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CORONARY CATHETERIZATION;
FREQUENCY OF LOSS OF RADIAL PULSE IN PATIENTS UNDERGOING TRANSRADIAL CORONARY CATHETERIZATION

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ABSTRACT… Introduction: In recent years the trans-radial approach has been increasingly employed as an alternative approach to percutaneous coronary intervention. Loss of radial pulse may lead to ischemic symptoms like pain in hand, claudication etc. There is a lack of local data regarding complication associated with trans-radial coronary catheterization. Therefore, there is need for local study to find out the frequency of complications associated with trans-radial approach. **Objectives:** To determine the frequency of loss of radial pulse in patients undergoing trans-radial coronary catheterization. **Design:** Cross sectional study. **Setting:** Department of Cardiology, Jinnah Hospital, Lahore. **Period:** From 3rd June 2014 to 2nd December 2014. **Methodology:** All 325 cases fulfilling the inclusion/exclusion criteria undergoing coronary catheterization were included in the study. **Results:** A total of 325 patients, both male and female with positive Allens test, undergoing Trans-radial angiography for intervention were included. Loss of radial pulse was evaluated clinically at four weeks follow up.In our sampled population, mean age was 57.01 ± 6.8 years and 240 patients (73.8%) were male while 85 patients (26.2%) were female. Only 14 patients (4.3%) out of 325 had loss of radial artery pulse while remaining 311 patients (95.7%) didn't have loss of radial artery pulse. There was found no effect of gender on outcome i.e. loss of radial pulse but older age made a person prone to loss of radial pulse. **Conclusion:** It is concluded that the frequency (percentage) of loss of radial pulse is quite low (4.3%) in our patients undergoing trans-radial coronary catheterization.

Key words: Myocardial Infarction, Angiographic Intervention, Transradial Angiography.

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INTRODUCTION

Percutaneous coronary intervention (PCI) today is not what it was two decades ago. In patients with acute ST elevation myocardial infarction (STEMI) it is an established and preferable method of revascularization.[1] Radial artery is a common intervention for frequent arterial blood gas measurements and continuous blood pressure monitoring in the operating room and intensive care unit. With these successes, recent attention has turned to reducing complications associated with vascular access.[2]

An increasing number of diagnostic angiographies and PCIs are performed using the radial artery as the point of vascular access. The Trans-radial approach for cardiac catheterization is growing and gaining acceptable alternative to femoral approach. The technique is not difficult to learn, and the equipment is similar to that used in more traditional approaches.[3]

The primary advantage of trans-radial cardiac catheterization and intervention is reduced access-site complications, as the radial artery is small and superficial, it is easily compressible, and bleeding complications associated with radial arterial access are extremely rare.[4,5]

On the other hand, as this technique is now being used more commonly for cardiac catheterization, it is of paramount importance to be aware of its complications and to understand their prevention and management.[6]

Brueck M and workers[7] recorded 0.58% loss of pulse while Loss of radial pulse mean there will be inability of this approach for any other intervention.

While it was reported about 30.5% by others.[8] Loss of radial pulse may lead to ischemic symptoms like pain in hand, claudication etc. Lack of local data regarding complication associated with trans-radial coronary catheterization, further more local technique of radial artery puncture and closure may vary from international practices. Therefore, there is need for local study to find out the frequency of complications associated with trans-radial approach. If our study shows acceptable frequency of radial artery loss comparable to international data, it may encourage us to promote the practice of trans-radial catheterization.

PATIENTS AND METHODS

OBJECTIVE

Our objective was to determine the frequency of loss of radial pulse in patients undergoing trans-radial coronary catheterization.

Operational Definitions

Transradial catheterization

It was defined as coronary catheterization (angiography/angioplasty) using trans-radial approach.

Loss of pulse

The loss of pulse was determined on clinical examination at one month of follow up.

MATERIAL AND METHODS

Setting

The study was conducted in Department of Cardiology, Jinnah Hospital, Lahore.

Duration of Study

3rd June 2014 to 2nd December 2014.

Study Design

Cross sectional study

Sampling Technique

Non-probability consecutive sampling.

Sample Size

The calculated sample size was 325, with 5% margin of error, 95% confidence level taking expected percentage of loss of pulse in patients undergoing trans-radial catheterization i.e. 30.5%.[8]

SAMPLE SELECTION

Inclusion Criteria

1. Both male and female
2. Age 25 to 70 years.
3. All selected patients for trans-radial catheterization
4. Patients with presence of radial pulse of good amplitude, presence of ulnar pulse, and a good collateral flow through the palmar arch assessed by Allen's test. Positive Allen's test: The hand was elevated and the patient/person is asked to make a fist for about 30 seconds. Pressure was applied over the ulnar and the radial arteries so as to occlude both of them. Still elevated, the hand was then opened. It should appear blanched (pallor can be observed at the finger nails). Radial pressure was released and the color should return in 7 seconds then Allen' s test was positive meaning by radial artery supply to the hand was sufficient and it was safe to cannulate / prick the radial artery.

Exclusion Criteria

1. Patients with indication for rotational atherectomy, intracoronary ultrasound, intra-aortic balloon, systemic vasculitis and previous catheterization were excluded from the study.
2. Peripheral arterial disease (history and examination), systemic vasculitis (history and examination), history of trauma to hand/ arm, unhealthy radial artery (examination) and previous catheterization using radial approach were excluded from the study.

METHODOLOGY

All 325 cases fulfilling the inclusion/exclusion criteria undergoing coronary catheterization at cardiology, Jinnah Hospital, Lahore were included in the study. An informed consent to include their data with the assurance of confidentiality was obtained. The potential effect modifiers that may alter the results of the study were excluded by following the exclusion criteria. Demographic information (name, age, gender, contact number) was recorded. The subjects undergoing for

trans-radial catheterization for radial artery were assessed by the researcher himself under the supervision of senior consultants. After the procedure the radial artery puncture were managed by pressure technique. On follow-up the patients were examined for the loss of pulse (according to operational definition).

Data Collection Tools

Quantitative and qualitative variables were entered into the predesigned proforma.

Statistical Analysis

The collected Data was analyzed using software Statistical Package for the Social Sciences (SPSS) version 19. Numerical variables like age were described as mean and standard deviation while categorical variables like gender and loss of radial pulse were presented as frequencies and percentages. Data was stratified for age, gender. Post stratification chi square and independent sample t test were used to determine the role of chance. A p value < 0.05 was considered significant.

RESULTS

A total of 325 patients with mean age of 57.01 + 6.8 years ranged from 45 to 70 year of their age were included in the study. Among them 240 (73.8%) were male while 85 patients (26.2%) were female. Only 14 patients (4.3%) out of 325 had positive results for loss of radial artery pulse while remaining 311 patients (95.7%) didn't have loss of radial artery pulse. Sampled population (n=325) was distributed into different groups according to their ages. 70 patients (21.5%) were either 50 years old or below 50 years of their age. While rest of 255 patients (78.5%) were between 51 to 70 years of age. To evaluate distribution of loss of radial artery-pulse in males and female patients we cross tabulated gender with loss of radial artery pulse Pearson Chi Square test gave us non-significant results (p=0.405) (Table-I). Out of 231 male patients only 9 males (3.8%) showed positive results for loss of radial artery-pulse. However 5 female patients (5.9%) among 85 female patients were having loss of radial artery-pulse. To find out that how loss of radial artery-pulse is distributed in different age groups we cross tabulated age groups with loss of radial artery-pulse and results were significant (p=0.046) (Table-II). Out of 279 patients belonged to age group of 50 years and below, there was not a single patient of this group who had loss of radial artery-pulse. However 14 patients (5.5%) were between 51 to 70 years having loss of radial artery-pulse while rest of 241 patients didn't have loss of radial artery-pulse.

			Loss of Radial Artery Pulse		Total
			No	Yes	
Gender	Male	Count	231	9	240
		% within Gender	96.3%	3.8%	100.0%
	Female	Count	80	5	85
		% within Gender	94.1%	5.9%	100.0%
Total		Count	311	14	325
		%	95.7%	4.3%	100.0%
Using Pearson Chi-Square test, P value= 0.405 (Non-significant)					

Table-I. Crosstab between gender and loss of radial artery pulse

			Loss of Radial Artery Pulse		Total
			No	Yes	
Age groups	50 years and below	Count	70	0	70
		% within age groups	100.0%	0.0%	100.0%
	51-70 years	Count	241	14	255
		% within age groups	94.5%	5.5%	100.0%
Total		Count	311	14	325
		%	95.7%	4.3%	100.0%
Using Pearson Chi-Square test, P value= 0.046 (significant)					

Table-II. Crosstab between Age groups and loss of radial artery pulse

DISCUSSION

Angiography and subsequent intervention has revolutionized the treatment of myocardial infarction. Trans radial Angiography is a recent development and practiced successfully in our settings. Current study aimed to determine the complication profile of patients undergoing Trans radial Angiography. Radial artery occlusion is a frequent problem. Factors are, prolonged high compression of radial artery, no anticoagulant used, small artery to sheath size ratio, use of non-hydrophilic sheath and multiple attempts.[13,14] Treatment of Radial artery occlusion is Low molecular weight heparin in body weight adjusted dose.[15]

Age predicts loss of radial pulse after transradial angiography. The mean age was 57.01 ± 6.8 years ranged from 45 to 70 years in the study. There was statistically significant loss of radial pulse in older patients (p=0.046). In the current study, mean age was similar to recently published local study in which mean age was 57.62 years and is slightly less than 58.1 year reported by tuncezetal. Age distribution of included patient shows still younger group with a mean age of 57 years is having the maximum burden of CHD. It is quite different from that of developed countries in which age is above 60. Our age range was 45-70 years showing a need of extensive preventing program leading to decrease in young age mortality in our patients at risk of coronary artery disease.[9,10]

More male patients (73.8%) were included in the study which may be either due to health seeking behavior of our population or hormone protection of female which lead to decrease incidence of myocardial infarction in female gender. Out of 231 male patients only 9 males (3.8%) showed positive results for loss of radial artery-pulse. However, 5 female patients (5.9%) among 85 female patients were having loss of radial artery-pulse but this trend is non-significant (p=0.405). The results are contrary to a local study where there was significant gender difference in terms of RAO, 10 of 141 (7.1%) patients with RAO six(6) of those were females and four(4) were males patients (60% vs 40%) (p<0.04).[9] Similar trend was observed in study by Tuncez et al where 80% of patients with RAO were females and in meta-analysis by Rashid et al in which reported incidence of RAO among females is 66.7%.[10,11]

In our sampled population, Only 14 patients (4.3%) out of 325 had positive results for loss of radial artery pulse while remaining 311 patients (95.7%) didn't have loss of radial artery pulse. This result is quite encouraging and matches with those reported by previous studies but in one of the major prospective study, its incidence reported is 18%.[9,10,12] We may say that transradial Angiography is a safe procedure and our current practices are up to international standards.

CONCLUSION

It is concluded that the frequency (percentage) of loss of radial pulse is quite low (4.3%) in our patients (14/325) undergoing transradial coronary catheterization.

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It takes some courage to stand up and speak; it takes even more courage to open your mind and listen.

– Unknown –

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
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