LEFT RADIAL ARTERY APPROACH FOR CORONARY ARTERY INTERVENTION

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ABSTRACT

Objective: To determine the success rate of left radial artery approach for coronary intervention.

Study design: Descriptive study.

Place and Duration of Study: Armed Forces Institute of Cardiology/National Institute of Heart Diseases Rawalpindi. Study Period spanned from 15 January 2010 to 15 July 2010.

Patients and Methods: The study was conducted on a total of 41 patients, out of these 41 patients, 25(61%) had undergone diagnostic coronary angiography using left radial artery approach and 16(39%) underwent percutaneus coronary intervention. Left radial artery route was selected after Positive Allen Test. Injection Verapamil 5mg was given through side connection of radial artery sheath to prevent spasm.

Results: No conversion to femoral artery route was done, establishing 100% success rate,without any bleeding or haematoma.

Conclusion: Left radial artery approach for coronary angiography and percutaneus intervention is convenient and safe for the patient and almost free from major access site complication.

Keywords: Coronary Angiography, Left Radial Artery approach,. Percutaneus Coronary Intervention.

INTRODUCTION

Interventional cardiologists are searching for more innovative access means for coronary angiography and percutaneous coronary intervention (PCI). Traditional transfemoral approach to transradial one, from ulnar artery approach, now, to left radial artery approach have broadened the horizon of coronary access route leaving multifaceted options for the interventionists. The development of percutaneous procedures to diagnose and treat coronary artery disease has changed the concepts of coronary diagnostic and interventional procedures. Patients with limiting symptoms can now often be returned to full activity by, with a low risk of procedure related cardiac events. PCI has obvious advantages over coronary artery bypass grafting. As increasingly complex disease can be treated in patients with previously prohibitive comorbidity, the demand for both diagnostic and interventional procedures increases every year.[1]

PATIENTS AND METHODS

This discriptive study was conducted at the Armed Forces Institute of Cardiology-National Institute of Heart disease, Rawalpindi from 15 January 2010 to 15 July 2010 on a total of 41 patients undergoing coronary angiography and (PCI), using left radial artery access route. Out of these, 39 (95%) were male and only 2 (5%) patients were female.

Left radial artery access route was selected after positive Allen test establishing adequate ulnar collateral circulation to hand. Left hand of patient was placed across the abdomen of the patient, after adequate sterilization and draping. Local anesthesia with 2% plain Xylocain (5cc) was infiltrated 2 cm proximal to radial styloid process after palpating the left radial artery. Left radial artery puncture was done using 21 Gauge (4 cm length) size needle and 0.018 inch size guide wire was used to secure the access. Skin nick was given in the long axis of the artery, to facilitate the sheath insertion. 6F hydrophilic coated radial artery sheath of 23-25 cm length with tapered tissue dilator was used. Injection verapamil 5 mg through the side connection of radial artery sheath was given to prevent radial artery spasm. Two meter long guide wire was used for coronary diagnostic and guide catheters insertion.

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Statistical Analysis

Data had been analysed using SPSS version 15. Descriptive statistics were used to describe the data.

RESULTS

A total of 41 cases of left trans-radial coronary interventions were included in this study. A total of 41 patients, 25 (61%) were diagnostic coronary angiography including 2 (8%) females and 16 (39%) had percutaneous coronary intervention. Out of the 25 diagnostic coronary angiography 2 (8%) had graft study. Age description for coronary angiography is given in table-1.

In present study 16 patients underwent PCI through left trans-radial approach; all 16 patients were males. Nine (56.25%) patients had undergone single vessel PCI while 6 (37.5%) patients underwent double vessel PCI. One patient (6.25%) underwent triple vessel PCI. Out of these 16 patients, 3 (18.75%) had CTO (chronic total occlusion); out of these 3 CTOs, two were intervened successfully and one CTO could not be crossed with guide wire. Age description of patients underwent PCI is given in table-2

No conversion to femoral route was done in this study, thus establishing 100% left trans-radial route success. No local site complication of bleeding or haematoma was observed in these patients.

DISCUSSION

The femoral artery has traditionally been the preferred access site for coronary procedures, but this approach has several limitations.

The hand receives a dual arterial supply from the radial and ulnar arteries, which come together to form deep and superficial palmar arterial arches. The radial artery, unlike the femoral or brachial 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 compression (by device) of the artery so that patients can be mobilised as soon as the arterial sheath is removed on completion of the procedure. Radial access thus has the potential advantages of reduced access site complications, rapid patient mobilisation, day case PCI, and reduced cost, especially in a developing country like Pakistan, which is already constrained with a huge volume of disease load.

Many case series have reported low rates of complications at the radial access site,[4,5] and data are now available from several randomised trials comparing arterial access approaches.[2,6-9] In the access study, statistically significant successful coronary cannulation was achieved[2] in 93.0% v 95.7% v 99.7% of patients ($p< 0.001$). Most failures were due to puncture the artery; in all cases, successful coronary cannulation was achieved on crossover to an alternative access route. Once arterial access had been achieved, the rates of successful angioplasty did not differ. Fluoroscopy or procedure time did not differ significantly, and neither did rates of major adverse cardiac events at one month. Major entry site complications (haemoglobin loss ≥ 2 g/dl or need for blood transfusion or vascular repair) occurred in significantly fewer patients in the radial group.

The patients likely to benefit most from the reduced rate of access site complications associated with the radial approach are those treated with the most aggressive antithrombotic and anticoagulant regimens. No major access site complications (resulting in haemoglobin loss ≥ 2 g/dl, blood transfusion, vascular repair, or prolonged hospitalisation) occurred in the radial group compared with a rate of 7.5% in the femoral group ($p = 0.04$). Access site complication rates of zero have also been described in case series of transradial PCI for acute myocardial infarction that used glycoprotein IIb/IIIa inhibitors[3].

One of the main advantages of radial access over the femoral route is rapid mobilisation of the patient and earlier discharge from hospital. The reduction in bed occupancy might be expected to reduce expenditure per patient and increase turnover of patients. In a randomised trial of transradial versus transfemoral diagnostic coronary angiography,

hospital stay was indeed significantly shorter (3.6 v 10.4 hours; $p < 0.0001$) in the radial group[8]. Hospital costs were also lower. The 5-6 hour duration of post-procedure bed rest in this study is longer than the 2-4 hour period used in current UK practice.

Patients prefer radial access to the femoral approach[6,8]. This reflects the early mobilisation possible with this technique. Among 200 stable patients randomised to coronary angiography by either radial or femoral approach, day one and week one measures of bodily pain, back pain, and walking ability all favoured the radial group ($p < 0.01$)[8]. Furthermore, those patients who had had angiography by both approaches expressed a strong preference for the radial approach, with 80% preferring the radial approach and only 2% preferring the femoral approach ($p < 0.0001$).

The talent study[10] randomized 1540 patients over the course of a year at a single high-volume Italian center to either a left or right radial approach. A total of 1467 were randomized for their diagnostic cath, and 688 patients were randomized for their PCI cath, with some patients randomized twice for both procedures. Investigators included elective, unstable-angina, and non-STEMI patients but excluded STEMI patients, patients with prior CABG, hemodynamically unstable patients, and patients with a radial or ulnar artery deemed unsuitable by Allen test.

Sciahbasi[10] showed during a hotline session, the primary end points of fluoroscopy time and dose/area of irradiated tissue (dose area product) during fluoroscopy were significantly reduced among patients treated via the left radial artery vs the right during diagnostic procedures. For interventional procedures, amounts were also reduced for both end points, but not to a significant degree.

Of note, stroke rates and crossovers to femoral access were very low for both radial routes—only 1% of patients crossed over to a femoral procedure in both groups, and only one stroke occurred in the entire series this cross over rate almost corresponds to our study.

As expected, subclavian tortuosity was significantly more common in right radial cases (16%) than in left (8%). This is something that interventionists know intuitively, but it has never been prospectively compared and counted. In multivariate analyses, the only strong predictors of subclavian tortuosity were age >70 years and right radial approach.

In a prespecified analysis, Sciahbasi and colleagues also reanalyzed their data according to whether the procedure had been performed by cardiology fellows or senior interventionists. For both fluoroscopy time and dose area product, the differences between right and left radial approach were only statistically significant for the fellows; for the senior, more experienced physicians, differences were almost negligible.

CONCLUSION

Left trans-radial approach for coronary angiography and PCI has opened another route for coronary interventionists. It is convenient and safe for the patients and almost free from major access site complications. Although we had only 2 patients for graft study, in present study; but it was very convenient to catheterize the LIMA graft via left radial artery approach.

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Table-1: Age Groups for Coronary Angiography

Age Groups (Years)	Number of Patients	Percentage
41-50	8	32%
51-60	9	36%
61-70	6	24%
71 and above	2	8%

Table-2: Age Groups for PCI

Age Groups (Years)	Number of Patients	Percentage
41-50	5	31.25%
51-60	6	37.5%
61-70	5	31.25%