

Frequency Domain Optical Coherence Tomography for the evaluation of Left Main Coronary Artery Disease.

Comparison of two different pull backs from the daughter vessels

D. Vlad, K. Bouki, D. Tsoukalas, N. Goulas, D. Varvarousis, M. Gavriilidis, K. Kastritsis, T. Apostolou.
General Hospital of Nikea, Pireaus, Greece

I have no conflict of interest

Background

- Fourier-Domain Optical Coherence Tomography (FD-OCT) provides high resolution images of the coronary arteries.
- It has already been used to assess the severity of coronary artery stenoses in comparison with IVUS and FFR.

Background

- OCT has the disadvantage of the need for full blood displacement by contrast injection during image acquisition, making difficult the imaging of large vessels with proximal location such as Left Main (LM).

Background

- FD-OCT imaging for non-ostial LM lesions is feasible using particular tricks like coaxial coronary intubation and appropriate contrast medium flow during scanning.
- The LM bifurcation is usually perfectly evaluated by FD-OCT.

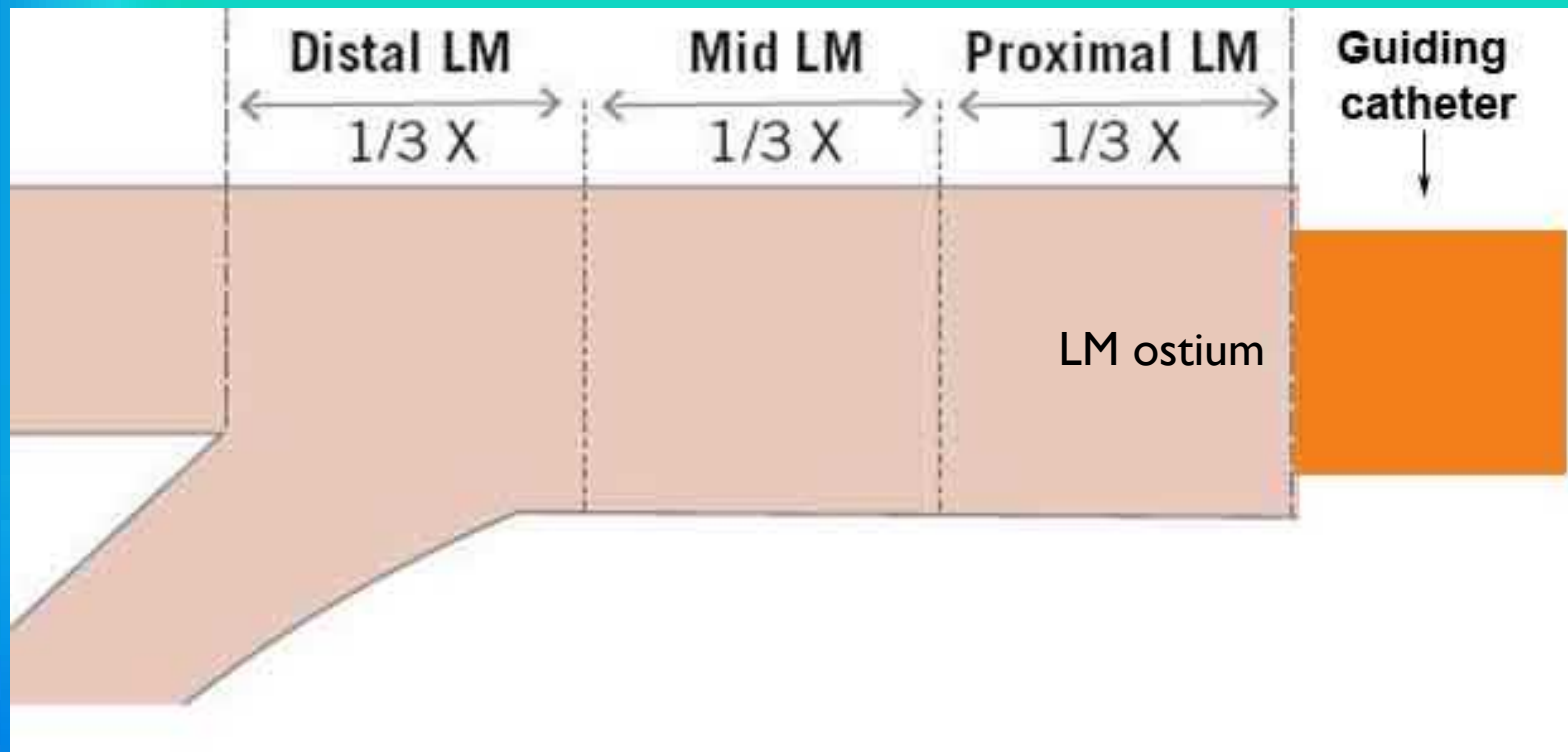
Purpose

- The assessment of LM coronary artery lesions by FD-OCT even in the ostium of the LM
- The comparison of measurements between different pull-backs from both daughter vessels, left anterior descending artery (LAD) and left circumflex artery (LCX).

Methods

- We prospectively enrolled 35 patients with LM coronary artery disease (20-80% diameter stenosis by angiographic visual estimation)
- In each patient, double FD-OCT imaging of the LM was performed from both LAD and LCx pull-backs.

Methods



Methods

Angiographic measurements:

- Reference Lumen Diameter (RLD),
- Minimal Lumen Diameter (MLD),
- Percent diameter stenosis (%DS)
- LM Length

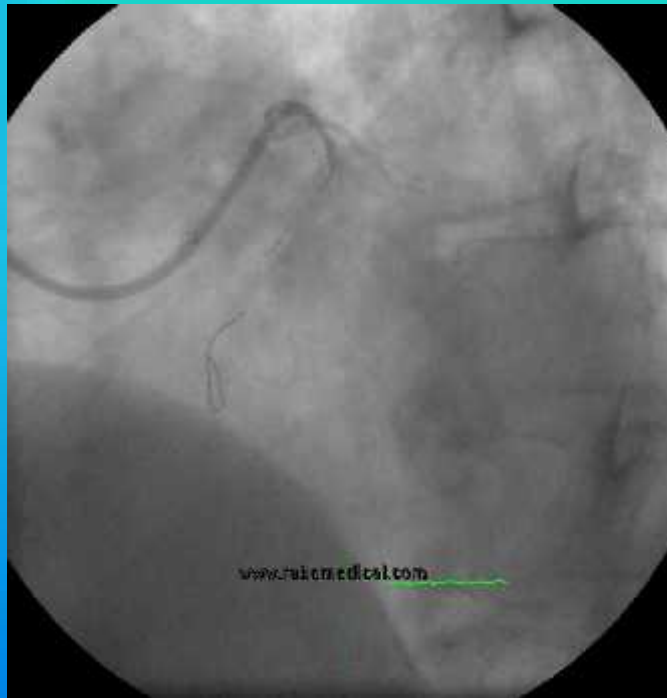
Methods

The following parameters were measured:

- LM length
- Reference Lumen Area (RLA),
- Minimum Lumen Area (MLA),
- Reference Lumen Diameter (RLD) ,
- Minimum Lumen Diameter (MLD),
- % Area Stenosis (AS),
- % Diameter Stenosis (DS)

Methods

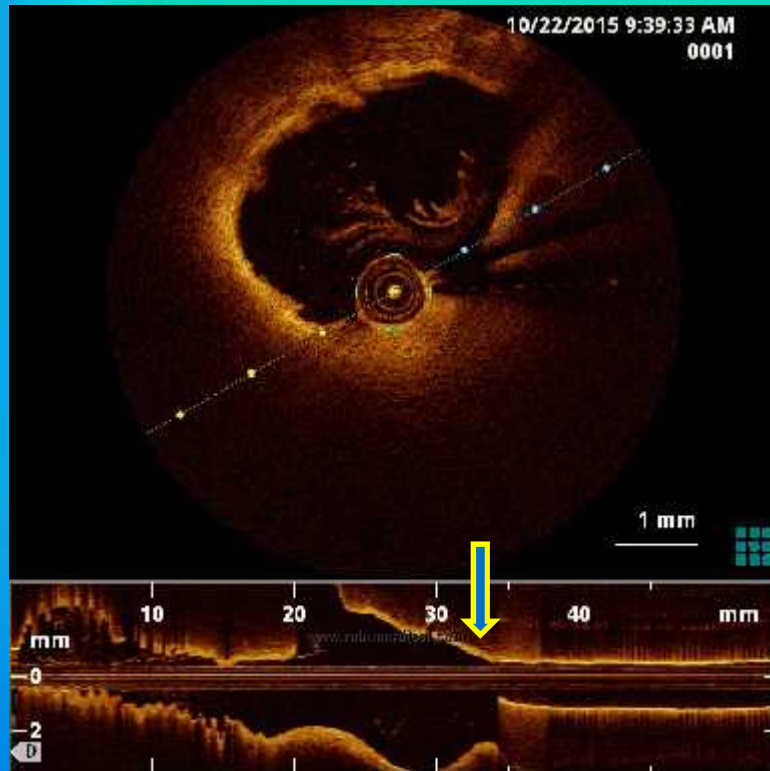
LAO projection of the LCA with the OCT catheter in LAD



LAO projection of the LCA with the OCT catheter in LCX



Methods



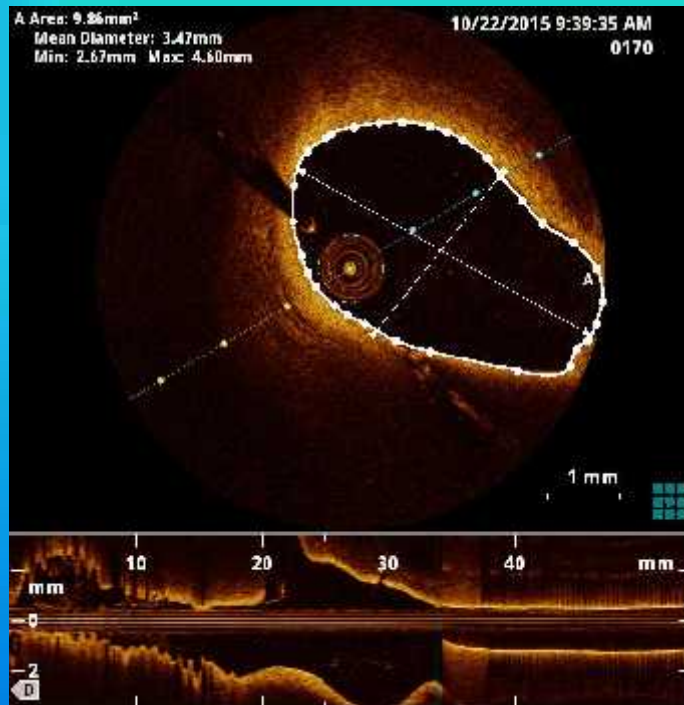
Pull-back from LAD



Pull-back from LCX

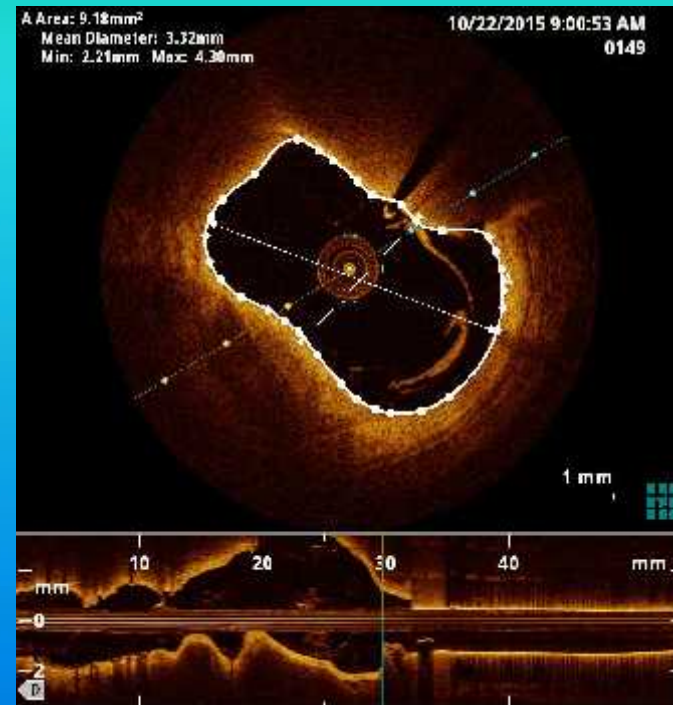
Methods

LMCA



Pull-back from LAD

LMCA



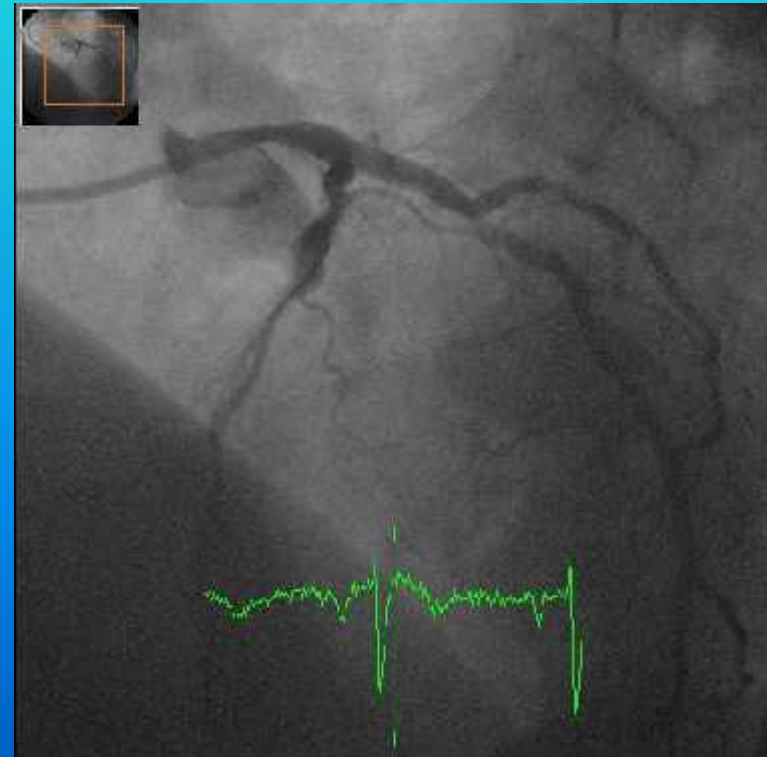
Pull-back from LCX

Results

- Number of repeated runs and total amount of contrast used did not differ significantly between LAD and LCx pull-backs in order to visualize the entire length of the LM ($3,2 \pm 1,4$ runs vs. $3,1 \pm 1,6$ runs respectively, $p=ns$ and $36,3 \pm 14,5$ ml vs. $35,3 \pm 16,5$ ml, respectively, $p=ns$).

Results

- Ostial (proximal third of LM) stenosis was present in 10/35 (28%) patients.
- FD-OCT provided adequate visualization of the LM ostium in all the 10/10 (100%) patients with ostial lesion, either from LAD or from LCx or from both pull-backs.



RESULTS

	Pull- back LAD	Pull-back LCx	Absolute difference	Intraclass correlation coefficient, (CI)	P value
LM Length (mm)	9,21±4,06	10,47±3,81	1,25±2,30	0,88 (0,71-0,94)	0,000
Reference lumen area (mm)	14,13±4,75	14,09±4,99	0,04±0,99	0,99 (0,98-0,99)	0,000
Minimum lumen area (mm)	5,50±2,02	5,98±1,98	0,47±0,98	0,92 (0,81-0,96)	0,000
Reference lumen diameter (mm)	4,14±0,63	4,16±0,76	0,02±0,24	0,97 (0,94-0,98)	0,000
Minimum lumen diameter (mm)	2,29±0,55	2,40±0,56	0,10±0,40	0,84 (0,67-0,92)	0,000
% area stenosis	58,54±13,80	53,48±16,17	5,05±9,44	0,86 (0,65-0,94)	0,000
% diameter stenosis	43,33±13,33	40,23±11,23	3,09±10,16	0,78 (0,54-0,90)	0,000

Conclusions

- FD-OCT is feasible and effective for the imaging of LM lesions even in the ostium of the vessel.
- Pull-backs either from LAD or from LCx provide very similar results and thus both vessels can be used for the assessment of the LM.