSS Inc., Chicago, IL, USA). Quantitative variables like stent length were expressed as Mean±SD while qualitative variables like age and gender were expressed as numbers and percentages (%). For quantitative data we used Student t test while Chi square test was used for qualitative variables. $P \leq 0.05$ was considered statistically significant.

RESULTS

A total of 200 patients were included with 120 male patients. Mean age was 55±5.60 years (range 30 -70

years). About 58.60% patients presented to the department with STEMI while 41.40 % patients were diagnosed with NSTEMI. Among STEMI patients about 70% of the patients had anterior wall while 30% had inferior wall Myocardial infarction. Group 1 consisted of 90 patients and Group 2 consisted of 110 patients. Among the patients 62% were hypertensive, 57% were diabetics and 50% were smokers (Table 1). The mean value of left ventricular (LV) ejection fraction (EF) of patients was 43.8±9%.

Different stent parameters were also considered. Mean stent diameter was significantly smaller in Group 1 ($p=0.04$) while stent length was more in Group 2 as compared to Group 1 ($p=0.05$). No significant difference was found between the groups in terms of angiographic and procedural success as shown in table 2.

Table No.1: Demographic variables of study population (n=200)

Variables	Number (n)	Percentage (%)
Age	55±5.6 years (range 30 -70 years)	
Males	120	60%
Females	80	40%
STEMI	110	54.6%
NSTEMI	52	26.3%
USA	38	19.1%
EF	43.8±9	
Hypertension	124	62%
Diabetes	114	57%
Smokers	100	50%

STEMI: ST Elevation Myocardial Infarction,
NSTEMI : Non ST Elevation Myocardial Infarction,
USA : Unstable Angina, EF: Ejection Fraction

Table No.2: Angiographic Variables observed in study (n=200)

Variables	Group 1(n=90)	Group 2 (n=110)	p value
Number of vessels			
1	60	70	0.38
2	18	20	
3	12	20	
Length of stents			
<20	50	35	0.05
>20	40	70	
Diameter of stents	2.5+ 0.41	3.2+ 0.61	0.04

The different outcomes of the patients at 6 months follow up are shown in table 3. In total 25 (12.5%) patients had primary adverse events [STEMI = 08 (4.0%) NSTEMI= 04 (2.0 %), Recurrent Angina = 13 (6.5%)]. About 5 (2.5%) patients died.

In group 1, STEMI, NSTEMI and Recurrent angina was found in 03, 02 and 05 patients respectively. Similarly, in group 2, 05 patients presented with STEMI, 02 patients with NSTEMI while 07 patients presented with recurrent angina.

Cardiovascular death was recorded in 2 patients in group 1 and 3 patients in group 2 respectively (Table 3) On compilation, 13.33% of patients in the Group 1 and 15.45 % of patients in Group 2 suffered from primary adverse outcomes (p=0.11). Similarly, mortality rate was not much different between the 2 groups (p=0.14) as shown in table 4.

Table No.3: Outcomes at 6 months post procedure

Variables	Group 1 (n=90)		Group 2 (n=110)	
	number	percent	number	percent
stemi	03	3.33	05	4.54
nstemi	02	2.22	02	1.81
angina	05	5.55	07	6.36
death	01	1.11	03	1.81

Table No.4: Post Procedure Outcomes at 6 months between groups (n=200)

Variables	Group 1 (n=90)	Group 2 (n=110)	p value
ACS	11.11	12.72	0.11
Death	1.11	1.81	0.14

DISCUSSION

Our study revealed that the overall death post PCI in ACS group was 2.8% which is much less as compared to a study where it was 16% in unstable CAD subsets, although it reduced all-cause mortality in study population.⁴ In another study there was no major impact on MI and cardiac death in stable CAD just like in our study (p=0.14). Similar results were also shown in other 2 large studies named COMPLETE trial (multi-vessel disease in STEMI) and the ISCHEMIA trial (stable CAD). PCI has established benefit in mortality over fibrinolysis, in patients with STEMI. The utility of PCI in stable CAD is however controversial.⁹

A patient discharged post STEMI would be considered to have stable CAD, just as in our study group.¹³ In accordance with our study in another study they also went for late post MI intervention showing similar results of complications as in early intervention group.⁴ However urgent angiography would be considered in un-revascularized post-MI patient if indicated. "Moreover data suggests that PCI does not reduce overall mortality, cardiovascular mortality or MI in patients with stable CAD".⁴ From previous data it is clear that the un-revascularized post-MI patients such as unstable coronary artery disease (CAD) as well as multi-vessel disease following STEMI were managed with fibrinolysis in routine without undergoing angiography. But our study suggests that PCI has more benefit as compared to fibrinolysis.¹⁴

The data from the ISCHEMIA trial, showed that there was "no difference in all-cause mortality", "cardiovascular mortality" or "MI between the early and late intervention just like in our study".⁹

In near future PCI might be accepted as the preferred procedure to reduce mortality.¹⁵ However, for stable CAD, there is lack of evidence about its favorable effect on "all cause mortality", as well as on cardiovascular mortality and re infarction. Like our study another data showed that the difference between early vs late intervention was not much different in case of major MI and cardiovascular death.¹⁵

One of the study having 8912 patients requiring PCI for stable CAD, included symptomatic patients on anti-anginals, patients with single vessel disease, had a success rate of 97% with reduction in mortality. PCI is being performed in patients with co morbidities and complex coronary anatomy with marked reduction of MACE approximately from the last 27 years.¹⁶ In our study frequency of diabetes mellitus, hypertension, and smoking was high.

The courage trial has shown some efficacy of PCI in relieving ischemic symptoms with improved outcomes in patients with stable CAD, previously in ACIP study.¹⁷ The reduction in the use of nitrates and calcium channel blockers has been found although the use of beta-blockers has increased in recent times. These reflects the trends in medical therapy for stable CAD.¹⁷

CONCLUSION

Although it is evident from international data that PCI has greater benefit in ACS patients but the benefit of early interventions as compared to late intervention in avoiding adverse events like re MI, cardiac death and angina does not differ much.

Author's Contribution:

Concept & Design of Study:	Iqtidar Ud Din
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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