EFFICACY AND SAFETY OF TRANSRADIAL APPROACH IN PRIMARY PCI FOR STEMI

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ABSTRACT

Objective: To determine the efficacy and safety of transradial approach in primary percutanous intervention in acute ST segment elevation myocardial infarction.

Study Design: Descriptive study

Place and Duration of Study: Emergency reporting (ER) department of Armed Forces Institute of Cardiology National Institute of Heart Diseases (AFIC/NIHD) from Dec 2011 to Dec 2013

Method: Retrospective data of 354 patients had been collected through records. All the patients presented with acute myocardial infarction to emergency reporting (ER) department of Armed Forces Institute of Cardiology National Institute of Heart Diseases were included in the study. All the patients underwent primary coronary intervention through transradial route. All patients received IIB IIIA inhibitors bolus and infusion. The primary end points were procedure success and local access site hematoma and secondary end points were major bleeding requiring blood transfusion and door to balloon time.

Results: The mean age of the patient was 64 ± 18 years, there were 251 (70.9%) males and female were 103 (29.1%). Radial access site cannulation time was 194 ± 22 sec and door to balloon time was 78 ± 14 min. Procedural success was 349 (98.6%). Forearm hematoma was noted in 4 (1.12%). No major bleeding requiring transfusion was noted.

Conclusion: Primary percutanous intervention (PPCI) via transradial (TRI) route in acute STEMI patients can be achieved with high success and low complications in our population. The clinical outcome is matching with local and international data.

Keywords: Myocardial infarction, Primary percutanous intervention, Transradial approach.

INTRODUCTION

Primary percutanous coronary intervention is the treatment option for patients with acute myocardial infarction as directed by focused updated American heart association (AHA)/ACC guidelines[1,2]. Transfemoral route is the most common access site through which PPCI is performed world wide due to operator experience and availability of predesigned equipment. The transradial access site for primary PCI is though technically more challenging but it is associated with less access site and bleeding complications which directly reduces early and long term mortality[3]. The major drawback considered for transradial access is longer procedural time and lower success rate due to increase learning cure for the operators[4]. In high volume centers with increasing operators the experience procedure success rates are high and with low complications[5]. Many international and one recent local study had shown the effectiveness and safety of transradial access site in PPCI[6].

Periprocedural bleeding complications in PPCI are associated with increased short and long term morbidity and mortality. The patients undergoing PPCI will be expecting to receive aspirin, clopidogrel, heparin and IIB IIIA inhibitors which are life saving on one hand, but increase the risk of bleeding occurring in most patients at the site of vascular access. The main advantage of TRI is the low rate of access site bleeding complications particularly in high risk patients, i:e hypertensive women, low body weight and use of IIB IIIA inhibitors. Many studies have compared the transradial and transfemoral approach for PPCI in acute

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myocardial infarction (AMI) and found transradial approach equally effective with low complications[7,8]. No formalized guidelines exists regarding the development of TRI-AMI program. But now in many centers it is emerging rapidly as an first choice approach in primary PCI. Recent studies from China and Spain showed a 96.5% and 96% success with minimal access site bleeding complications[9,10].

At our center AFIC/NIHD transradial approach for coronary intervention is being used routinely. All the operators have adequate experience and well trained in transradial coronary interventions. In Pakistan primary PCI program is emerging in many centers. In local literature only a recent study from Karachi showed outcome of transradial PPCI in acute MI. This provides a need to look for outcome of PPCI via TRI in our population and determine its efficacy and safety.

MATERIAL AND METHOD

This descriptive study was carried out at AFIC/NIHD from Dec 2011 to Dec 2013. Retrospective data of patients presenting with acute myocardial infarction to emergency room of was collected from the record. Data of 354 patients had been reviewed. All the patients underwent primary coronary intervention through the transradial approach as mode of reperfusion. All patients received dispirin 300 mg, clopidogrel 600 mg, high dose atorvastatin, weight adjusted heparin and two boluses of IIBIIIA inhibitor followed by infusion. Patients were kept in coronary care unit after primary PCI.

Diagnostic angiogram was performed using the right radial artery as access site followed by PCI of the infarct related artery. Both bare metal stent (BMS) and drug eluting stent (DES) were used as per operator discretion. Intracoronary nitroglycrine, adenosine, verapamil and thrombus aspiration device were used to tackle large thrombus load or no reflow phenomenon. Following data was collected including age, gender, history of diabetes, hypertension and smoking. Angiographic details including culprit vessel non infarct related artery disease, use of coronary stents and IIBIIIA inhibitors. Time variables were computed including time to presentation and door to balloon time which is the time from arrival to hospital to first balloon inflation in catheterization laboratory. Time of achieving radial artery access was noted. Procedure success was defined as vessel patency and thrombolysis in myocardial infarction (TIMI)

Table-1: Description of angiographic detail of the patients (n = 354)

LAD Left anterior descending artery	204(57.6%)
LCX left circumflex artery	20(5.6%)
RCA right coronary artery	130(36.7%)
Stents	
Bare metal stent (BMS)	220(62.1%)
Drug eluting stent (DES)	134(37.8%)

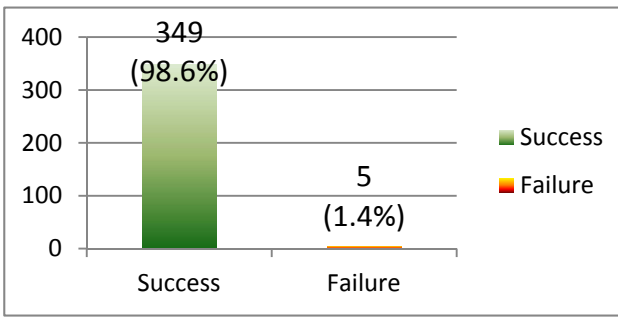

Figure-1: Description of success rate among patients (n = 354).

3 flow in infarct related artery.

Primary end points were access site cannulation, procedural success and access site hematoma (>5 cm) secondary end points were door to balloon time and major bleeding needing transfusion. All the variables were entered into SPSS 14 for data analysis. Descriptive statistics were calculated as mean and standard deviation for quantitative variables like age, door to balloon time (min) and time for radial artery cannulation (sec). Frequencies and percentage were calculated qualitative variables like gender, hypertension,

diabetes, procedural success, major bleeding and forearm hematoma.

RESULTS

The mean age of the 354 study patients was 64 ± 18 years. 251 (70.9%) were males and 103 (29.1%) females. There were 124 (35%) diabetics, 214 (60%) hypertensive, 156 (44%) were smokers and family history of ischaemic heart disease (IHD) was present in 123(35%). The median time for radial artery cannulation was 194 ± 22 seconds and mean door to balloon time was 78 ± 14 minutes. All the patients received IIB IIIA antagonist bolus and infusion. Procedural success was 98.6% (n=349) (Fig.-1). Five (1.41%) patients had failure in radial intervention out of which 2 developed iatrogenic radial artery laceration and remaining 3 had highly torturous anatomy making coronary cannulation difficult. Four (1.1%) patients had significant hematoma formation none had significant major bleeding. The angiographic data showed left anterior descending (LAD) as culprit vessel in 204 (57.6%) followed by right coronary artery (RCA) 130 (36.7%) and left circumflex artery LCX 20 (5.6%) (Table-1). Stents were used in all patients DES in 134 (37.8%) and BMS in 220 (62.1%). No major bleeding was reported in any patients requiring transfusion.

DISCUSSION

Treatment of acute myocardial infarction via mechanical reperfusion was advocated by Hatzler et al in 1983. Primary PCI is now the standard treatment option for patients with STEMI in centers where expertise of cardiologists, surgical backup and 24 hrs catheterization facilities are available[11].The role of primary PCI and its advantage over thrombolytic therapy in reducing death,stroke and combined end point mortality has been advocated in meta analysis of many studies[12]. In majority of centers primary PCI is currently been performed by transfemoral route. The main drawback of radial approach is considered as difficulty in access site cannulation which may delay the reperfusion time[13]. As the operators experience grows the transradial approach is associated with decrease rate of procedural failure[14]. A study showed that in high volume centers if operator performed more than 80 transradial cases, it was correlated with reduction in sheath insertion time and overall procedural time[15]. In our center which is high volume center each operator has large volume and experience in transradial intervention, which correlates with the results in sheath insertion time and procedural success in the study. In another study comparison between radial and femoral approach during primary PCI showed that there was no significant difference in procedure time, sheath insertion time and procedure success[16,17].

In primary PCI GPIIBIIIA inhibitors are used in addition to aspirin clopidogrel and heparin which can lead to periprocedural bleeding complications[18]. This hemorrhagic complications limits the clinical benefit of primary PCI. There is growing evidence that using transradial approach as compare to femoral route is associated with significant reduction in bleeding complications[19]. In our study the incidence of major bleeding requiring transfusion was zero and major access site hematoma incidence was 1.12%(n=4). Another study confirmed transradial route reduces major bleeding by 73%[20].

In primary PCI door to balloon time is prime indicator of myocardial salvage. The major criticism is that transradial approach can cause increased door to balloon time which can lead to more myocardial damage. Many studies have shown no significant difference in door to balloon time in femoral versus radial approach[21]. In this study door to balloon time was 78 ± 14 min which is comparable with local and international data. Another study compared the radial and femoral route in patients with acute MI during PPCI the procedural success was 96.1% and 94.6% and access site bleeding complications were present only in the femoral group[22].

In TEMPURA study patients undergoing PPCI through transradial route had a procedural success of 98%[23]. In another local study the procedural success was reported as 98% and

access site hematoma 1.8%[24]. In our study the procedural success was 98.5% (n=349). Forearm hematoma in our study was 1.12% (n=4), which is comparable to one study in which forearm hematoma >5 cm was 3.1%. No patient had major bleeding which required blood transfusion.

CONCLUSION

Though PPCI through transradial approach is demanding and has a steep learning curve. However in experienced hands in a large volume centers, transradial PPCI can be efficiently performed with high success rate with very less bleeding complications. As this study concluded that transradial route is effective and safe choice for PPCI in STEMI patients.

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