

Using a Transradial Method, The Results of Primary Percutaneous Coronary Intervention at a Tertiary Care Cardiac Centre

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ABSTRACT

Objective: The purpose of this study is to investigate the in-hospital outcomes of primary percutaneous coronary intervention (PCI) performed using a transradial technique in a cardiac centre that provides tertiary care.

Study Design: Descriptive/ observational study

Place and Duration: Department of cardiology, Peshawar Institute of Cardiology, Hayatabad phase 5 Peshawar, KPK in the duration from April, 2022 to September, 2022.

Methods: 104 patients were included in the trial; all had ST-segment elevation myocardial infarction and had presented within 12 hours of symptom onset without a history of thrombolytic treatment, coronary angioplasty, or cardiac surgery. Patients were monitored for forearm hematoma and mortality during their hospital stays after diagnostic angiography and primary percutaneous coronary intervention (PCI) of the artery supplying the infarct. SPSS 24.0 was used to analyze all data.

Results: There were majority 75 (72.1%) males and 29 (27.9%) females among all cases. Included patients had mean age 48.44±13.67 years and had mean BMI 27.6±3.48 kg/m². 48 (46.2%) patients were smokers and most common comorbidity was diabetes found in 63 (60.6%) cases followed by HTN, CAD, hyperlipidemia and obesity. Success rate of PCI by using transradial method was found in 101 (97.1%) cases. Mortality was only found in 2 cases and post-procedure forearm hematoma was found in 1 patients. Mortality and forearm hematoma was found because of old age among patients.

Conclusion: In this study, we came to the conclusion that primary percutaneous coronary intervention (PCI) performed using a transradial technique is a viable alternative that has great success rates in terms of both mortality rates and morbidity, such as hematoma of the forearm.

Keywords: Primary percutaneous coronary intervention, transradial approach, Forearm hematoma, mortality

INTRODUCTION

The primary focus of treating ST-elevation myocardial infarction (STEMI) is to recanalize the blocked artery and restore perfusion to the myocardium. There is evidence that early reperfusion improves outcomes [1, 2]. There are many methods for reperfusion, but thrombolytic treatment and primary percutaneous coronary intervention (PPCI) are the most prevalent [3]. Compared to thrombolysis, PPCI has been shown to be more effective in the treatment of STEMI in terms of mortality, stroke, and reinfarction in multiple studies across multiple demographics [4].

The use of PPCI in appropriate individuals, in conjunction with effective pharmaceutical therapy, reduces mortality and morbidity rates across a range of subgroups with diverse risk profiles, yielding substantial advantages for the medical community as a whole [5]. As device technology and antithrombotic therapy continue to advance, more patients with a wider variety of lesion complexity are opting for PCI as their treatment of choice [8,10]. Both the transfemoral and the transradial approaches are suitable for PPCI. While the transradial method is gaining favour, there is a clear learning curve to acquire transradial abilities [6]. This is because the transradial procedure is associated with less bleeding problems.

Percutaneous coronary intervention (PCI) via the transradial technique was first described by Kiemeneij et al.[7]. Several trials in Brazilian centres and elsewhere have proved its benefits, which include less problems at the puncture site, earlier ambulation, and shorter hospital stays.[8,9]

The most alluring aspect of this form of access is, of course, the assurance of safety it provides. Bleeding, pseudoaneurysms, arteriovenous fistulas, and bruising are uncommon and typically easy to avoid with radial access. Though the learning curve affects the occurrence of problems.[7-9]

The transradial technique is still not commonly employed for diagnostic or therapeutic treatments in interventional cardiology centres. Less than ten percent of all surgical procedures are carried out this way worldwide. In 2008, only 12.6% of treatments

in Brazil were conducted using this method, according to data collected by the Central Brazilian Registry of Cardiovascular Interventions - CENIC.2 Technical failures and the need to crossover to the femoral approach are very common in the early stages of the learning curve, as evidenced by previous research.[10,11]

Percutaneous coronary intervention (PCI) for ST-elevation myocardial infarction has also come a long way in the recent decade. Standardised reperfusion pathways have been proven to reduce bleeding and increase the use of radial artery access and drug-eluting stents, both of which have been linked to decreased mortality. Short-term and long-term mortality rates for the two sexes remain unclear, as are the causes of discrepancies in practice,7 in-hospital and prehospital treatment delays, and contradictory data.[12-14]

There is a clear learning curve, and data are missing addressing the safety of transradial technique for PPCI of patients with STEMI in our community, but the transradial strategy is gaining rapid acceptability among cardiologists in our area of the world. Because of the paucity of research in this area, there is a compelling need to investigate the mortality and complication rates associated with percutaneous coronary intervention (PPCI) using a transradial technique.

MATERIALS AND METHODS

This Descriptive/ observational study was conducted at Department of cardiology, Peshawar Institute of Cardiology, Hayatabad phase 5 Peshawar, KPK in the duration from April, 2022 to September, 2022 and comprised of 104 patients. Patients were aged between 20-80 years. All the patients diagnosed with STEMI were included. Patients who had previous angioplasty or bypass surgery on their coronary arteries were not included. Patients were also ruled out if they developed cardiogenic shock, an infected puncture site, or needed surgery to create an arteriovenous fistula.

All trial participants had to get a diagnostic angiography before undergoing percutaneous coronary intervention (PPCI) with or without stenting in the offending artery. All patients provided written informed permission before undergoing any operations or taking part in the trial. If necessary, phased PCI was planned in addition to treating only the offending artery. Expert consultant interventional cardiologists used the radial approach for all PPCI operations. All patients received the same standard of pre-, peri-, and post-procedural pharmacological medication and care in accordance with STEMI guidelines and institutional policies. Clinical histories of hyperlipidemia, diabetes mellitus, hypertension, and smoking were collected, along with basic demographic information (age and gender). Patients with total cholesterol levels above 200 mg/dL, triglyceride levels over 150 mg/dL, low-density lipoprotein levels over 100 mg/dL, high-density lipoprotein levels below 40 mg/dL, or those who had been using lipid-lowering drugs for at least six months were considered to have hyperlipidemia. All the variables were entered into the Statistical Package for Social Sciences software, version 24 (SPSS Inc., Chicago, IL) for data analysis. Descriptive statistics were computed. Mean \pm standard deviation (SD) or median (interquartile range) were computed for quantitative variables, and frequency count with percentage was computed for all categorical variables. The strength of association among different clinical presentations and study outcomes was assessed using the chi-square test, and P-value \leq 0.05 was considered statistically significant.

RESULTS

There were majority 75 (72.1%) males and 29 (27.9%) females among all cases. Included patients had mean age 48.44 ± 13.67 years and had mean BMI 27.6 ± 3.48 kg/m². 48 (46.2%) patients were smokers and most common comorbidity was diabetes found in 63 (60.6%) cases followed by HTN, CAD, hyperlipidemia and obesity.(table 1)

Table-1: Demographics of the enrolled cases

Variables	Frequency	Percentage
Mean age (years)	48.44 \pm 13.67	
Mean BMI (kg/m ²)	27.6 \pm 3.48	
Gender		
Male	75	72.1
Female	29	27.9
Smokers		
Yes	48	46.2
No	56	53.8
Comorbidities		
DM	63	60.6
HTN	43	41.3
CAD	24	23.1
Hyperlipidemia	18	17.3
Obesity	15	14.4

Success rate of PCI by using transradial method was found in 101 (97.1%) cases.(figure 1)

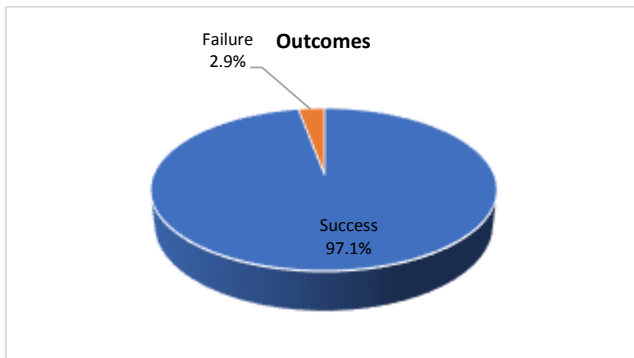


Figure-1: Outcomes of PCI with transradial method

Mortality was only found in 2 cases and post-procedure forearm hematoma was found in 1 patients due to older age.(table 2)

Table-2: Frequency of died cases and post-procedure forearm hematoma

Variables	Frequency (n=104)	Percentage
Mortality		
Yes	2	1.9
No	102	98.1
Forearm hematoma		
Yes	1	0.96
No	103	99.04

Majority of the cases 71 (68.3%) had hospital stay <3 days and 33 (31.7%) patients had hospital stay >3 days.(table 3)

Table-3: Hospitalization of the enrolled cases

Variables	Frequency (n=104)	Percentage
Hospital stay		
<3 days	71	68.3
>3days	33	31.7

DISCUSSION

The gold standard of care for STEMI is generally regarded as primary PCI. Primary PCI was found to be more effective and safe than fibrinolysis in some randomized clinical trials. In patients with STEMI who are admitted within 60 minutes of diagnosis, both American and European guidelines endorsed primary PCI as the preferable treatment choice. In our facility, primary PCI is now a standard procedure.[15,16] The purpose of this research was to determine if the transradial approach to PPCI in patients with STEMI is safe for our patient population. One point nine percent of patients died in the hospital, 0.96 percent experienced forearm hematomas after the procedure, and not a single operation required a crossover or switching access site from the transradial route to the transfemoral route for any reason. Forearm hematomas are more common in elderly individuals, can be treated with non-invasive methods, pose little immediate danger, and respond well to conservative care.

In current study 104 patients were included. There were majority 75 (72.1%) males and 29 (27.9%) females among all cases. Included patients had mean age 48.44 ± 13.67 years and had mean BMI 27.6 ± 3.48 kg/m². These were comparable to the previous studies.[17,18] Patients who received PPCI using a transradial route had a mortality rate of about 11%, according to an analysis by Deftereos et al. [19]. One of the major risks of PPCI by transradial access was the development of a hematoma in the patient's forearm. One study found that 3% of PPCI patients experienced forearm hematoma [19], while another investigation found the rate to be nearly 4% [20]. A local research found an astounding 95% success rate with elective transradial PCI [21]. Trans-radial access for PPCI in patients with STEMI has been shown to be safe and feasible, thanks to the work of Vink et al.[22]. Transradial access was the predominant access used in 96.1% of surgeries during the study period.

When opposed to the transfemoral method, the risk of problems is drastically lower with the transradial procedure. The transradial technique has been shown in multiple trials to significantly reduce serious adverse cardiovascular events, especially in the case of STEMI.[23] When performed by skilled surgeons, the transradial approach has the potential to reduce bleeding complications and, in turn, major adverse cardiovascular events in patients undergoing primary percutaneous coronary intervention (PCI). In a meta-analysis including 21 trials and 8,534 patients, Romagnoli et al.[24] found that the use of the radial access decreased death from cardiovascular disease, incidence of bleeding, as well as length of hospital stay in the treatment of unstable CAD in 30 days.[25] Mortality was similarly reduced in an examination of the same population in the RIVAL trial, but only in those with ST-segment elevation.[24]

One of the most worrying consequences of percutaneous treatments is bleeding, which has been linked to higher rates of death and morbidity [26]. There are a variety of pharmaceutical alternatives that have been studied and advised for lowering the risk of bleeding, but several studies have found that going in through the patient's wrist instead of their usual vein actually lowers that risk [27]. Consistent with these results, we found that post-procedure forearm hematoma affected only about 5.6% of patients and was substantially linked to preexisting patient factors such as age, diabetes, and high cholesterol. The transradial technique is correlated with less contrast volume and less time under fluoroscopy [27,28].

CONCLUSION

In this study, we came to the conclusion that primary percutaneous coronary intervention (PCI) performed using a transradial technique is a viable alternative that has great success rates in terms of both mortality rates and morbidity, such as hematoma of the forearm.

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