

RADIAL ARTERY APPROACH FOR CORONARY INTERVENTION - EARLY EXPERIENCE

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Contribution

All the authors contributed significantly to the research that resulted in the submitted manuscript.

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ABSTRACT

Objective: To see the clinical outcome of patients undergoing Transradial Coronary Angioplasty with stable Angina.

Methodology: This was a single center observational study with prospective data collection of 338 patients who underwent transradial coronary angioplasty from September 2009 to August 2011, at Post Graduate Medical Institute, Lady Reading Hospital, Peshawar. Patients of both genders and all ages who had transradial coronary angioplasty for chronic stable angina were included in the study. Patients were clinically examined in out patients department on first month of hospital discharge and clinical outcome data was recorded.

Results: A total of 338 patients were included in the study. Male were 58.8% and 41.2% were female with mean age of 52 ± 7 years. All the patients had coronary intervention through right radial artery. Baseline characteristics of the patients were; 48.2% diabetic, 43.2% hypertensive, 30.5% smokers, dyslipidemia was 45.7% and mean values of serum creatinine and Hemoglobin were 1.1 ± 0.3 and 11.5 ± 1.5 , respectively. The frequency of various complications were as follow; hematoma 1.3%, nausea and vomiting 2.2%, pain in hand 11.2%, readmission to hospital for chest pain 6.5%, need for revascularization 2.2%, hand ischemia 1.8%, minor bleeding 0.9%, no major bleeding and 1.9% mortality.

Conclusion: The radial artery approach for coronary intervention is useful with low degree of access site vascular complications and an early mobilization.

Key Words: Transradial Approach, Angioplasty, Chronic Stable Angina, Access Site Bleeding.

INTRODUCTION

Common Femoral Artery (CFA) is routinely used as access site for coronary angiography and angioplasty because of larger diameter and ease of puncture.¹⁻⁴ However there are certain problems like; bleeding, hematoma formation, tortuous Femoral Arteries especially in old age and delayed mobilization.⁵⁻⁸ With advent of better coronary equipment and newer anticoagulation agents, situation is widely changed.^{9,10}

Radial artery approach has decreased bleeding complications,¹¹⁻¹⁴ as opposite to femoral one especially when patients are getting anticoagulants, aspirin, clopidogril, prasugrel, and platelet glycoprotein IIb/IIIa receptor inhibitors.¹¹⁻¹⁵ Campeau reported a success rate of 88%, without remarkable complications in 1989.¹⁶

Transradial approach (TRA) or diagnostic and therapeutic coronary angiography gained more and more popularity because of its advantages over the femoral approach, with major access site vascular complications of 0% vs. 5.5%,^{15,17} and 23.8% in GRACE Registry,¹⁸ enhancing patient comfort and reducing duration of hospital stay.^{11,15,17} The clinical outcome of patients who underwent Transradial Coronary interventions are more encouraging; Ruzsa et al reported 92% success rate in primary PCI in patients presenting with acute STEMI.⁷ TRA is safe for Percutaneous Interventions (PCI) even in Octagenarian.^{2,3}

Since its early start in 1989 it did not gain much popularity worldwide. The aim of this study was to see the safety of this approach and early mobilization of patients undergoing coronary intervention in patients with chronic stable angina.

METHODOLOGY

This was a single center observational study with prospective data collection of 338 patients who underwent transradial coronary angioplasty from September 2009 to August 2011, at Post Graduate Medical Institute, Lady

Reading Hospital, Peshawar. Written informed consent was taken from all patients and the study protocol was approved by the hospital ethical review committee.

A performa was designed to record patient demographics including age, gender, cardiac risk factors, telephonic contacts and full present and permanent residential addresses, and post-procedural complications. To look for early complication rates (first month), patients were clinically examined in outpatients department and clinical data was recorded on a pre-formed performa.

Patients of both genders and all ages who had transradial coronary angioplasty for chronic stable angina were included in the study. The 6F sheath was used in all of the study population. Patients were given nitrates and verapamil through radial artery soon after it was entered and were repeated if there was any spasm of radial artery. All patients were given heparin and activated clotting time (ACT) was kept in the range of 250-300sec (HemoTech). All patients had their radial artery checked manually before discharge to identify radial artery occlusion.

The collected data was recorded on Statistical Package for Social Sciences version 16.0 software (SPSS Inc., Chicago Illinois). Continuous variables like age, dyslipidemia, serum creatinine and hemoglobin level were presented as Mean \pm SD. Categorical variables like gender, diabetes, hypertension, cigarette smoking, hematoma, nausea and vomiting, pain in hand, readmission to hospital for chest pain, need for revascularization, hand ischemia, bleeding, uncomplicated clinical course and mortality were presented as percentages.

RESULTS

A total of 338 patients, who had transradial coronary angioplasty through right hand, in the study period, were included in the study. Our study population comprised of 199 male (58.8%) and 139 (41.2%) females with mean age of 52 ± 7 SD years. All patients were having chronic stable angina (Table 1).

Table 1: Baseline Characteristics of Patients who had Coronary Intervention through Radial Artery

Variable	% Value (n)
Age (Years)	52 \pm 7
Male	58.8 (199)
Female	41.2 (139)
Diabetes Mellitus	48.2 (163)
Hypertension	43.2 (143)
Cigarette Smoking	30.5 (103)
Dyslipidemia	45.7 (152)
S Creatinine (mg/dl)	1.1 \pm 0.3
S Hemoglobin (g/dl)	11.5 \pm 1.5

Table 2: Frequency of Different Clinical Outcome

Parameter	% Value (n)
Hematoma	1.3 (04)
Nausea & Vomiting	2.2 (07)
Pain In Hand	11.2 (38)
Readmission to Hospital for Chest Pain	6.5 (22)
Need for Revascularization	2.2 (07)
Hand Ischemia	1.8 (06)
Minor Bleeding	0.9 (03)
Major Bleeding	0 (00)
Mortality	1.9 (06)

Pain in hand was most commonly due to vasospasm (9%) or due to puncture site injury (2.2%). Hematoma which developed in 1.3% was mild and resolved with conservative treatment. The main reason for readmission to hospital for chest pain was acute coronary syndrome (4.5%) and acute myocardial infarction was responsible in 2% of cases. All patients who needed revascularization had re-angioplasty, i.e.; 2.2%. Mild hand ischemia occurred in 1.8% and was due to vessel thrombosis. Only minor bleeding occurred, i.e.; 0.9%, which resolved with manual pressure. No major bleeding occurred in our study population (Table 2).

DISCUSSION

Coronary artery Interventions through radial artery has shown significant reduction in complications, shortened hospital stay, improved early ambulation and rehabilitation. Unfortunately radial access accounts for less than 10% of procedures worldwide.¹⁹ The reason might be the fear of site access failure and prolonged procedure time.

The frequency of complication is higher with transfemoral than transradial approach, e.g.; access site bleeding complications with transfemoral approach range from 1.7 to 6%.^{15,22,24,28} On the other hand, transradial access site bleeding complications range from 0.8% to 5.7%.^{12,16,17}

Studies from Pakistan report figures of 1.5% to 8.4%.^{20,23-25} Our study showed access site bleeding of 0.9%, the reason might be the selection of patients, as all our patients were having chronic stable angina, thus minimizing the need of more anticoagulants in peri- and post-procedure period. The ACCESS study¹⁰ too, clearly demonstrated reduction of major access site complications from radial compared to femoral and brachial approaches (0% vs. 2.3% vs. 2% respectively). In a recent meta-analysis of 22 randomized control trials by Jolly et al.,⁹ radial access reduced major

bleeding by 73% compared to femoral access. We documented that hematoma formation at vascular access site was 1.3%, i.e.; four patients, against 0.9% to 2.1%^{6,7,13,17} reported in different studies.

Vasospasm is more common with transradial approach reaching up to 58.5%¹¹ but this complication was just 8.5% in our study, probably due to periprocedure nitrate and verapamil given into radial artery and also better coronary catheters. Hand ischemia occurred in 1.8% of our patients, as opposite to 1.5% reported by Khan et al.²⁰ and 10.5% by Caputo et al.²⁵ In the latter study, however, patients were repeatedly subjected to intervention through radial artery, increasing the rate of hand ischemia. Hand ischemia was mainly due to either radial artery vasospasm or/and thrombosis, but majority of patients remain asymptomatic probably by retrograde perfusion from ulnar artery through palmar arches. All the symptomatic patients with hand ischemia were kept in hospital and treated conservatively with low molecular weight heparin (LMWH), which has proven its efficacy.²⁹

No revascularization procedure is final and Choussat et al.¹⁹ reported that up to 15% of patients were readmitted to hospital for chest pain, Caputo²⁵ put this figure at 4% and our 22 patients (6.5%) admitted to hospital for chest pain, of whom 4.5% were diagnosed as acute coronary syndrome and 2% as acute myocardial infarction. The number of patients who needed revascularization was 7 (2.2%) and all had repeated PCI through femoral approach.

The limitations of our study were; firstly, we did not compare it with those who had PCI via femoral approach, secondly, data of asymptomatic radial artery occlusion was not collected.

CONCLUSION

The radial artery approach is found to be safe with low

7degree of access site vascular complications, early mobilization and rehabilitation.

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