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**Original Research Article**

# Clinical outcome of proximal left anterior descending revascularization with everolimus eluting stents via transradial route: a single centre experience in Western Rajasthan, India

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## ABSTRACT

**Background:** The proximal left anterior descending (LAD) artery stenosis represents the most important proximal site for obstructive coronary artery, as it supplies 40%–50% of the total left ventricular myocardium and could result in ischemia to a large area of myocardium. This study assesses the clinical outcome of patients with coronary artery diseases undergoing percutaneous revascularization with everolimus eluting stent implantation in the proximal left anterior descending coronary artery via trans radial route.
**Methods:** 150 patients with significant angiographic lesion of proximal LAD artery stenosis treated with PTCA and stenting to proximal LAD via TRA were selected for study and were followed for one year.
**Results:** Total 15 events were recorded 4 (2.6%) deaths and 11 (7%) MI and TLR was noted in 4% of patients. One (0.6%) case of acute stent thrombosis was recorded.
**Conclusions:** Total MACE of this record (10% at 12 months of clinical follow-up) is consistent with those observed in the large randomized and multi-center studies with drug-eluting stents implanted in the proximal left anterior descending artery.

**Keywords:** Everolimus eluting stent, Left anterior descending artery, Trans radial route

## INTRODUCTION

The proximal left anterior descending (LAD) artery stenosis represents the most important proximal site for obstructive coronary artery after left main stem lesion disease, as it supplies 40%-50% of the total left ventricular myocardium and could result in ischemia to a large area of myocardium. Moreover, patients with a critical stenosis of the proximal LAD segment are particularly prone to adverse effects of myocardial infarction and therefore, require a safe and long-term effective method of treatment.[1] The transradial approach (TRA) for coronary procedures has gained progressive acceptance since its first introduction by Campeau in 1989 for diagnostic coronary angiography.[2] Kiemeneij and Laarman did percutaneous transluminal coronary angioplasty (PTCA) and stenting with improving the TRA.[3]. Evidences suggest that lower vascular site complications, improved patient comfort, reduced cost are the major advantages which leads to increasing popularity of TRA for coronary angiography and angioplasty including primary percutaneous coronary interventions (PCI). Recently published reports support that apart from reducing complications such as major bleeding, TRA selection may also result in a better clinical outcome compared to femoral access.[4]

The radial access dramatically affect access site–related bleeding risk.[5] Although technically more demanding, the TRA has been demonstrated feasible in the acute

coronary syndrome setting and safe in terms of local vascular complications.[6,7]

The RIVAL (radial versus femoral access for coronary intervention) trial showed a clear benefit in terms of mortality in the subgroup of patients with ST elevation acute coronary syndrome (STEACS) undergoing percutaneous coronary intervention (PCI). The RIVAL study and a posthoc analysis of the HORIZON-AMI trial showed improved event-free survival in patients undergoing primary PCI via TRA.[8,9]

With the introduction of newer generation drug eluting stents (DES), late angiographic restenosis rates have consistently shown to be lower than those observed with bare-metal stent implantation. In the SPIRIT IV trial (N= 3,687), the primary endpoint of target lesion failure(TLF) at 1-year was significantly lower with the EES compared with the PES (4.2% vs. 6.9%, p<0.001).[10]

The COMPARE (Second-Generation Everolimus-Eluting and Paclitaxel-Eluting Stents in Real-Life Practice) trial also demonstrated significantly lower rates of major adverse cardiac event (MACE) (defined as all-cause mortality, myocardial infarction, or clinically driven target vessel revascularization (TVR) at 1-year with the EES compared with the PES (6.2% vs. 9.1%, p ¼ 0.02).[11]

We conducted the evaluation of one year clinical outcome of a consecutive series of patients with coronary artery disease undergoing PCI with DES (everolimus eluting stent) implantation in the proximal LAD via TRA in the deparment of cardiology, MDM hospital, Dr. S.N Medical College Jodhpur, Rajasthan, India. The patients were followed for 1 year to see a composite of MI, TVR, stent thrombosis (ST), target lesion revascularization (TLR).

Objective of the study was to assess the clinical outcome of patients with coronary artery diseases undergoing percutaneous revascularization with everolimus eluting stent implantation in the proximal left anterior descending coronary artery via trans radial route.

## METHODS

This prospective study was conducted in our institution between October 2014 and September 2015. 150 patients with significant angiographic lesion of proximal LAD artery stenosis, treated with PTCA and stenting to proximal LAD via TRA were selected for study and were followed for one year.

### *Inclusion criteria*

- Symptomatic stable angina
- Symptomatic unstable angina
- Documented myocardial ischemia with exercise treadmill testing (ETT).

### *Exclusion criteria*

- Acute myocardial infarction (AMI)
- History of CABG
- Contraindication to antiplatelet therapy
- Cardiogenic shock
- Chronic total occlusions (CTO)

Treatment options were fully discussed with the patient and informed consent was obtained. All patients underwent anticoagulation with unfractioned heparin, so as activated clotting time (ACT) was kept between 250-350 seconds, and between 200-250 seconds when using glycoprotein IIb/IIIa inhibitors.

The use of catheters, guide wires, balloons, PCI procedures (approach of bifurcations, direct stenting, distal protection devices, thrombus aspiration, etc.) and coadjuvant pharmacological treatment were done according to procedure requirement. Patients were followed clinically by visits at 30 days, 6 months, 1year after the index procedure.

If clinically necessary follow-up coronary angiograms were performed. The following parameters were analyzed

- Demographic parameters: age and gender;
- Cardiovascular risk factors: hypertension, diabetes mellitus, smoking, dyslipidemia.
- Past history of relevant cardiovascular events: CAD and surgical and/or percutaneous coronary revascularization.
- Clinical characteristics that indicated PCI: unstable angina and acute coronary syndrome.
- Urgency of the procedure: elective or urgent.
- Type of lesion according to the American Heart Association classification.
- Use of glycoprotein IIb/IIIa inhibitors, stent diameter, stent length, and procedural success.
- Left ventricular function (by 2D echocardiography).

## RESULTS

The description of patients involved in this study is shown in Table 1. Mean age was 68 years with the predominance of males (80%), history of MI in approximately half of the patients, history of diabetes mellitus in 46% of patients, and history of previous PCI to LAD in 5% of patients. The clinical and angiographic characteristics regarding the percutaneous revascularization procedure are shown in Table 2.

Sixty percent of patients had acute coronary syndrome (ACS), one third had left ventricular systolic dysfunction and the procedure was elective in 69% (n = 103) of the cases. In 47% (n = 67) patients isolated proximal LAD disease was observed.

In 60% (n = 90) of the patients, a second coronary lesion was present and treated during the same procedure. In 50% (n=75) of patient's glycoprotein IIb/IIIa inhibitors were used.

**Table 1: Demographic criteria.**

| Mean age | Female | Hypertension | Dyslipidaemia | Smoker | Diabetes | H/O PCI |
|---|---|---|---|---|---|---|
| 62 years | 56 (37%) | 67 (45%) | 105 (70%) | 79 (53%) | 66 (44%) | 32 (21%) |

**Table 2: Clinical and angiographic characteristics.**

| Characteristics | Number |
|---|---|
| Elective PCI | 103 (69%) |
| ACS | 90 (60%) |
| Isolated proximal LAD disease | 90 (60%) |
| Multivessel PCI | 18 (12%) |
| Angiographic success | 150 (100%) |
| Acute occlusion | 1 (0.6) |
| Xience prime stent | 125 (83%) |
| Promus element stent | 25 (16%) |
| Direct stenting | 46 (31%) |
| Use of Gp 2b/3a inhibiter | 75 (50%) |
| LVEF (less than 50%) | 67 (47%) |

The great majority of the lesions treated were type B2. Xience prime and promus element stents were implanted in all of the cases and TIMI 3 flow with no residual stenosis were achieved in all cases. One case of acute stent thrombosis 30 minutes after PCI was recorded. No periprocedural deaths occurred in the study.

All the patients were clinically followed for one year. No local complications were noted during in hospital stay. One case of acute stent thrombosis was recorded. Four deaths were registered during follow up. Eleven patients were admitted with MI out of which 6 patients underwent repeat PCI due to ISR, 2 patients were sent for CABG (coronary artery bypass grafting) and 3 patients had MI due to another vessel lesion.

Total 15 events were recorded 4 (2.6%) deaths and 11 (7%) MI and TLR was noted in 4% of patients as shown in Table 3 and bar chart 1.

**Table 3 Clinical outcome.**

| MI | ISR | ST | CABG | TLR | DEATH |
|---|---|---|---|---|---|
| 11 (7%) | 6 (4%) | 1 (0.6%) | 2 (1.3%) | 6 (4%) | 4 (2.6%) |

## DISCUSSION

The left anterior descending coronary artery (LAD) is responsible for the blood supply up to 70% of the left ventricular myocardial mass. As a result, proximal LAD coronary artery disease leads to ischemic impairment of a significant myocardial territory, thus contributing to the poor prognosis of individuals with coronary artery disease in this location.[12]

Management of proximal coronary artery disease is important due to the large areas of myocardium that lie downstream of the stenoses. The DES are the main stay in treating patients with flow-limiting coronary lesions.

First-generation DES showed a substantial improvement reduction in restenosis and need for repeat revascularization compared with bare metal stents. However, these first-generation devices failed in adding a major gain in terms of long-term mortality and a major concern remained on long-term safety, in particular, related to late stent thrombosis. The second-generation DES, with novel stent design/material, improved polymer biocompatibility, and novel antiproliferative drugs were developed to improve acute performance and long-term outcomes.[13] In a large overview of comparative trials, treatment with EES significantly reduced the risk of repeat revascularization and definite ST compared with SES (sirolimus eluting stent).[14]

In a previous meta-analysis, Baber et al also demonstrated an inconsistent benefit with EES using stratified analysis, and detected differences in the treatment effect across control non-EES strata, showing reductions in clinical outcomes were substantial in trials versus PES (paclitaxel eluting stent), intermediate versus ZES (zotarolimus eluting stent), and smallest against SES.[15] In our study, the cardiac mortality was observed in 2.6%, ST in 0.6% of cases. Eleven patients were admitted with MI out of which 6 patients underwent repeat PCI due to ISR and 3 patients had MI due to another vessel lesion, 2 patients were sent for CABG. Total 15 events were recorded 4 deaths and 11 MI. TLR was noted in 4% of patients.

## CONCLUSION

Percutaneous coronary intervention in the proximal left anterior descending artery with implantation of drug-eluting stents showed a low need for TLR (4%) in our series of non-selected consecutive patients in one year follow up. No cases of late stent thrombosis were noted. Total MACE of this record (10% at 12 months of clinical follow-up) is consistent with those observed in the large randomized and multi-center studies with drug-eluting stents implanted in the proximal left anterior descending artery.

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