

ORIGINAL ARTICLES

Advantage of Trans Radial Coronary Angiography: A Study of 40 Patients

Mohammad Saifullah Patwary¹, Mir Jamal Uddin², Md. Mukhlesur Rahman¹
Syed Azizul Haque², Md. Khurshed Ahmed¹, Sazzad Haider¹, Nilufar Fatema¹

¹Department of Cardiology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Shahbag, Dhaka

²Department of Cardiology, National Institute of Cardiovascular Diseases (NICVD), Dhaka.

Address for Correspondence

Dr. Mohammad Saifullah Patwary, Department of Cardiology, Bangabandhu Sheikh Mujib Medical University, Dhaka

E-mail : dr_saif71@yahoo.co.uk

Abstract

Percutaneous coronary catheterization and revascularization are commonly performed all over the world. Among various access sites for coronary interventions, most cardiologists favour the femoral approach, while the procedure via the radial artery is only performed by a limited number of operators. In this study, we aimed to assess the procedural outcome of the trans-radial coronary angiography (CAG) among the patients in a tertiary care hospital in Bangladesh. This prospective observational study was carried out among 40 patients underwent trans-radial coronary angiography. The study was conducted for a period of one year. Indication of CAG including chronic stable angina, unstable angina, non ST elevated myocardial infarction (MI) and ST elevated MI were observed. Procedural attempt, success rate and outcome with or without complications were mentioned. Out of 40 patients, 70% were male and 30% were female (M: F=2.3:1). Among the patients undergoing trans-radial CAG, 50% had dyslipidemia and HTN, 55% had family history of IHD, 52.5% were smoker and 20% had DM. Most of the patients underwent trans-radial CAG due to unstable angina (52.5%) and this was followed by ST elevated MI (30%), non ST elevated MI (10%) and chronic stable angina (7.5%). The mean procedural time was 19.85±1.3 minutes. The fluoroscopy time was 9.60±.9 minutes. The mean hemostasis time was 9.00±7.0 minutes. All patients were ready for discharge within 24 hours. Only 7.5% patients experienced spasm of radial artery during CAG. No other complications were detected. Trans-radial approach is an attractive alternative to conventional trans-femoral approach, in suitable patients at the hand of experienced operator, with appropriate hardware and should be ready to cross over, to the femoral approach when needed.

Keywords : Trans-radial coronary angiography, trans-femoral approach.

Introduction

In Bangladesh, coronary angiography (CAG) have generally been performed using a transfemoral approach. However, it has been shown that the transradial approach to coronary interventions presents a series of advantages that make it an attractive alternative to the femoral or brachial approaches. Patients comfort, early ambulation and a shorter hospital stay and of course less complications are facilitated in transradial approach^{1,2}. After the first transradial coronary angiography was reported by Campeau in 1989 and transradial coronary intervention was reported by Kiemeneij et al. in 1992, the transradial approach has been used as an alternative route for coronary angiography and angioplasty²⁻⁶. In this study, we aimed to assess the procedural outcome of the transradial coronary angiography among the patients in a tertiary care hospital in Bangladesh.

Materials and methods

This prospective observational study was carried out among 40 patients underwent transradial CAG in the department of Cardiology, Sir Salimullah Medical College and Mitford Hospital, Dhaka. The study was conducted for a period of one year starting from February 2007 to January 2008. All the consecutive patients who underwent elective coronary angiogram during the study period were considered as study population. Allen's test was conducted in each case and negative result excluded the patient from this approach. Right radial artery was used in all transradial CAG. The vascular sheath was Cordis 5Fr, guide wire was long guide wire and catheter were TIG 5Fr, Pigtail 5Fr, JR 5Fr, JL 5Fr used in this study. No catheter engagement was encountered during study period. Patients were distributed in four age groups including group I (<40), group II (40-49), group III (50-59) and group IV (≤60). Different risk factors for ischaemic heart diseases including dyslipi-

daemia, hypertension (HTN), diabetes mellitus (DM), smoking and family history were evaluated. BMI of each patient was also identified. Indication of CAG including chronic stable angina, unstable angina, non ST elevated myocardial infarction (MI) and ST elevated MI were observed. Procedural attempt, success rate and outcome with or without complications were mentioned. The study protocol was approved by the institutional ethics committee. Informed written consent was taken from each patient or his / her guardian. Analysis of data was performed using SPSS 14.

Results

Out of 40 patients, 70% were male and 30% were female (M: F=2.3:1). Most of the patients (35%) were fall in Gr-III (50-59 years) and it was 7.5%, 25% and 32.5% in Gr-I, Gr-II and Gr-IV respectively. The mean age of patients was 51.5 ± 10.5 SD years.

The mean body mass index (BMI) was (23.8±1.5) SD.

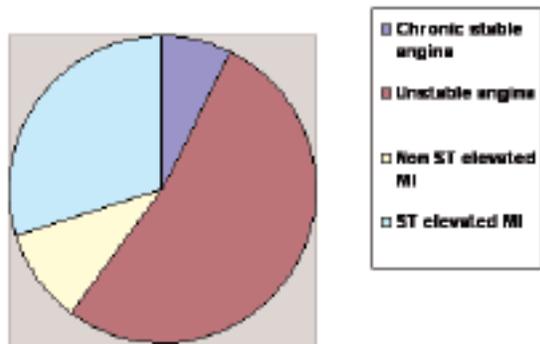


Fig 1: Indication of transradial CAG.

Most of the patients underwent transradial CAG due to unstable angina (52.5%) and this was followed by ST elevated MI (30%), non ST elevated MI (10%) and chronic stable angina (7.5%).

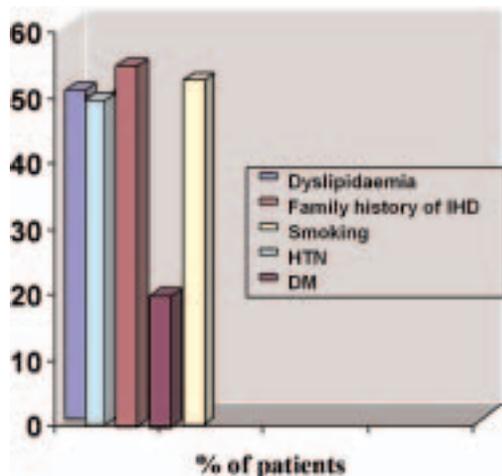


Fig 2: Distribution of patients by risk factors.

Among the patients undergoing transradial CAG, 50% had dyslipidemia and HTN, 55% had family history of IHD, 52.5% were smoker and 20% had DM.

Table I. Procedural attempt, success and failure of different activities among patients. (n=40)

Variable	Mean ± SD (Range)
Procedural time (min)	19.85±1.3 (15-21)
Fluoroscopy time (min)	9.60±0.9 (7-11)
Haemostasis time (min)	9.00±7.0 (1-21)
Puncture attempted	1.25±0.4 (1-2)
Ambulation time (hrs)	0.00±0.0 (0-0)
Ready for discharge (hrs)	24.00±0.0 (12-24)

The mean procedural time was 19.85±1.3 minutes. The fluoroscopy time was 9.60±.9 minutes. In terms of haemostasis time, the mean time was 9.00±7.0 minutes. All patients were ready for discharge within 24 hours.

Only 7.5% patients experienced spasm of radial artery during CAG and this was managed by using cocktail of injection Verapamil and Nitroglycerine. No other complications were detected. All the patients were followed up 24 hours after coronary angiography. Data analysis revealed that no patient developed any complication immediately after procedure. However, 2.5% of the patients in transradial procedure developed minor bruising and another 2.5% developed blister in their puncture site. No patient developed haematoma. Data analysis also found that no patient developed any complication at the time of discharge. Data indicated that no patient developed any major adverse cardiac events such as myocardial infarction, stroke or death.

Discussion

Transradial approach for performing CAG has become increasingly popular day by day because it is associated with decreased incidence of hemorrhagic and vascular complications, increased patient comfort, earlier ambulation, earlier hospital discharge, and cost reduction^{2,6,7-11}. But this procedure has the disadvantages of potential radial spasms and post-procedural radial artery occlusions, physicians experience with the procedure and the devices used for coronary interventions. Transradial approach has some advantages over transfemoral approach. The radial artery is easily compressible, thus bleeding is controllable and haemorrhagic complications are significantly reduced. Moreover, no major veins or nerves are located near the artery, minimizing risk of injury to these structures. Finally,

post procedure bed rest is not required, permitting immediate ambulation, more comfort and early discharge, which improve quality of life of patients and reduced hospitalization cost.¹² Moreover, Kiemeneij et al. compared the radial approach to the brachial and femoral approaches in patients under going PTCA, demonstrating that there were no significant differences between the approaches in terms of success of coronary angiography or angioplasty or the duration of the procedures².

In the elderly the trans femoral catheterization can be more complicated. Older patient's arteries are more calcified and their walls contain less elastic fibers. Consequently, this can increase the risk of injury, which could result in haematoma or aneurysm. More over, the elderly are frequently affected by prostatic hypertrophy or backache, thus a site approach for catheterization which shorter bed rest time, is necessary to improve their comfort. With the increasing age of the population and of patients requiring cardiac revascularization. This technique should be taken into account as a useful strategy for reducing vascular complications and for improving patient comfort. Therefore, the transradial procedure may be routinely attempted, with some exceptions and is to be preferred in those patients at high risk of local vascular complications (such as the elderly, the obese, patients with aorta iliac diseases or those receiving anti-thrombotic and anti-platelet drugs)¹³.

In this study, out of 40 patients, male, female ratio was 2.3:1. The mean age of patients was above 50years (51.5 ± 10.5 SD). The mean BMI was (23.8 ± 1.5) SD with a range 19.4 to 27.4. No one was found obese in this study. Among the risk factors family history of IHD (55%) and smoking (52.5%) was higher than the others. The studies carried out abroad demonstrated different patterns, as mentioned by Grunday, Balady & Criqui 1998 in their work. This may be due to ethnic and cultural differences among the study populations. But there was no difference of opinion that diabetes increases the risk of coronary heart disease by two to four times for men & women respectively. In our study, 20% were diabetic¹⁴.

Clinically it was evident that highest percentage of patient had unstable angina (52.5%) followed by ST elevated MI (30%) and Non ST elevated MI (10%). It was consistent with those found by Reinecke et al in 2003 but differ greatly from the study conducted by Chi-Hung Huang et al where 86% patients had angina¹⁵.

While working on the subject, there was neither any major adverse cardiac event (MACE) nor any entry site complications in transradial CAG. It was found that vessel tortuosity and persistent arterial spasm sometimes can be a cause of difficulty in puncture of radial procedure. This study also

revealed radial artery spasm obstructing the guide wire and catheter progression, difficulty in rotating and manipulating the catheter leading to difficulty in engagement of catheter into the coronary ostia. All of these may contribute to procedural failure. Three patients developed spasm in radial artery. The cause of these lower procedural complications of this study may be due to more appropriate materials used. But the findings were some what different with those found in Momenuzzaman et al, in which 24 (5.79%) out of 430 patients had procedural complications, 8 (1.93%) failed puncture, 6 (1.45%) catheter non engagement and 10 (2.41%) radial artery spasm.¹⁶ The mean procedural time for CAG by transradial approach was 19.85 ± 1.3 minutes with a minimum of 15 minutes and maximum 21 minutes. These findings were consistent with those found by Momenuzzaman et al and Hildick-Smith, Lowe & Walsh(1998). In which the mean procedural time for radial approach was 16.77 minutes, minimum 8.50 minutes and maximum 35.5 minutes^{16,17}. One of the main advantages of radial access over the femoral route is rapid mobilization 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 this study mean length of hospital stay by transradial route was 24.00 ± 0 hours. This finding was consistent with those found in Archbold et al¹⁸.

Conclusion

This study demonstrated that transradial approach is safe and highly effective coronary procedure. It has no access site complications. More importantly, transradial procedure leads to improved quality of life after the procedure and thus gives much comfort to the patient. It also shortened mean duration of hospital stay. So, transradial approach is an attractive alternative to conventional transfemoral approach, in suitable patients at the hand of experienced operator, with appropriate hardware and should be ready to cross over, to the femoral approach when needed. Of course this needs further studies covering a larger population to draw a firm conclusion in this regard.

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