

PREVALENCE OF CHRONIC TOTAL OCCLUSION IN A TERTIARY CARE CARDIAC CENTRE IN PAKISTAN

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ABSTRACT

Objective: To calculate the incidence of chronic total occlusion and frequency of involvement of various arteries along with different characteristics.

Study Design: Prospective study.

Place and Duration of Study: It was a six months prospective study in the Armed Forces Institute of Cardiology and National Institute of Heart Diseases Pakistan, from Jan 2016 till Jul 2016.

Material and Methods: All the consecutive patients who underwent coronary angiography in the Armed Forces Institute of Cardiology/National Institute of Heart Diseases were reviewed for the presence of CTO along with its arterial involvement and the type of lesion. Age, gender, presence or absence of co-morbid such as diabetes mellitus, hypertension and smoking were documented.

Results: Twenty percent of the total coronary angiograms conducted were found to have chronic total occlusions involving mostly the left anterior descending (LAD) followed by the right coronary artery (RCA) and left circumflex (LCX). With most of them having tapering ends and bridging collaterals. Our study will point out the disease burden of CTO and will work as a pilot to plan the future management strategy of CTO in our region.

Conclusion: Our study will help in the guidance of future management strategies for CTO in this region. Our study will also point out the disease burden of CTO and emphasize that percutaneous management of CTO PCI should be the next target of all the leading tertiary care cardiac centers in this region¹⁶.

Keywords: Chronic total occlusion, Coronary angiogram, TIMI.

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INTRODUCTION

Chronic total occlusion (CTO) is defined as an occlusion in the coronary artery with Thrombolytic In Myocardial Infarction (TIMI) 0 flow of 3 months duration¹. In the current era, incidence of CTO ranges from 15% to 30%² depending on different scenarios in which those patients were being studied. This has led to an increasing interest in its percutaneous management. This interest has also increased because of the advent of new techniques, such as the retrograde wire approach, parallel wire technique and introduction of devices specifically designed for the management of CTO³. CTO PCI is considered as the final frontier of

interventional cardiology³.

CTO consists of a fibrotic or calcified proximal cap having a tapering or non tapering end. Most of the CTO, microscopically, have fibrous or calcified tissue, atheroma and local lymphocytic infiltrate⁴⁻⁶. On the other hand, distal cap of the occlusion has an increased incidence of tapering end, (78.9 vs. 48.4%) which paved the way for introduction of retrograde wire approach^{7,8}.

Various centers have different frequency of the incidence of CTO and its management. The North American centers have an incidence of 29 and 33% yet they treat only 6 and 9% of these patients via percutaneous techniques^{9,10}. On the other hand Japanese centers have an incidence of 19% CTOs and perform percutaneous procedures on 61.2% of these patients^{9,11}.

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No study has been published regarding the approved by the institutional review board of the

Table: Showing demographics, co-morbid and clinical characteristic.

Variables	n (%)
Gender	
Male	136 (80.1%)
Female	35 (19.9%)
TVCAD	102 (60.8%)
Hypertension	88 (52.0%)
Diabetes	92 (54.4%)
Previous MI	70 (40.9%)
Smoking History	65 (38.2%)
LVF	107 (63.2%)
LAD	71 (42.7%)
LCX	34 (20.5%)
RCA	63 (36.8%)
Tapered proximal end	111 (64.9%)
Bridging collaterals	78 (46.8%)
Length of lesion < 5cm	116 (68.4%)
Length of lesion < 10cm	160 (94.2%)
Fibrous cap	62 (36.2%)
No calcification	82 (48.5%)
Mild calcification	61 (36.3%)
Bending of diseased segment	25 (15.2%)

frequency of CTO from our region; therefore we calculated the incidence of CTO and frequency of involvement of various arteries along with different characteristics.

MATERIAL AND METHODS

A prospective study was conducted from January 2016 till July 2016. All the consecutive patients who underwent coronary angiography in the Armed forces institute of cardiology /National institute of heart diseases were reviewed for the presence of cto along with its arterial involvement and the type of lesion. Age, gender, presence or absence of co-morbid such as diabetes mellitus, hypertension and smoking were documented. Previous history of myocardial infarction, triple vessel coronary atherosclerosis and left ventricular ejection fraction were also documented. In patients who underwent multiple coronary angiographies, only the first procedure was included in the study. Patients who had their index study conducted before the time of commencement of this research were excluded. The study was

above mentioned hospital.

CTO was defined as a total coronary artery

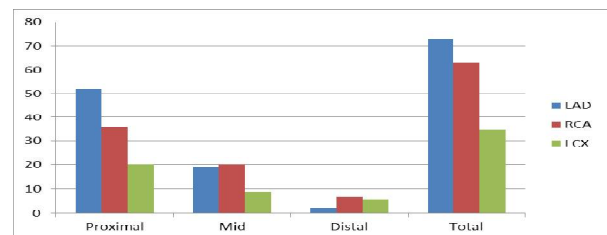


Figure: Distribution of disease according to coronary arterial involvement.

occlusion of more than 3 months duration with timi 0 flow.

RESULTS

Among 846 coronary angiographies conducted over a period of 6 months, 171 patients were found out to have CTO of one or more arteries, which were 20% of the total coronary angiograms (table). The most frequent involvement of CTO was found in the left anterior descending (LAD) artery in 73 patients (42.7%) followed by the Right Coronary Artery

(RCA) in 63 patients (36.8%) and the rest of 35 patients had CTO of left circumflex (LCX) Artery (fig).

More than 60% of the arteries involved in CTO had tapering ends and almost half of the arteries involved had bridging collaterals. More than 65% of CTO were of 5cm or less in length and more than 90% of the CTO were of 10cm or less in length. No fibrous cap was appreciated on the coronary angiogram in 63.2% of the CTO and most of the lesions had almost no evidence of calcification or minimum calcification (84.8%). Only 15% of the CTO had a bendy lesion and 63.2% of the CTO were in the ostio-proximal vessel. The distribution of disease according to coronary arterial involvement has been shown in figure.

Most of the patients were male. The frequency of diabetics in CTO was 54.4%. The presence of hypertension was found in 52% of the patients and 38.8% of the patients were smokers.

All the frequencies have been shown in a tabulated form in table.

DISCUSSION

In this study, we have found that a significant number of patients in Pakistan suffer from CTO. In one of the largest studies conducted for coronary atherosclerosis the incidence of CTO was found out to be 18.4% and the incidence increased when the patients under investigation had multiple co morbidities, increased age or had a past history of coronary artery by-pass grafting (CABG)¹².

Our study has also shown that almost half of our patients have bridging collaterals, the lesions themselves are generally small in size with tapering ends and without fibrous caps or bends. It was also found that many of our patients have none or minimally calcified lesions. All of these characteristics are consistent with an increased chance of successful intervention¹³. In one of the studies conducted in Japan, arteries having similar characteristics as most of our patients were found to have an initial success rate of more

than 80% at the very least. These lesions were also found to have used less amount of contrast and less total fluoroscopic time¹⁴. Another study conducted in Pakistan showed the success rate of 94% of CTOs which were managed in their institute¹⁵.

CONCLUSION

As it has been observed that the successful opening of CTO leads to an improvement of anginal symptoms, decrease in the ischemic burden, an improvement of left ventricular ejection fraction^{7,8} with a Meta analysis of 13 studies showing an overall improvement of 44% in successful CTO PCI compared to unsuccessful CTO PCI. Our study will help in the guidance of future management strategies for CTO in this region. Our study will also point out the disease burden of CTO and emphasize that percutaneous management of CTO PCI should be the next target of all the leading tertiary care cardiac centers in this region¹⁶.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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