

Outcome off Primary Coronary Angioplasty by Radial Route: Study on 100 Cases

Dr. Dilip Ratnani¹, Dr. Rekha Ratnani^{*2}

¹Assistant Professor Department of Medicine Shri Shankaracharya Institute of Medical Sciences Bhilai (Durg, CG) 490020

²Professor and HOD Department of OBGY CCM Medical College Durg (CG)

Address for Correspondence

Dr. Rekha Ratnani

Professor and HOD Dept. of OBGY

Chandulal Chandrakar Memorial Medical College Kachandur Durg



Abstract

Recently radial artery is being used as a vascular access route for coronary procedures. Primary angioplasty with transfemoral procedure is associated with high access site bleeding complications due to use of potent antiplatelets and anticoagulants therefore radial access should be preferred if the operators are experienced and familiar with the technique. **Methods:** Total 100 patients were included in the study in which procedure was performed by the trans radial route. All routine laboratory investigations were performed. Support of a temporary pacemaker was kept ready. All patients were prepared according to the Cardiac Catheterization Laboratory Standards. Radial artery cannulation was performed. **Results:** 100 patients were included in the study selected for radial route. Mean age of the patients who underwent primary CAI was 59 ± 8.4 . The most affected artery in the as shown angiography was Left anterior descending (58%) followed by Right coronary artery (41%). Least affected artery was left main (6%) and Ramus intermedius (6%). Mean of diseased vessels was 1.34 ± 1.25 . Crossover from radial to femoral route was done on 5 patients of which 2 patients were having radial artery anomaly and in 3 patients arterial puncture was not successful. Mean hospital stay of the patients after procedure was 6.8 ± 2.1 . **Conclusion:** transradial approach for coronary procedures is a safe technique and gives similar clinical results to transfemoral access. Complications at the radial access site are negligible. Length of hospital stay, time to mobilisation and cost all are reduced in the transfemoral approach.

Introduction

A percutaneous procedure for diagnosis and treatment of coronary artery disease (CAD) has transformed the lives of many patients. It has advantages over coronary artery bypass grafting and the demand for both diagnostic and interventional procedures is increasing every year. Campeau et al. in 1989 introduced the transradial approach for diagnostic and interventional coronary angiography was by recently radial artery is being used as a vascular access route for coronary procedures.^[1] In elective percutaneous coronary interventional with the radial artery success rate was similar to those of transfemoral coronary intervention with less access site bleeding complications.^[2] Primary angioplasty with transfemoral procedure is associated with high access site bleeding complications due to use of potent antiplatelets and anticoagulants.^[3] Primary percutaneous coronary intervention (PCI) is more effective than thrombolytic therapy for ST-segment elevation myocardial infarction (STEMI).^[4] Patients with STEMI undergoing primary PCI are treated with aggressive antithrombotic drug therapy for which the radial techniques are more

expressive.^[5] Some reviews suggest that the radial access should be preferred if the operators are experienced and familiar with the technique.^[6] Also radial artery has primarily been preferred if access is difficult or prior aortic surgery or tortuosity.^[7] Also post-procedure recumbency is required to avoid disruption of the arterial puncture site and this may not be tolerated by patients with back pain, hip pain and lung disease and the rate of complications despite complete bed rest may be 2-8% in transfemoral PCI.^[8,9]

In percutaneous coronary procedures under local anaesthesia a sheath with a haemostatic valve is inserted into a peripheral artery. Catheters are passed to the ostium of the relevant coronary artery and angioplasty wires, balloons, stents, radiography contrast medium are delivered. Post procedure haemostasis is achieved by manual compression or by an arterial closure device, or direct repair.^[10]

In this study we are summarizing the transradial coronary procedures its success rate, duration of hospital stay and its clinical implications.

Patients and Methods

This prospective and non-randomised study was conducted in Shri Shankaracharya Institute of Medical Sciences and Hospital. Study period was from Aug 2017 to August may 2018. Total 100 patients were included in the study in which procedure was performed by the transradial route. Allen's test was performed on all the patients who underwent angioplasty by transradial approach.^[11] Maintenance of an arterial waveform was recorded by an oxygen saturation probe placed on the index finger while compression of the radial artery which provides objective evidence of a satisfactory collateral circulation. If the incomplete palmer arch flow was found by Allen's test angiography was performed by femoral route. The study group included patients who were posted for the primary angioplasty. Patients who were having, severe anaemia, and pyrexia of unknown origin or fever of unknown origin, renal failure were excluded from the study.

All routine laboratory investigations which include complete blood count, electrolytes, urea, liver and kidney function tests were carried out before the procedure. Coagulation profile, HIV and hepatitis status were performed.

Written informed consent was obtained from the patient or family member(s) before the primary PCI. In the cath lab, the inguinal area was also prepared in the event that the radial approach failed and to crossover for femoral route. Support of a temporary pacemaker was kept ready.

All patients were prepared according to the Cardiac Catheterization Laboratory Standards.^[12] Patients allergic to contrast were premedicated with IV hydrocortisone. Patients were sedated orally the night before the procedure.

Radial artery cannulation was performed as per review by Schneider JE.^[13] The transradial PCI was performed either through the left or right radial artery. The patients' arms were abducted and their wrists were hyper extended. Subcutaneous infiltration was given with 2% lidocaine for local anaesthesia. Radial artery puncture was done with a 20-gauge angio catheter needle. Left heart catheterisation was performed with a dedicated 5 French sheath, 5 French diagnostic catheters. After sheath insertion 100mg glyceryl trinitrate and verapamil 2mg was injected, then 5000 international units heparin inside the sheath. Radial artery sheath was immediately removed at the completion of the procedure and haemostasis was achieved by local compression and a tight pressure bandage for 3 hours.

Minor vascular complications were defined as haematoma >10 cm, arteriovenous fistulae, or pseudoaneurysm. Major complications were defined as death, vascular repair, major vascular bleeding vessel occlusion, or loss of pulse.^[14] Cerebrovascular Stroke was classified into minor cerebrovascular accident in which any new motor disability

post procedure that improved within one week and major cerebrovascular accident in which any new motor disability post procedure that continued beyond one week.^[14]

Results

Total 116 patients were assigned to the radial approach, of which 4 patients had Allen's test positive indicating incomplete palmer arch flow. 2 cases of extensive artery tortuosity was found and there was 10 cases of access site failures. So the 100 patients were included in the study selected for radial route

Table 1: Demographic characteristics

	Percentage
Age (years)	59±8.4
Male	78%
Female	22%
Hypertension	44%
Diabetes	39%
Dyslipidaemia	21%
Smoking	65%

Mean age of the patients who underwent primary CAI was 59±8.4. There was male predominance as 78% procedure was performed on male patients while there were only 22% females in the study. Hypertension, diabetes and dyslipidaemia were found in 44%, 39% and 21% patients respectively. 65% of the patients were smokers and all were male.

Table 2: Lesions in the coronary arteries

Coronary artery	Radial Route %	%
Left main	6	6
Left anterior descending	58	58
Diagonals	31	31
Left circumflex	24	24
Obtuse marginal	26	26
Ramus intermedius	6	6
Right coronary artery	41	41
Posterior descending	7	7

The most affected artery in the as shown angiography was Left anterior descending (58%) followed by Right coronary artery (41%). Least affected artery was left main (6%) and Ramus intermedius (6%). Mean of diseased vessels was 1.34 ± 1.25 .

Table 3: Complications and Procedure Time

	Radial Route
Crossover	5
Local vascular complications	0
General vascular complications	0
Procedure time	25.1 ± 6.4
Radiation exposure	12.2 ± 3.6
Hospital stay (hours)	6.8 ± 2.1

Crossover from radial to femoral route was done on 5 patients of which 2 patients were having radial artery anomaly and in 3 patients arterial puncture was not successful. Nogeneneral and local vascular complications observed in the radial angioplasty. Radiation exposure was 12.2 ± 3.6 while procedure time was 25.1 ± 6.4 . Mean hospital stay of the patients after procedure was 6.8 ± 2.1 .

Discussion

The radial and ulnar arteries gives dual arterial supply to the hand receives, and come together to form deep and superficial palmar arches. The radial artery is therefore not an end artery and in the presence of a satisfactory ulnar collateral supply, its occlusion does not compromise the vascular supply to the hand. Furthermore, the superficial course of the distal radial artery provides easy access to the artery and because of the bony background and therefore compression is easy to minimise the local vascular complications.

Our early experience with the transradial approach shows the advantages over the transfemoral approach. The most important advantage was nil local vascular complication. Similar results were shown by other studies in which vascular complications were nil or minimal.^[3,15]

If patients are given choice patients prefer radial access to the femoral approach.^[16] Technically, accessing the radial artery requires more expertise and requires more time for procedure as compared to transfemoral approach. In a meta-analysis by Agostoni et al.^[2] in the transradial group, the mean procedural time was 35 min, whereas in the transfemoral group, it was 33.8 min. No significant difference was found. In our study mean procedural time was 25.1 ± 6.4 which was less than the above meta-analysis, while it was similar with the study by Sallam M. et al.^[17] There were 5 crossover in the study of which 2 patients were having radial artery anomaly and 3 were having tortious subclavian artery. Similar crossovers are observed in other studies.^[17,18]

The radiation exposure time in our study was 12.2 ± 3.6 which was less than the procedural time. This explains that the radial approach requires expertise to puncture.

The mean hospital stay for the patient was 6.8 ± 2.1 . Which was quiteless than the transfemoral approach also the ambulatory time is decreased in the transradial approach. Similar results were shown in a clinical review by Archbold RA et al in their study.^[10] Also Philippe Fet al.^[3] showed Total hospital length of stay was significantly higher in the femoral group (5.9 ± 2.1 days vs 3.5 ± 1.2 days; $p=0.009$) as compared to radial group

Procedure failure rates, time to sheath insertion, and duration of procedure are all significantly reduced after

experienced femoral operators have done 20 transradial coronary angiograms.^[19,20]

Conclusions

This study shows that the transradial approach for coronary procedures is a safe technique and givessimilar clinical results to transfemoral access. Complications at the radial access site is negligible, and permits a wide range of diagnostic and therapeutic interventions. But crossover to another approach may require in case of emergency or anomaly. These findings thus support the transradial approach as a first choice in coronary interventions.Length of hospital stay, time to mobilisation and cost all are reduced in the transfemoral approach.

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