

## FREQUENCY OF COMPLICATIONS ASSOCIATED WITH TRANSULNAR APPROACH FOR CORONARY ANGIOGRAPHY

Muhammad Furrakh Maqbool<sup>1</sup>, Abdul Wadood Khan<sup>2</sup>,  
Ahmed Noeman<sup>3</sup>, Muhammad Sajid<sup>4</sup>

<sup>1-4</sup>Department of Cardiology, Punjab Institute of Cardiology, Lahore - Pakistan

Address for Correspondence:

**Muhammad Furrakh Maqbool**,  
Department of Cardiology, Punjab Institute of Cardiology, Lahore - Pakistan

Emails: justfurrakh@hotmail.com

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### Contribution

MFM conceived the idea, planned the study and drafted the manuscript. AWK collected data. AN & MS did statistical analysis and drafted the manuscript and critically reviewed manuscript. All authors contributed significantly to the submitted manuscript.

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### ABSTRACT

**Objective:** To determine the frequency of complications associated with transulnar approach for coronary interventions.

**Methodology:** A single centered, cross sectional, study was conducted from April 2014 to March 2015. Patients undergoing coronary intervention through transulnar approach in Cardiology Department of Punjab Institute of Cardiology were included after fulfilling inclusion criteria. Patients were observed and clinically assessed for periprocedure complications and their percentages recorded.

**Results:** A total number of 300 patients were studied. About 23.3% showed minor bleeding, 4.3% showed ulnar artery occlusion, 4% showed major bleeding, 2.7% had ulnar nerve injury and hematoma formation was observed in only 1% of patients.

**Conclusion:** The frequency of complications associated with transulnar approach is low during coronary interventions and this approach can be an alternate to transradial approach.

**Key Words:** Transulnar interventions, Coronary angiographic approaches, Coronary angiography.

## INTRODUCTION

Ischemic heart disease is a burden on health system in both developing and developed countries.<sup>1</sup> Advancement with coronary interventions revolutionized its management and outcome. Among different approaches of coronary interventions, transradial approach got popularity because of short hospital stay and less complications.<sup>2</sup>

Initially reported in 2001 by Terashima et al, transulnar approach was considered as an alternative for coronary interventions in candidates who were not suitable for transradial interventions. Multiple factors including vasospasm, access site failure, variation in size and anatomy, poor collateral support can make transradial approach a less suitable choice.<sup>3</sup> Transulnar angiographic interventions by Yun-zhi et al showed minor bleed was 5.9% and asymptomatic ulnar artery occlusion was 5.1% with no ulnar injury, major bleed, pseudoaneurysm and atrioventricular fistula formation.<sup>4</sup>

All transarterial routes used for coronary interventions have their own pros and cons.<sup>9</sup> Transulnar approach being a recent advancement in coronary intervention may prove to be an alternate for patients who are not candidates for transradial approach. This study is an effort to determine and compare complication rates with highly skilful centers so we may find most beneficial approach for patients.

## METHODOLOGY

A single centered, cross sectional, trial conducted from April 2014 to March 2015. Patients undergoing coronary angiography through transulnar approach in Cardiology Department of Punjab Institute of Cardiology of either sex with age between 30-70 years with positive reverse Allens

test were enrolled in the study after obtaining informed consent. All patients were evaluated by clinical assessment of the forearm vessels before procedure by reverse Allens test to determine the patency of ulnar artery. Patients were followed for complications i.e. minor bleeding, ulnar artery occlusion or spasm and other rare complications (hematoma formation, major bleeding and ulnar nerve injury) by clinical examination. Length of procedure was measured additionally as effect modifier.

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

## RESULTS

About 300 patients with mean age of  $57.01 \pm 6.8$  years ranging from 45 to 70 year were included in the study. Out of 300, 221 (73.7%) were males while 79 (26.3%) were females (Table 1). In our sampled population 70 (23.3%) patients showed minor bleeding mostly males ( $n=52$  with  $p=0.89$ ) and younger age group ( $p=0.96$ ). Only 13 (4.3%) patients showed ulnar artery occlusion with no significant gender distribution ( $p=0.31$ ). About 12 (4%) patients showed major bleeding ( $p=0.33$ ) and 8 (2.7%) patients showed ulnar nerve injury. Only 3 (1%) patients in coronary interventions showed hematoma formation (table 2). Coronary interventions procedure in MI varied in time from 20 to 70 min with mean time of  $50.40 \pm 14.3$  min.

**Table 1: Gender Distribution in study population (n=300)**

Gender	Frequency (n)		Percentage (%)
	Male	221	73.7
Female	79	26.3	
Total	300	100	

**Table 2: Frequency of Complications in Study Population (n=300)**

Complications	Frequency (n)	Percentage (%)	P-value
Minor bleeding	70	23.3	$p=0.89$
Major bleeding	12	4.0	$p=0.33$
Ulnar artery occlusion	13	4.3	$p=0.31$
Ulnar nerve injury	08	2.7	-
Hematoma formation	03	1.0	-

## DISCUSSION

Ischemic heart disease is a global burden both in developing as well as developed countries, with acute myocardial infarction being a leading cause of death.<sup>1</sup> Early diagnosis and opting coronary intervention as first line management strategy has revolutionized the treatment by improving outcomes.<sup>5</sup>

Transulnar approach is a recent development for coronary interventions and practiced successfully in our settings. Current study is aimed to determine the complication profile of patients undergoing coronary intervention through transulnar approach and its comparison with international standards.

In our study 300 patients with mean age of 57.01 + 6.800 years ranged from 45 to 70 year of their age were included in the study. It is quite different from that of developed countries in which age is above 60 years.<sup>8</sup> 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.

More males were included in the study which may be either due to health seeking behavior of our population or hormone protection in females which led to decrease incidence of myocardial infarction in female gender.

In our sampled population, 70(23.3%) patients showed minor bleeding. This rate is comparable with studies from other countries.<sup>6-7</sup> Incidence of ulnar artery occlusion was 13 (4.3%) as compared to an international study which compared post procedure radial and ulnar artery occlusion with ultrasonography.<sup>10-11</sup> About 12 (4%) patients showed major bleeding, 8 (2.7%) patients had ulnar nerve injury. Only 3 (1%) patients undergoing Trans ulnar Angiography showed hematoma formation.

These rates of different major and minor complications have shown that transulnar approach is a safe approach and our current practices are up to international standards.

## CONCLUSION

Transulnar approach is a feasible and safe alternative for coronary diagnostic and interventional procedures with reasonable success and complication rates and almost all local complications including perforation can be managed conservatively.

It is concluded that the frequency of complications associated with trans-ulnar approach for coronary angiographic intervention is low and comparable with international settings and can be practiced safely in developing countries in patients who are not candidates for transradial approach.

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