

## Original Article

## Percutaneous Coronary Intervention for Isolated Left Main Coronary Artery Disease: A Single Centre Experience

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### Abstract:

#### Objective:

Isolated left main coronary artery disease (ILMCAD) is not a frequent one. Though coronary artery bypass graft surgery (CABG) was thinks to be the standard treatment for left main coronary stenosis (LMCA). However, in the real world scenario, multiple studies suggests that treatment of patients with isolated left main coronary artery disease (ILMCAD) with percutaneous coronary intervention (PCI) can be a safe & suitable option.

#### Methods:

This prospective observational study was carried out for 1 year between '01st February 2021 to 31st January 2022'. A total of 10 patients presented with Angina or NSTEMI & whom CAG reveals isolated left main coronary artery diseases were enrolled for this study. PCI to Left Main Coronary Artery was done with newer generation DES for all of this patients & six months outcome was recorded.

#### Results:

Mean age of the patients was  $44.1 \pm 6.6$  years. Among them male was 7 (70%), female was 3 (30%). Hypertension (70%) was the most common risk factor followed by smoking (60%), dyslipidemia (60%), diabetes mellitus (50%) and positive family history for IHD (50%). Among the total of 10 patients, 07 (70%) patients had chronic stable angina & 03 (30%) patients had NSTEMI. Ostial left main was involved in 03 (30%) patients, shaft involvement in 03 (30%) patients, 02 (20%) distal left main disease (Medina classification-1,0,0) & whole segment disease in 02 (20%) patients. Mean SYNTAX score was  $11.1 \pm 1.1$  with majority of patients having low SYNTAX score. All patients were treated with newer generation DES implantation. The post procedural outcome was satisfactory in all patients. No patient developed any Major Adverse Cardiovascular Events (MACE) during the study period.

#### Conclusions:

Left main PCI with newer generation DES can a suitable option with favorable outcome to treat the patients who have isolated left main coronary artery disease.

#### Keywords:

ILMCAD- Isolated Left Main Coronary Artery Disease, PCI- Percutaneous Coronary Intervention, CABG- Coronary Artery Bypass Graft.

**Introduction:**

Significant isolated left main coronary artery stenosis (ILMCA) is a life threatening condition. It is found in 3–10% of the patients undergoing coronary angiogram.<sup>1,2</sup> PCI has long been tried as an alternative option in treatment of LM coronary artery disease. PCI with bare metal stents (BMS) were found to have low-procedural complications but they had unacceptably higher rate of repeat revascularization rate.<sup>3-6</sup> Since the advent of drug eluting stents (DES) in 2002, with the promise of vastly reduced rate of in stent restenosis, there has been a resurgence of interest of ILMCA stenting. Several registries from different parts of the world have shown comparable short-term outcomes in terms of death or MI that rivals those of CABG.<sup>7-13</sup> Over the last 20 years, advancement of PCI technique, improvement of stent technology and adjuvant drug therapy has led to progressively improved PCI outcomes for LMCA disease.<sup>14</sup>

In Bangladesh death due to cardiovascular disease is the top most cause of death. With advancing image modalities & newer generation DES, many centers are routinely practicing left main intervention with favorable outcome. Here we present our experience PCI in ILMCA from single centre tertiary care hospital in Gazipur, Bangladesh using DES.

**Methods**

This prospective observational study was carried out for 1 year between '01st February 2021 to 31st January 2022' at Sheikh Fazilatunnessa Mujib Memorial KPJ Specialized Hospital, Gazipur, Dhaka, Bangladesh. A total of 10 patients presented with Angina or NSTEMI & whom CAG reveals isolated left main coronary artery diseases were enrolled for this study. Clinical parameters were recorded. SYNTAX score was calculated for all patients. Then after CAG, PCI to Left Main Coronary Artery was done with newer generation DES for all of this patients having ILMCA Stenosis. Standard techniques were applied for all the cases. Most of the pt got loading dose of Antiplatelets, UF Heparin & Eptifibatide during procedure. All patients were kept on DAPT, Aspirin 150 mg for all along with either Clopidogrel 75 mg or Prasugrel 10 mg. Follow up was done at 2 weeks, 6 weeks, 12 weeks & 24 weeks and outcome is noted.

**Results**

A total of 10 patients with who have ILMCA stenosis found in angiogram & treated with DES were included in the study. Baseline patient characteristics and angiographic characteristics are recorded.

Mean age of the patients was  $44.1 \pm 6.6$  years. Among them male was 7 (70%), female was 3 (30%). Hypertension (70%) was the most common risk factor followed by smoking (60%), dyslipidemia (60%), diabetes mellitus (50%) and positive family history of IHD (50%). **(Figure-1)**

Among the total of 10 patients, 07 (70%) patients had chronic stable angina, 03 (30%) patients had NSTEMI.

Good left ventricular systolic function was present in 8 (80%) patients & 2 (20%) patients had mild dysfunction, no moderate or severe left ventricular systolic dysfunction. Right dominant circulation was 80%, left dominant circulation was 20%. Ostial left main involvement in 03 (30%) patients, shaft involvement in 03 (30%) patients, 02 (20%) distal left main disease (Medina classification-1,0,0) & whole segment disease in 02 (20%) patients. **(Figure-2)**

Mean SYNTAX score of the study population was  $11.1 \pm 1.1$  with majority of patients having low SYNTAX score. All patients were treated with DES implantation. Among them 8 (80%) were Everolimus Eluting Stent & 2 (20%) were Sirolimus Eluting Stent. No Bare Metal Stent was used. **(Figure 3)**

The post procedural outcome was satisfactory. Intravascular Ultrasound (IVUS) was done only in one patient, but for financial & logistic issues IVUS cannot be done in other patients. **(Figure- 4, Figure-5)**

Nine patients was fine with no further symptoms upto 6 months follow up. One patient developed symptoms at the end of 4 months & he had H/O discontinuation of Antiplatelets without notification. Check CAG (coronary angiogram) was done for that patient, which reveals 30-40% stent thrombosis & POBA was done uneventfully. No patient developed any MACE during the study period.

**Discussion**

The LMCA is of importance as it supplies approximately two-thirds of the blood to the heart and almost 100% of the blood flow to the left ventricle. As a result severe LMCA disease will reduce flow in a large portion of the myocardium placing the patient at a risk for life threatening events of LV dysfunction and arrhythmia.<sup>15</sup> The LMCA differs from the other coronary arteries by its relatively greater elastic tissue content which can explain elastic recoil and high restenosis rate following balloon angioplasty.<sup>16</sup>

Coronary artery bypass graft or percutaneous coronary Intervention are the well-known modalities in revascularizing the LM disease. The superiority of CABG and PCI is still debatable, and guideline recommendation has been updated time to time. Recent comparative studies of PCI and surgical revascularization for LM PCI, demonstrated that PCI may be an alternative to CABG in treating LMCA.<sup>21</sup>

The study was conducted with the purpose of analyzing the ILMCA PCI patients in a real world scenario.<sup>17</sup> During hospital stay, no patient had MACE. Several trials have presented outcomes of ILMCA PCI using DES over the recent years.<sup>17-21</sup> Results reported in these studies vary widely due to variation in patient selection and procedural technique. Most of these studies have shown that lesions involving left main ostium and shaft have better outcomes than distal left main lesions in terms of MACE. Significantly higher MACE was demonstrated in emergent or urgent ILMCA PCI, whereas favorable short- and long-term outcomes were shown in elective ILMCA stenting. In our study, most of the patients had origin & shaft. In our study 02 patients had distal lesion. Among these both cases were managed with single stent strategy. No patient developed any peri-procedural major or minor adverse cardiac events like anginal chest pain, arrhythmias, cardiac arrest, cardiogenic shock, Q-wave MI, repeat revascularization and death during their hospital stay. So in this procedural success & in-hospital survival rate was excellent (100%). Though one patient developed symptoms at the end of 4 months possibly because he had discontinued Antiplatelets for his gastrointestinal problem. We have checked coronary which reveals 30-40% stent thrombosis & POBA was done uneventfully & after that patient was asymptomatic.

**Conclusion**

In this study we have found that PCI to isolated left main coronary artery stenosis is a reasonable option. Isolated left main disease is an important predictor of cardiovascular mortality & morbidity. Numbers of studies have shown that PCI to left main coronary artery is non-inferior to CABG. With the use of newer generation DES, In Stent Restenosis (ISR) is significantly reduced with good outcome. Large scale multicenter study is needed to see long term outcome.

**Study limitations**

This is a single centre study with small sample size which prevents us to make any firm conclusion regarding clinical outcomes. Long term outcome is still unknown in this study. Due to financial & logistic issues IVUS guided PCI cannot be done in most of the cases. Comparison of outcome between PCI & CABG was not done.

**Conflicts of interest**

Nothing to declare

**Acknowledgement**

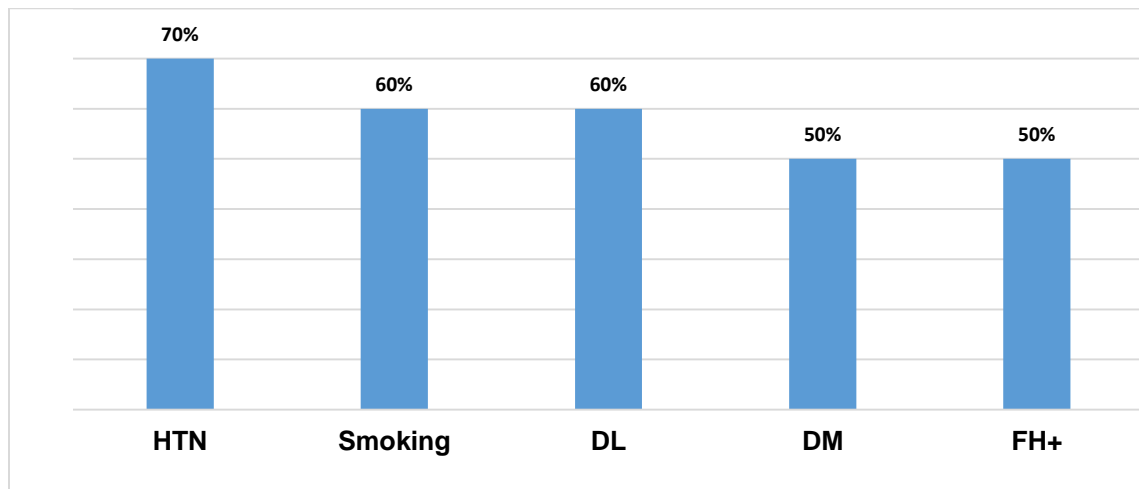
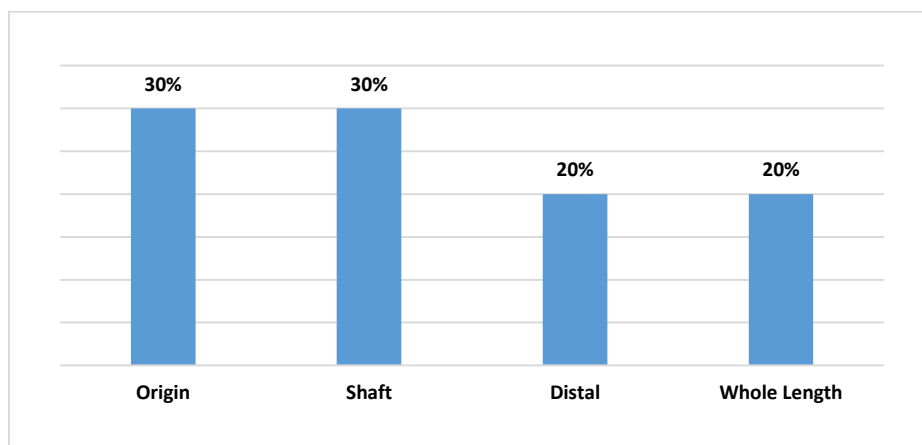
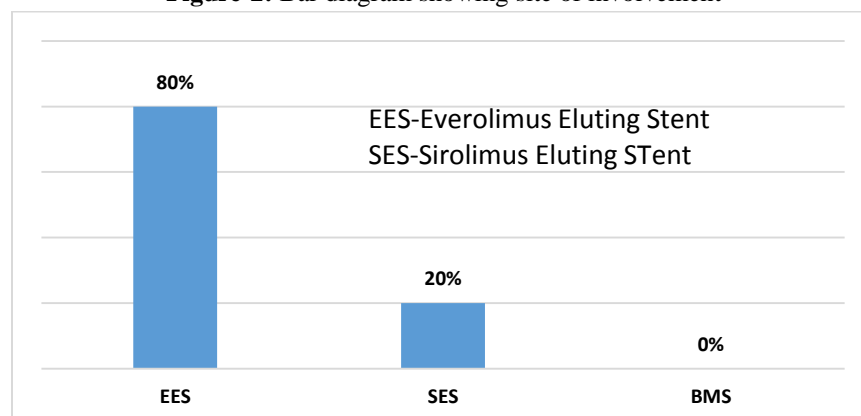
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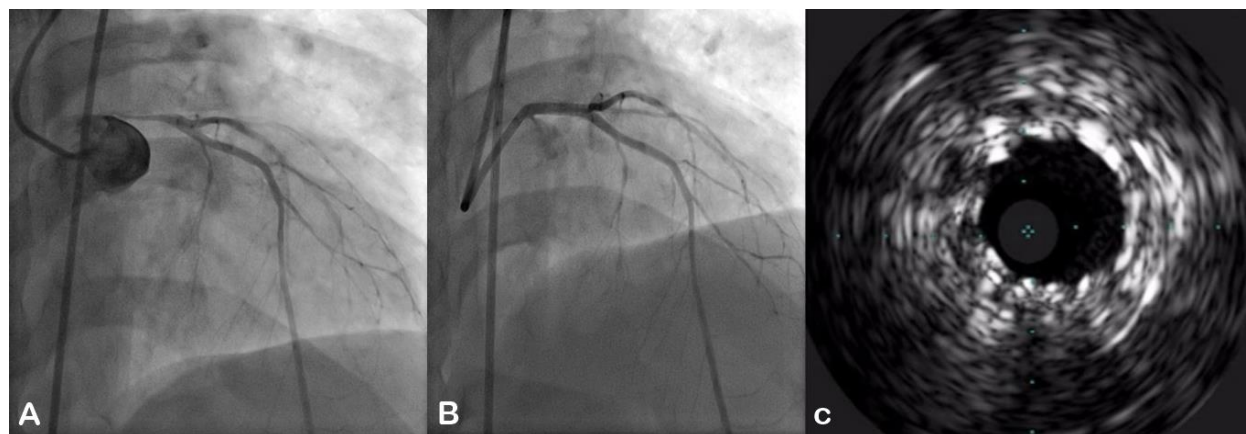
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## Figures/Charts/Images:

**Figure-1:** Bar diagram showing risk factors**Figure-2:** Bar diagram showing site of involvement**Figure-3:** Bar diagram showing types of stents used

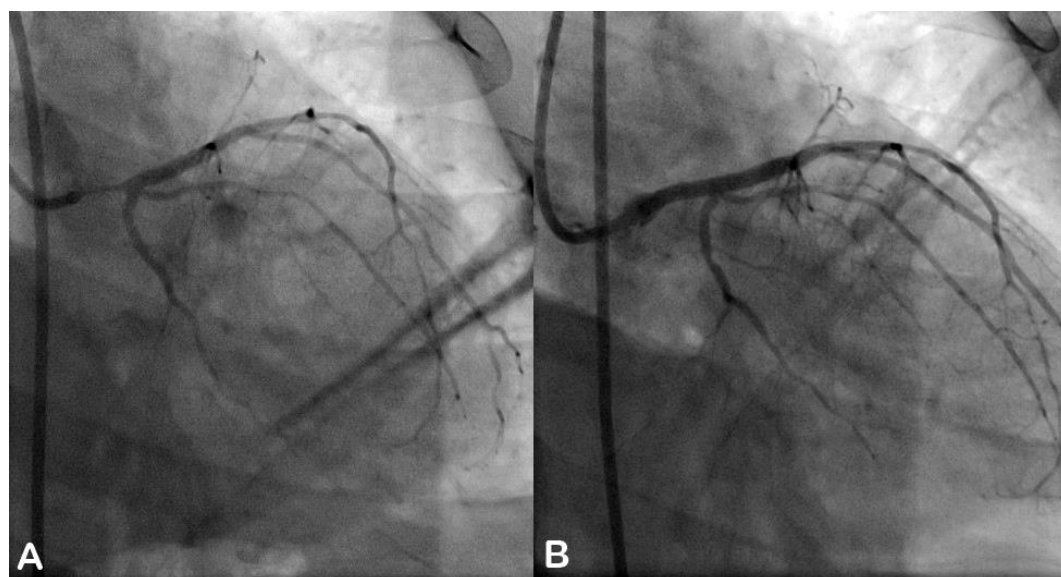


**Figure-4:** Angiography & IVUS Images

A. Coronary angiogram of LMCA showing 95-99% whole segment disease.

B. Final angiographic result was satisfactory.

C. Post IVUS Study (no malposition & well apposed).



**Figure-5:** Angiographic Images

A. Coronary angiogram of LMCA showing 90-95% whole segment disease

B. Final angiographic result with good distal flow.