International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

IVUS and FFR Guided PCI to Left Main Stem

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Abstract: ***Percutaneous coronary intervention (PCI) for left main coronary artery (LMCA) disease presents unique challenges due to its critical role in myocardial perfusion. This manuscript reviews the use of intravascular ultrasound (IVUS) and fractional flow reserve (FFR) in optimizing PCI outcomes for patients with LMCA lesions. By integrating these modalities, clinicians can enhance the assessment of coronary lesions, improve stent selection, and ultimately reduce adverse events.***

Keywords: PCI, LMCA disease, IVUS, FFR, coronary stent optimization

1. Introduction

The left main coronary artery supplies a significant portion of the heart muscle, and lesions in this region can lead to serious clinical consequences. Traditional angiography may not always provide adequate information regarding lesion significance and anatomy. The incorporation of IVUS and FFR into the PCI workflow offers a more comprehensive approach to managing LMCA disease.

IVUS (intravascular ultrasound) and FFR (fractional flow reserve) are valuable tools for guiding PCI (percutaneous coronary intervention) in left main coronary artery disease.

IVUS provides detailed images of the coronary arteries, allowing for assessment of plaque composition and vessel size, which can inform stent selection and placement.

FFR measures the pressure difference across a coronary lesion, helping to determine the significance of the blockage. In the context of the left main stem, FFR can clarify whether intervention is necessary, especially when lesions are ambiguous on angiography.

Together, these techniques enhance decision - making, optimize patient outcomes, and reduce complications in high - risk scenarios.

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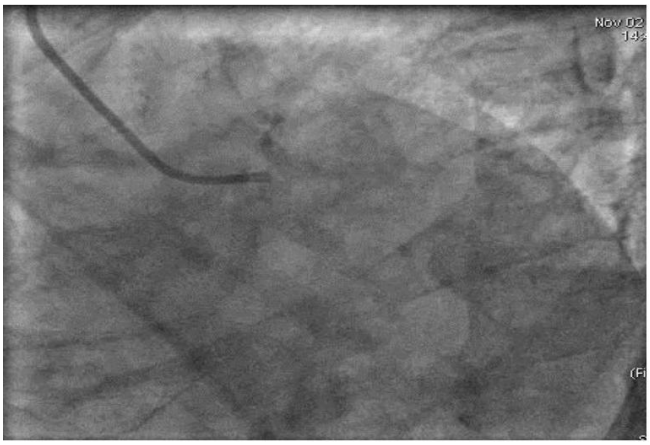
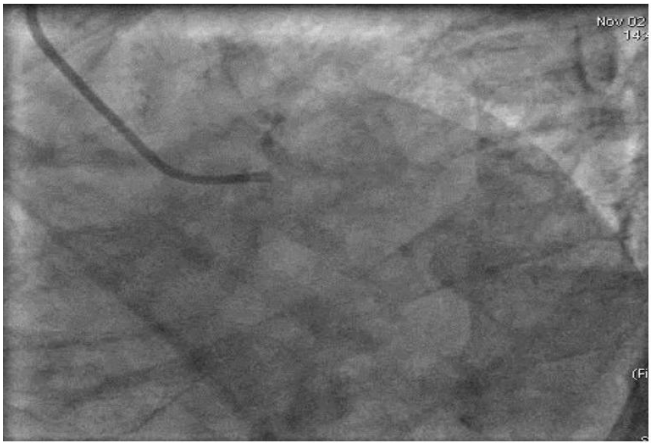
2. Case History

85 yr old Man, Diabetic, Creatinine 1.1, Good LV function. Progressively worsening Angina for 4 months. Pain even on walking few meters.

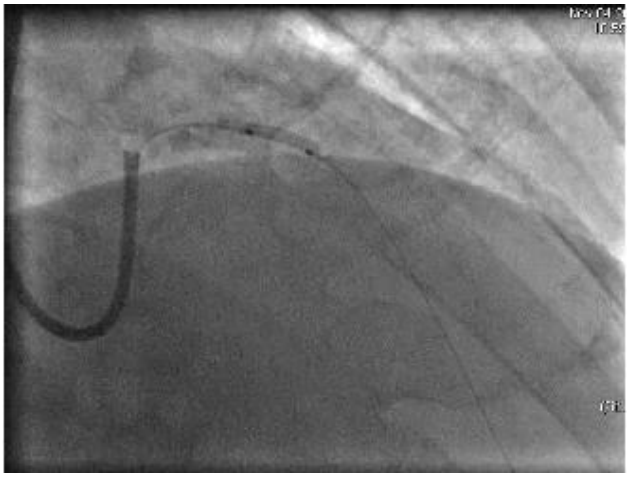
Angiogram

Moderate LMS, Critical osteal LAD disease. Calcified, Dominant Circumflex ostium not diseased. Distal, vessel disease, RCA small and diseased



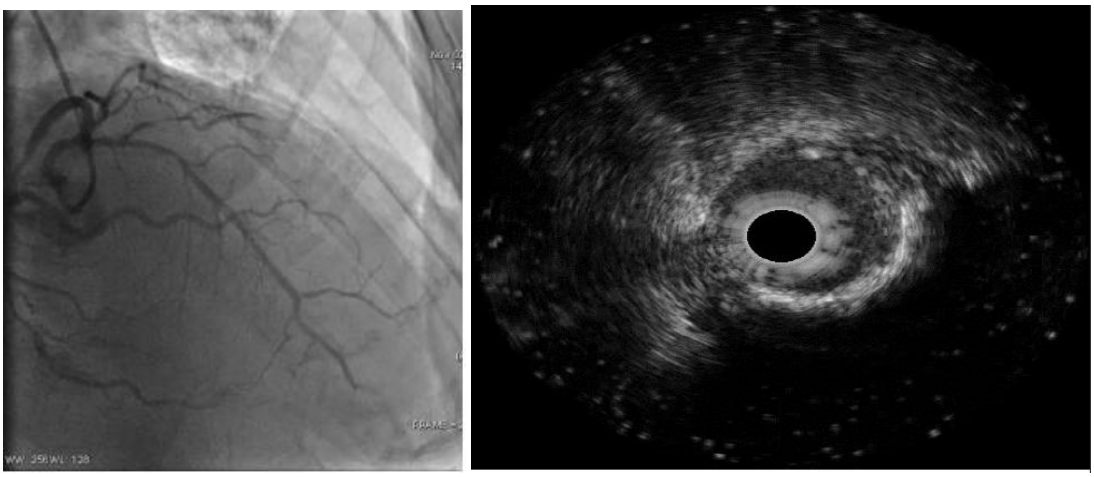


PCI to LAD and LMS

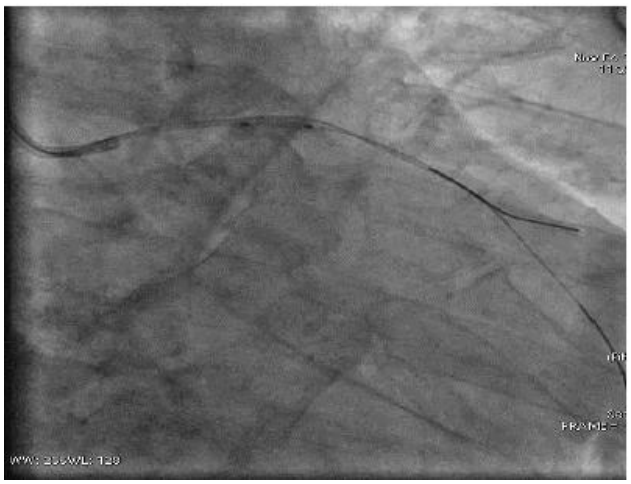


Rt. Radial Artery - 6fr XB 3.0, Runthrough wire to LAD, Predil 2.25x 15 NC, IVUS

IVUS

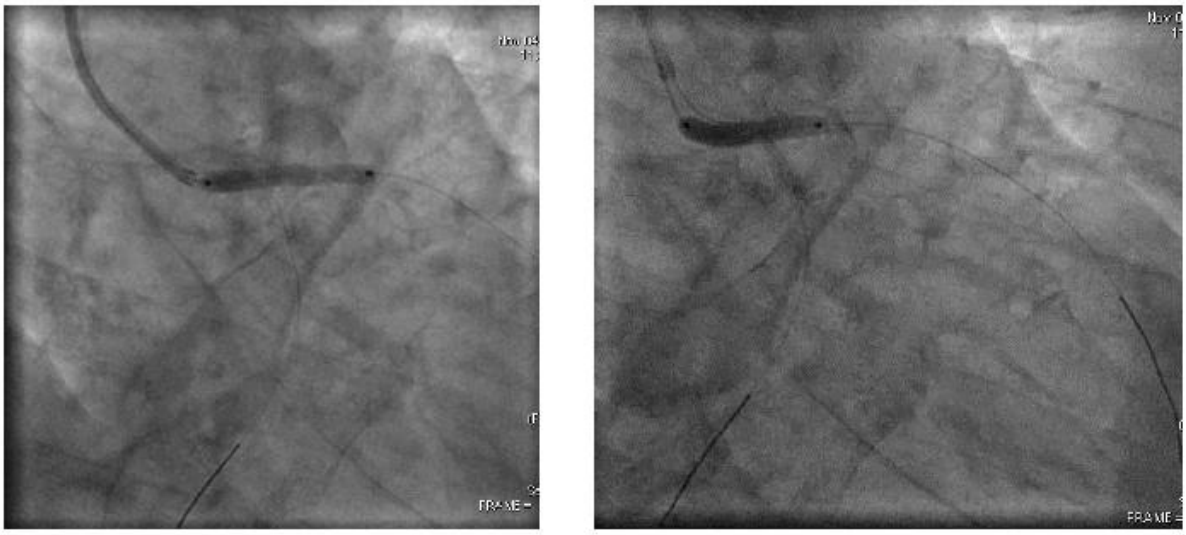


Home made scoring balloon with NC and 2 buddy wires



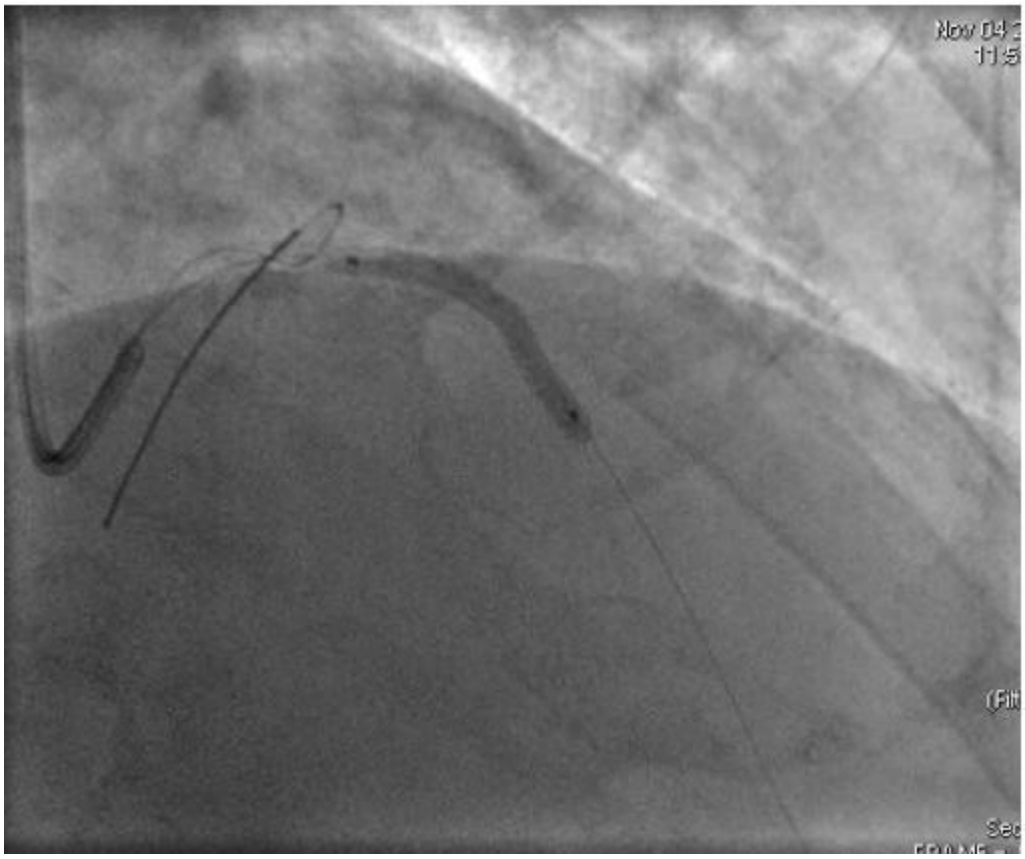
2.5 mm Saphire NC balloon dilated 24 atm with 2 buddy wires

Rinato Wire in Cx for guide stability.3x24 Promus Premier DES to LMS - LAD[at]11 atm



[at]18 atm osteal flare

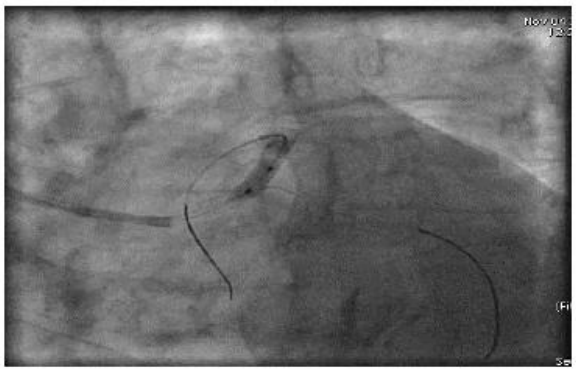
Overlapping 2.25x23 Xience Prime DES mid LAD[at]10 atm

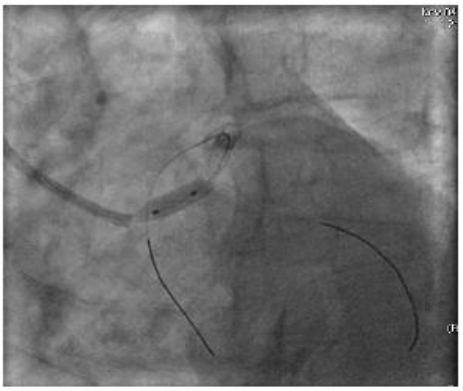


Circumflex wire removed

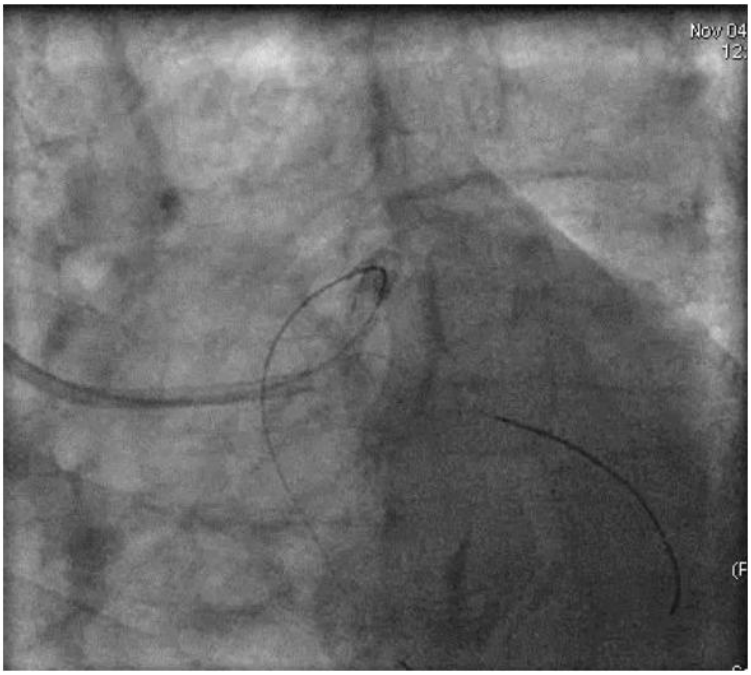
Serial Post dilatation
2.5x15 Saphire NC[at]24atm Mid LAD, 3.0 x12 Saphire NC[at]24 atm Prox/Mid LAD, 3.5x 8 Saphire NC[at]16 atm to prox LAD and LMS, 4.0x 8 Saphire NC[at]12 atm to LMS & osteal flare up, Circumflex was rewired with same Rinato wire

After Cx rewiring
3.5 NC[at]24 atm 4.0 NC[at]24 atm

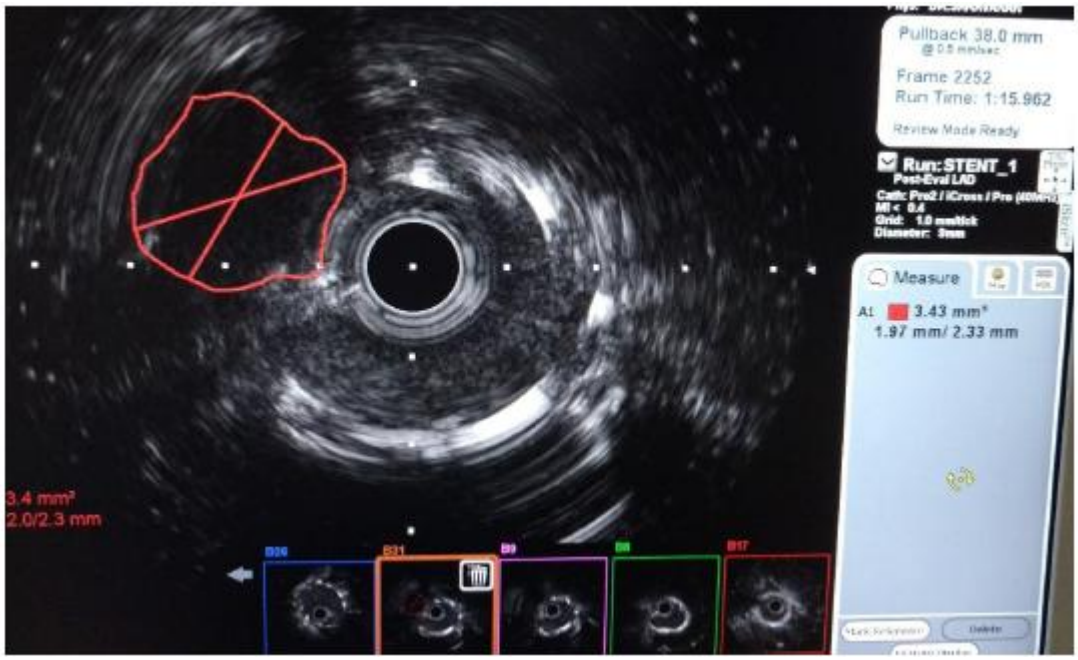




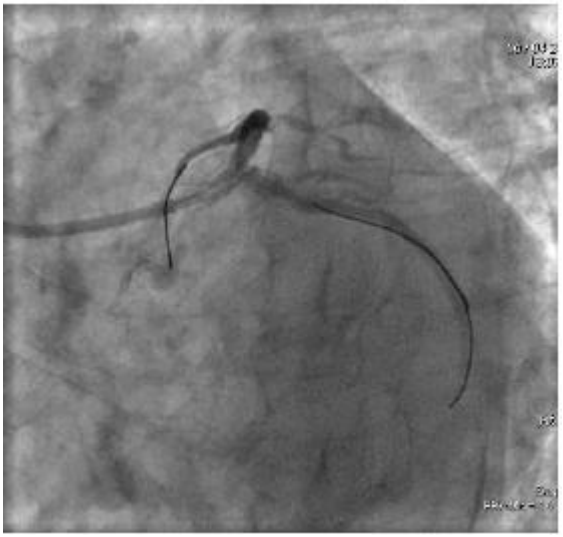
Osteal Cx pinched



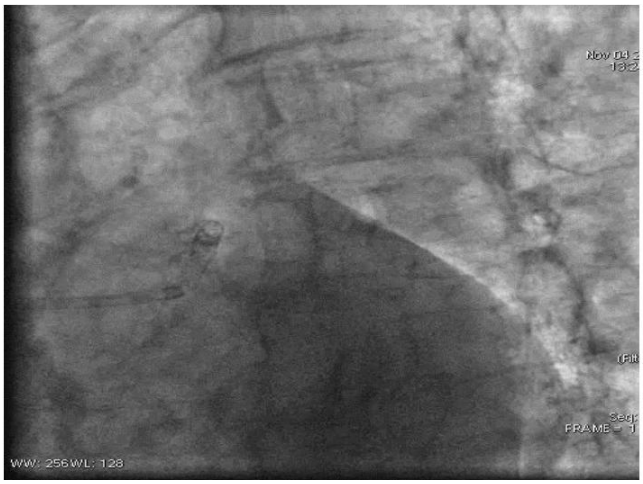
Ostium of Cx not clearly profiled in IVUS pullback of LAD

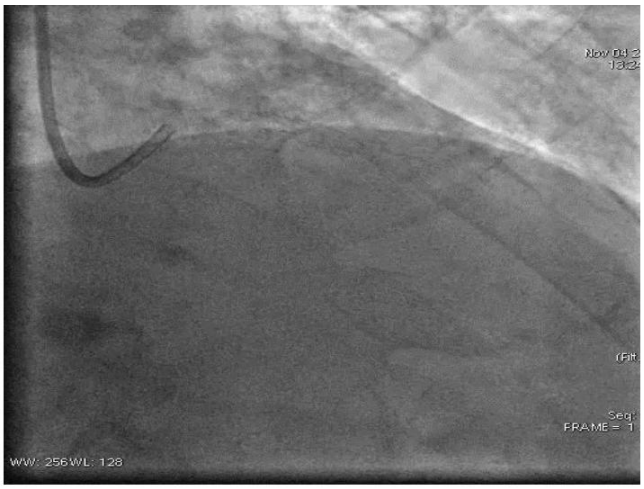


FFR



- Pressure wire to Cx
- 60 mic, 100 mic, 120 mic IC Adenosine given
- Good Consistent hyperemia achieved
- FFR in mid circumflex= 0.89
- Not ischaemic





3. Conclusion

IVUS to guide intervention to get optimal result. FFR to decide intervention to side branch –major circumflex. Avoiding unnecessary kissing balloon /stent to circumflex and avoiding distorting the main stent.

The integration of IVUS and FFR in guiding PCI for left main coronary artery disease represents a significant advancement in interventional cardiology. By utilizing these tools, clinicians can make more informed decisions, potentially improving patient outcomes and reducing procedural risks

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