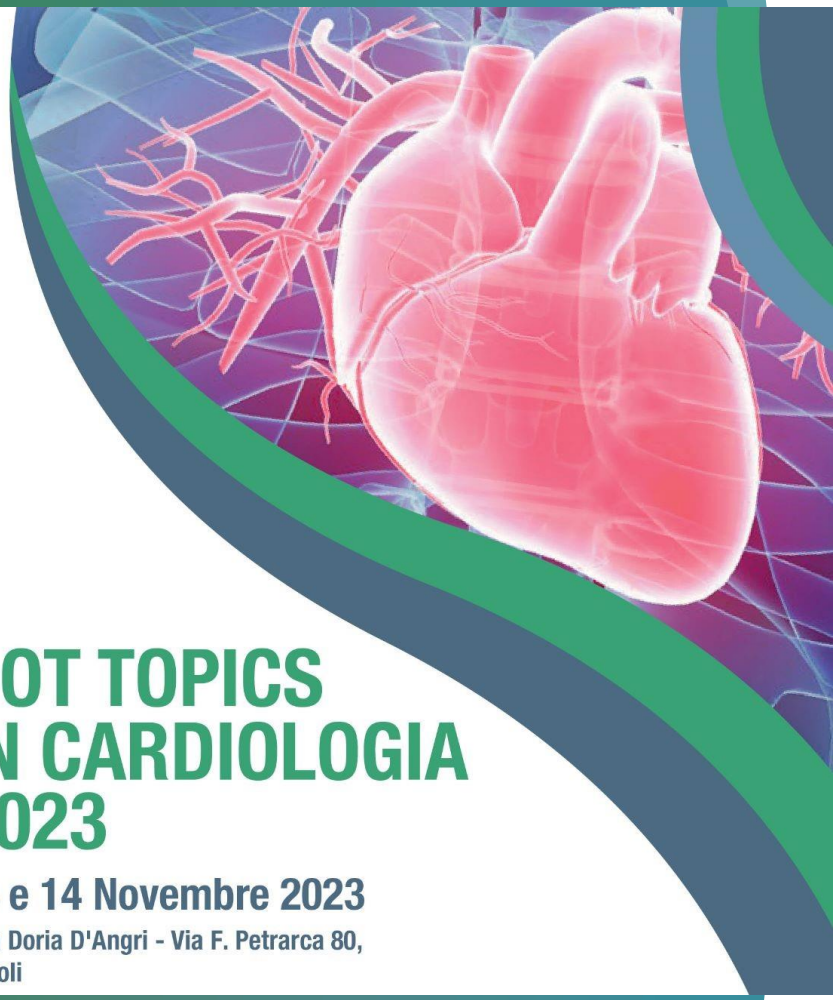

HOT TOPICS
IN CARDIOLOGIA
2023

13 e 14 Novembre 2023

Villa Doria D'Angri - Via F. Petrarca 80,
Napoli

L'EVOLUZIONE DEL TRATTAMENTO DELLA PATOLOGIA DEL TRONCO COMUNE IN CARDIOLOGIA INTERVENTISTICA

Dott. Andrea Mariani

Università degli Studi di Napoli Federico II

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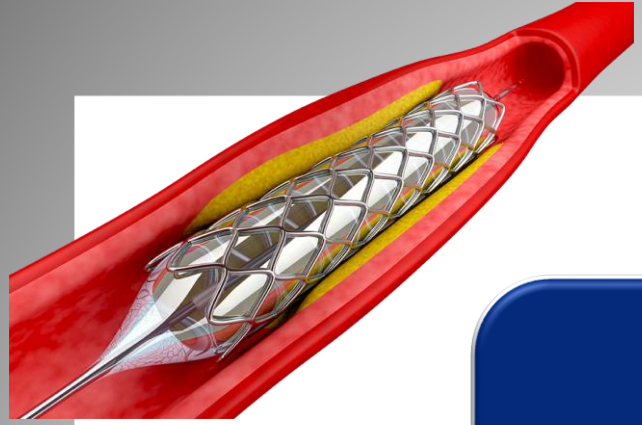
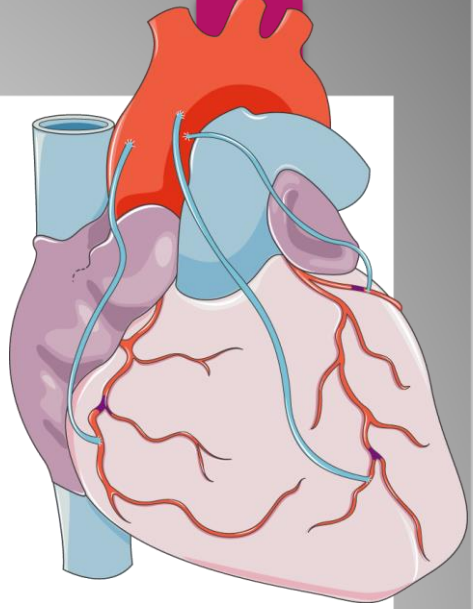


LMCA DISEASE



- PREVALENCE AND ANATOMY
- PAST
- PRESENT
- TECHNICAL ASPECTS

PREVALENCE AND ANATOMY

- ***Significant (>50% of stenosis) unprotected left main coronary artery (ULMCA) disease occurs in 5-7% of patients undergoing coronary angiography.***

Taylor HA et al. Asymptomatic left main coronary artery disease in the Coronary artery Surgery Study (CASS) Registry. Circulation. 1989.

- ***The left main stem (LMS) supplies 84% of the blood flow to the heart in a right dominant system (with 16% supplied by the right coronary artery [RCA]) and 100% of the blood flow to the heart in a left dominant system.***

Sianos G et al. The SYNTAX Score: an angiographic tool grading the complexity of coronary artery disease. EuroIntervention. 2005.

- ***If left untreated it is associated with 50% five-year mortality.***

Yusuf S et al. Effect of coronary artery bypass graft surgery on survival: Overview of 10-year results from randomised trials by the Coronary Artery Bypass Graft Surgery Trialists Collaboration. Lancet. 1994.

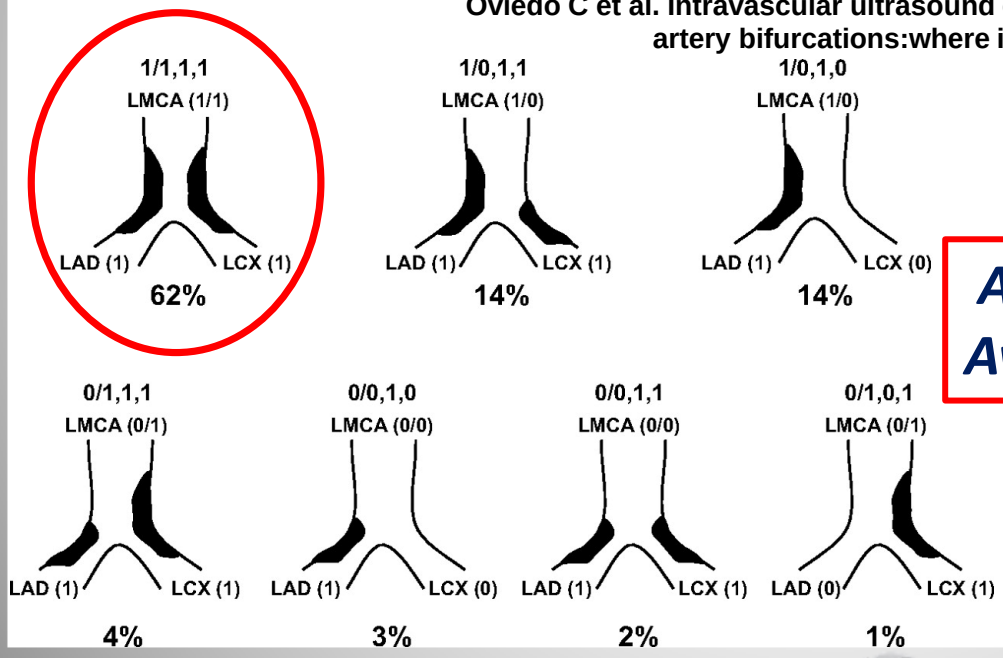
PREVALENCE AND ANATOMY

- *LMS can be divided in ostial, mid- and distal portion; the latter in 2/3 of pts bifurcates into LAD and LCx, in 1/3 of pts LMS bifurcates into LAD, LCx and Ramus Intermedius.*

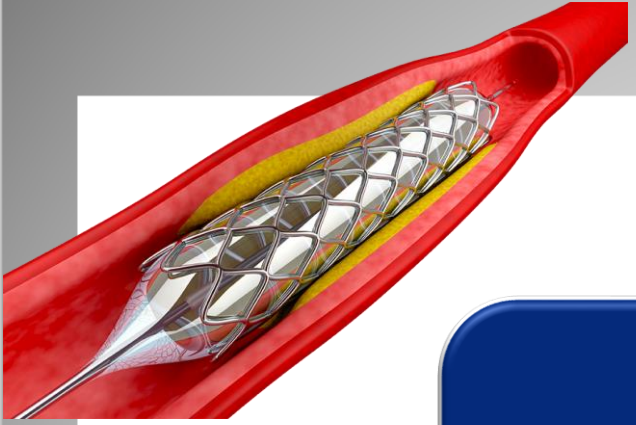
Reig J et al. Main trunk of the left coronary artery: anatomic study of the parameters of clinical interest. Clin Anat. 2004.

- *IVUS studies demonstrated that atherosclerotic plaques are diffuse, sparing the carina, with 62% of cases Medina 1,1,1.*

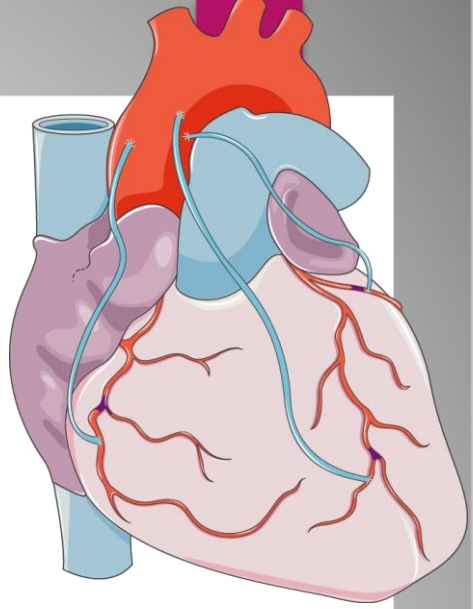
Oviedo C et al. Intravascular ultrasound classification of plaque distribution in left main coronary artery bifurcations:where is the plaque really located?Circ Cardiovasc Interv. 2010.



Average length: 10.8±5.2 mm
Average diameter: 4.9±0.8 mm



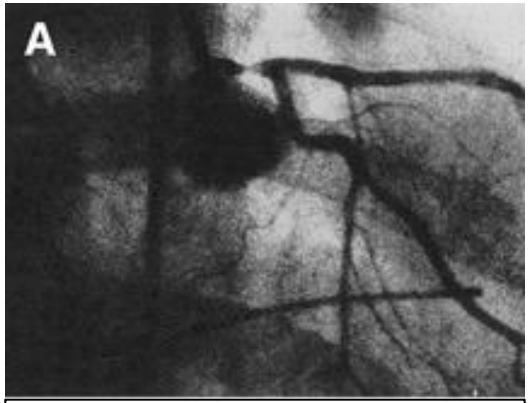
LMCA DISEASE



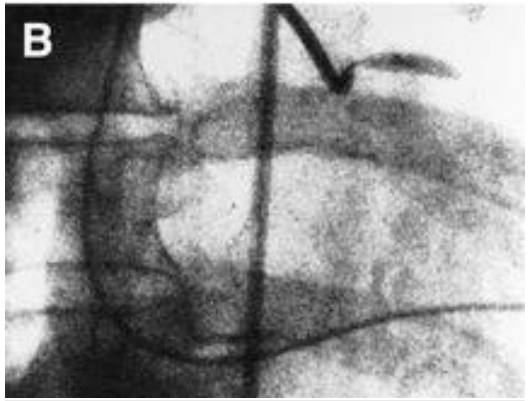
- PREVALENCE AND ANATOMY
- PAST
- PRESENT
- TECHNICAL ASPECTS

THE PAST

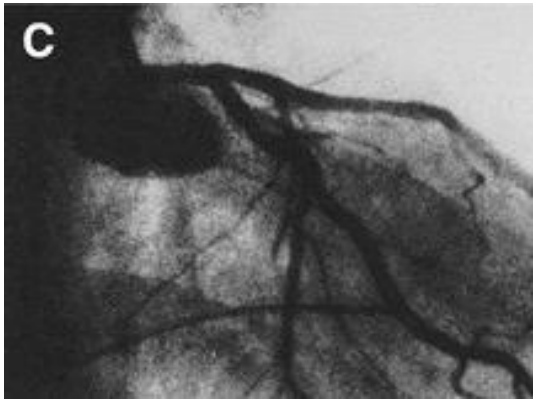
- *Historically, coronary artery bypass grafting (CABG) surgery has been the gold standard treatment for left main coronary artery (LMCA) disease.*
- *In 1977 Andreas Grüntzig performed the first LM PCI using plain old balloon angioplasty (POBA).*



80% stenosis of LMCA



POBA



Final result

Takaro T et al. The VA cooperative randomized study of surgery for coronary arterial occlusive disease II. Subgroup with significant left main lesions.Circulation. 1976.
Grüntzig AR et al. Nonoperative dilatation of coronary-artery stenosis: percutaneous transluminal coronary angioplasty. N Engl J Med. 1979.

THE RAPID EVOLUTION OF PCI

Bennett J et al. Percutaneous coronary intervention, a historical perspective looking to the future. J Thorac Dis. 2013.

From 2005 ESC guidelines…

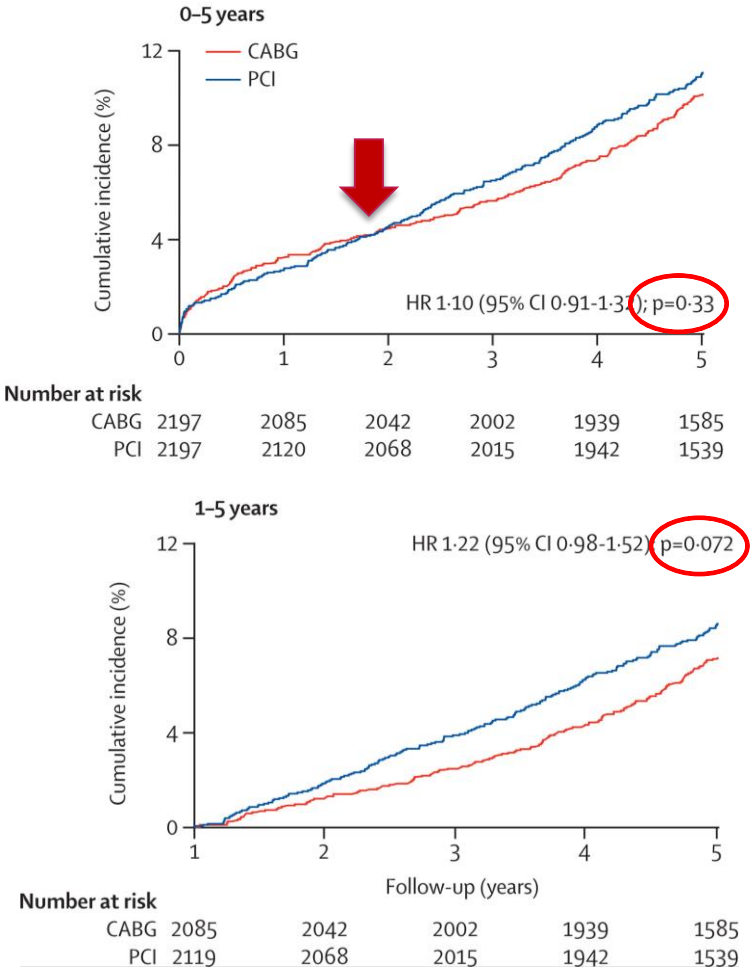
Stenting for unprotected LM disease should only be considered in the absence of other revascularization options.[36] Therefore, PCI can be recommended in these subsets when bypass surgery has a very high perioperative risk (e.g. EuroSCORE>10%). Initial data on the use of drug-eluting stents in unprotected LM disease seem promising.[37,38] *(Recommendation for PCI in patients with unprotected left main stenosis in the absence of other revascularization options: IIb C).*

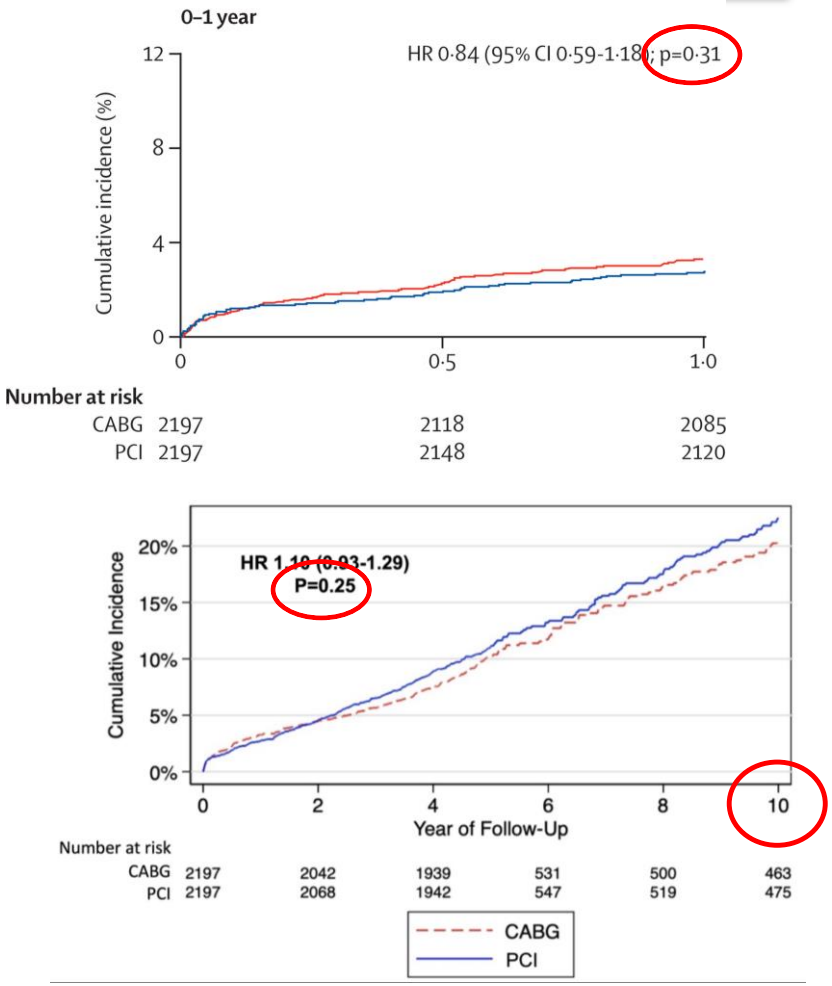
Recommendation	Class	Level
PCI of ULMCA may be performed only in the absence of other revascularization options.	**IIb**	**C**

Silber S et al. Guidelines for Percutaneous Coronary Interventions: The Task Force for Percutaneous Coronary Interventions of the European Society of Cardiology, European Heart Journal. 2005.

CABG vs. PCI

All-cause mortality (primary endpoint)



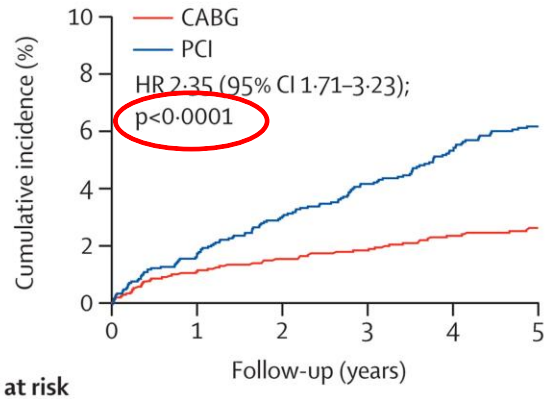


Sabatine MS et al. Percutaneous coronary intervention with drug-eluting stents versus coronary artery bypass grafting in left main coronary artery disease: an individual patient data meta-analysis. The Lancet. 2021.

CABG vs. PCI

Secondary endpoints

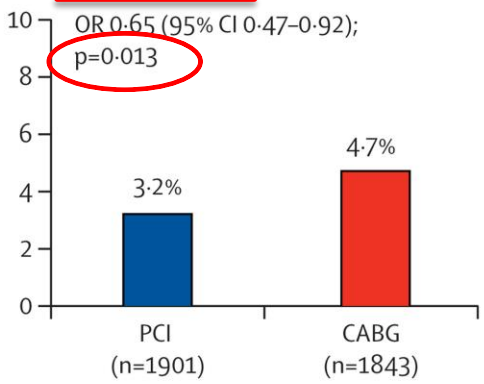
Spontaneous myocardial infarction



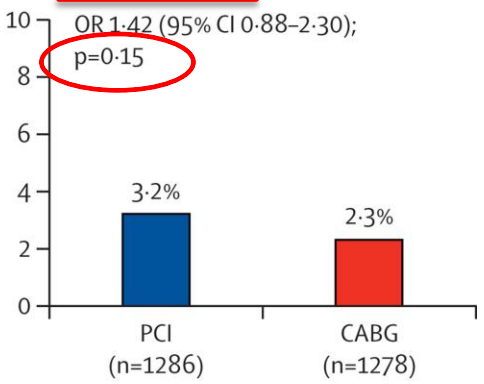
Number at risk

CABG	2197	2054	2000	1954	1884	1450
PCI	2197	2090	2012	1939	1848	1364

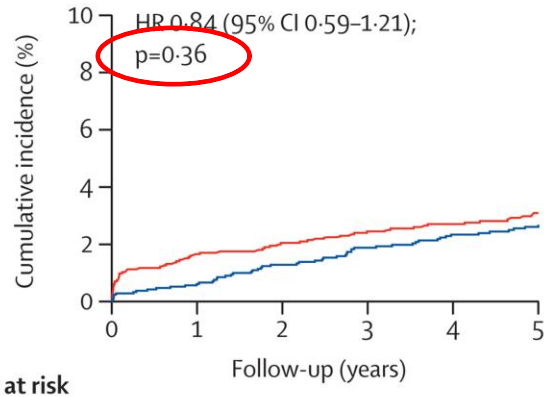
Procedural myocardial infarction (protocol definition)



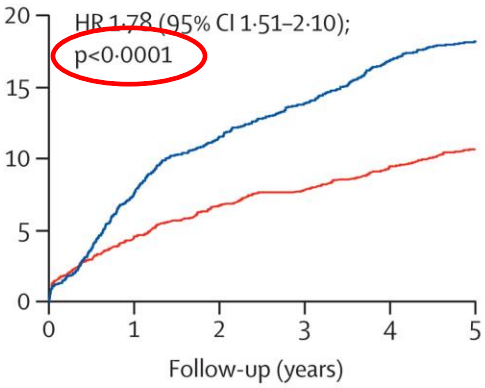
Procedural myocardial infarction (universal definition)



Stroke



Repeat revascularisation



Number at risk

CABG	2197	2049	1998	1953	1885	1451
PCI	2197	2109	2045	1984	1902	1405
	2197	1988	1900	1842	1749	
	2197	1972	1838	1745	1624	

Sabatine MS et al. Percutaneous coronary intervention with drug-eluting stents versus coronary artery bypass grafting in left main coronary artery disease: an individual patient data meta-analysis. The Lancet. 2021.

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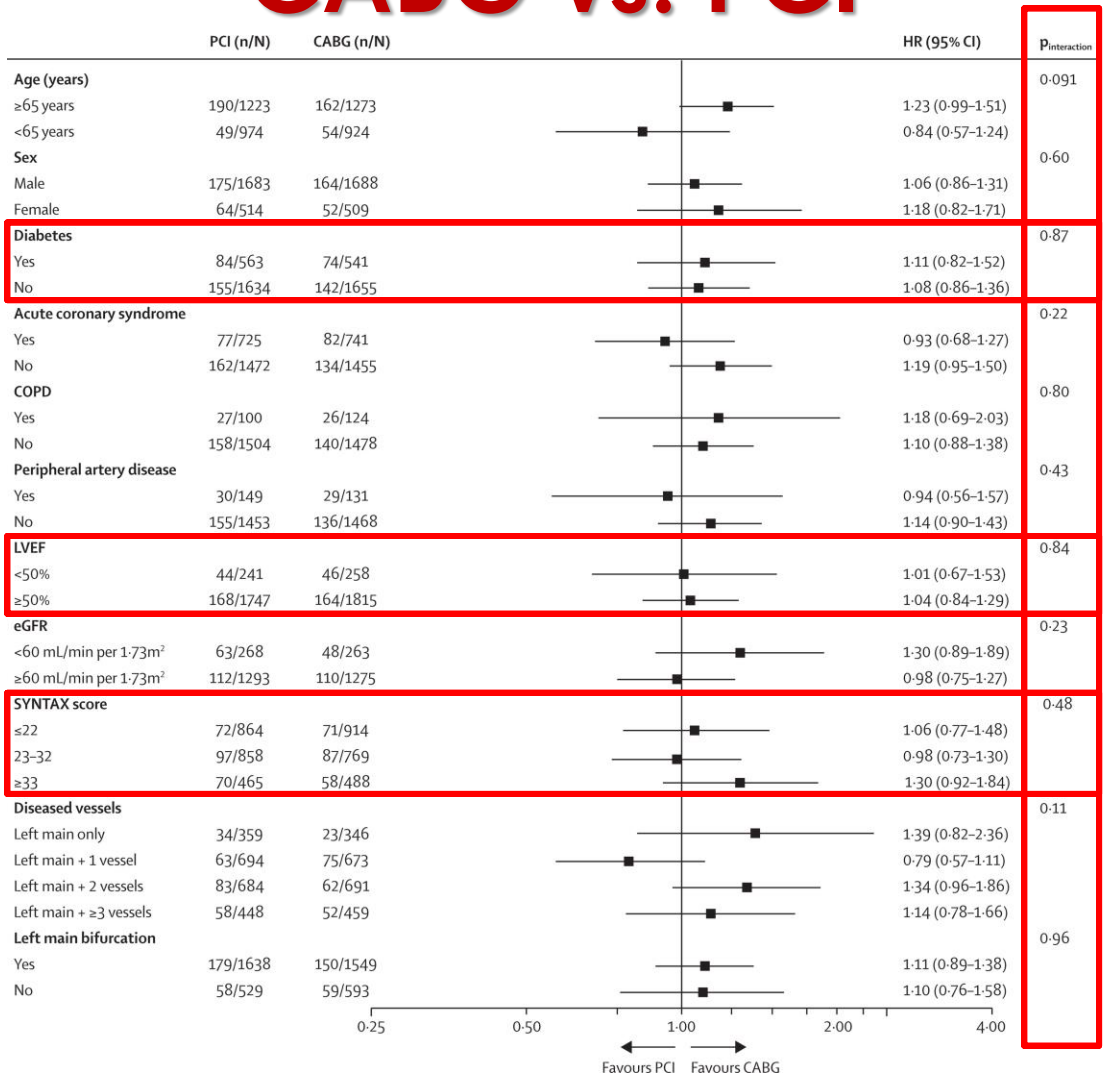
CABG vs. PCI



Sabatine MS et al. Percutaneous coronary intervention with drug-eluting stents versus coronary artery bypass grafting in left main coronary artery disease: an individual patient data meta-analysis. The Lancet. 2021.

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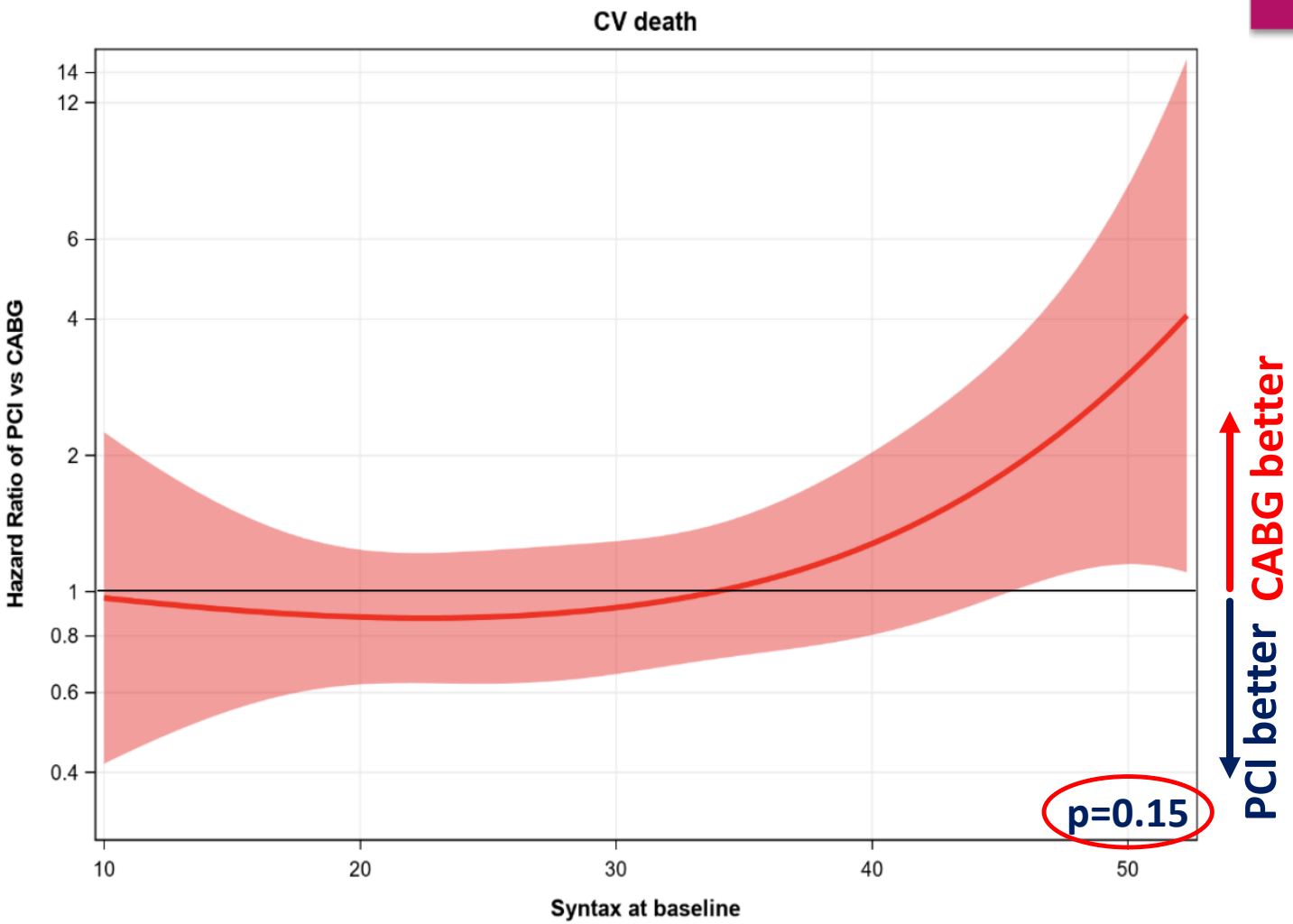
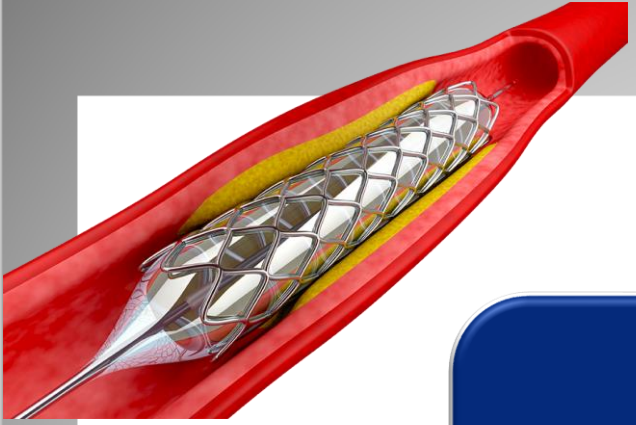
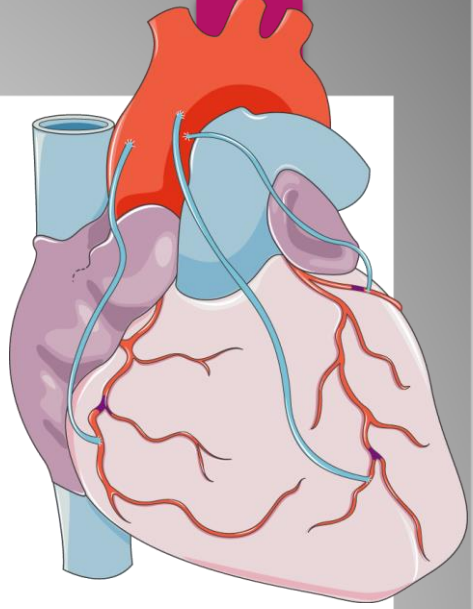
CABG vs. PCI



Adapted from Sabatine MS et al. Percutaneous coronary intervention with drug-eluting stents versus coronary artery bypass grafting in left main coronary artery disease: an individual patient data meta-analysis. The Lancet. 2021.



LMCA DISEASE



- PREVALENCE AND ANATOMY
- PAST
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- TECHNICAL ASPECTS

New European Guidelines

Recommendations according to extent of CAD	CABG		PCI	
	Class	Level	Class	Level
Left main CAD				
Left main disease with low SYNTAX score (0-22).	I	A	I	A
Left main disease with intermediate SYNTAX score (23-32).	I	A	IIa	A
Left main disease with high SYNTAX score (≥33).[a]	I	A	III	B

2018

Neumann F et al. 2018 ESC/EACTS Guidelines on myocardial revascularization. European Heart Journal. 2019.

...To 2022 ESC TF review

2022

Recommendation	CABG		PCI	
	Class[a]	Level[b]	Class[a]	Level[b]
Left main disease with low or intermediate SYNTAX score (0–32).	I	A	IIa	A

Byrne RA et al. 2022 Joint ESC/EACTS review of the 2018 guideline recommendations on the revascularization of left main coronary artery disease in patients at low surgical risk and anatomy suitable for PCI or CABG. European Heart Journal. 2023.

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AMERICAN GUIDELINES

2021

Left main CAD		
1	B-R	3. In patients with SIHD and significant left main stenosis, CABG is recommended to improve survival.[9-12]
2a	B-NR	4. In selected patients with SIHD and significant left main stenosis for whom PCI can provide equivalent revascularization to that possible with CABG, PCI is reasonable to improve survival.[9]

NO MORE SYNTAX SCORE!

Lawton JS et al. 2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Circulation. 2021.

CABG vs. PCI

Heart Team

		Favours PCI	Favours CABG
Clinical characteristics	Advanced age/frailty/reduced life expectancy	✓	
	Severe co-morbidity (not adequately reflected by scores)	✓	
	High surgical risk (STS PROM score)	✓	
	Reduced LVEF <35%		✓
	Diabetes		✓
	Contraindication for DAPT		✓
	Recurrent diffuse in-stent restenosis		✓
	Prior CABG with patent LIMA-LAD graft	✓	
Anatomical and Technical aspects	Ostial or mid-shaft lesion	✓	
	Distal or bifurcation lesion		✓
	Presence of multivessel disease		✓
	High anatomic complexity (e.g. SYNTAX score >32)		✓
	Anatomy likely resulting in incomplete revascularization with PCI		✓
	Occluded dominant graftable right coronary artery		✓
	Severely calcified coronary artery lesions limiting lesion expansion		✓
	Sequelae of chest radiation	✓	
	Severe chest deformity	✓	
	Porcelain aorta (if local expertise with OPCAB with anaortic grafting not available)	✓	
	Need for concomitant cardiac surgery or surgery of ascending aorta		✓

+ Patient Preference

Byrne RA et al. 2022 Joint ESC/EACTS review of the 2018 guideline recommendations on the revascularization of left main coronary artery disease in patients at low surgical risk and anatomy suitable for PCI or CABG. European Heart Journal. 2023.

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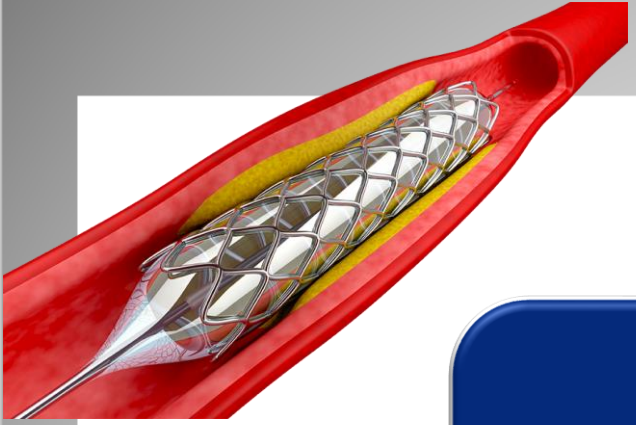
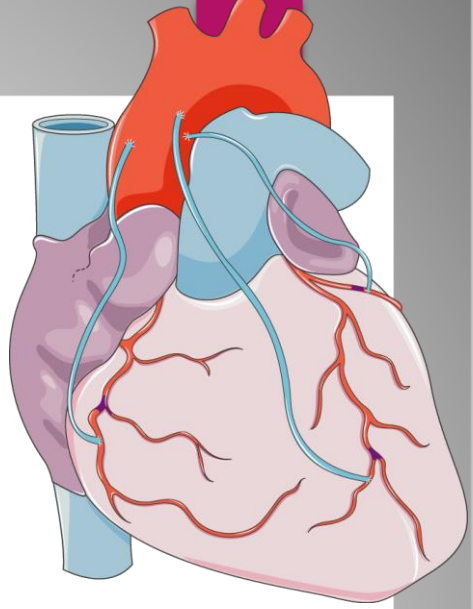


LMCA DISEASE



- PREVALENCE AND ANATOMY
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TECHNICAL ASPECTS

Hence, for LMCA PCI is crucial the use of IVUS before PCI to obtain the following informations:

- ***vessel size (stent sizing), lumen area (lesion severity), plaque extent, distribution and characteristics (planning PCI).***

Davidson LJ et al. A Practical Approach to Left Main Coronary Artery Disease: JACC State-of-the-Art Review. J Am Coll Cardiol. 2022

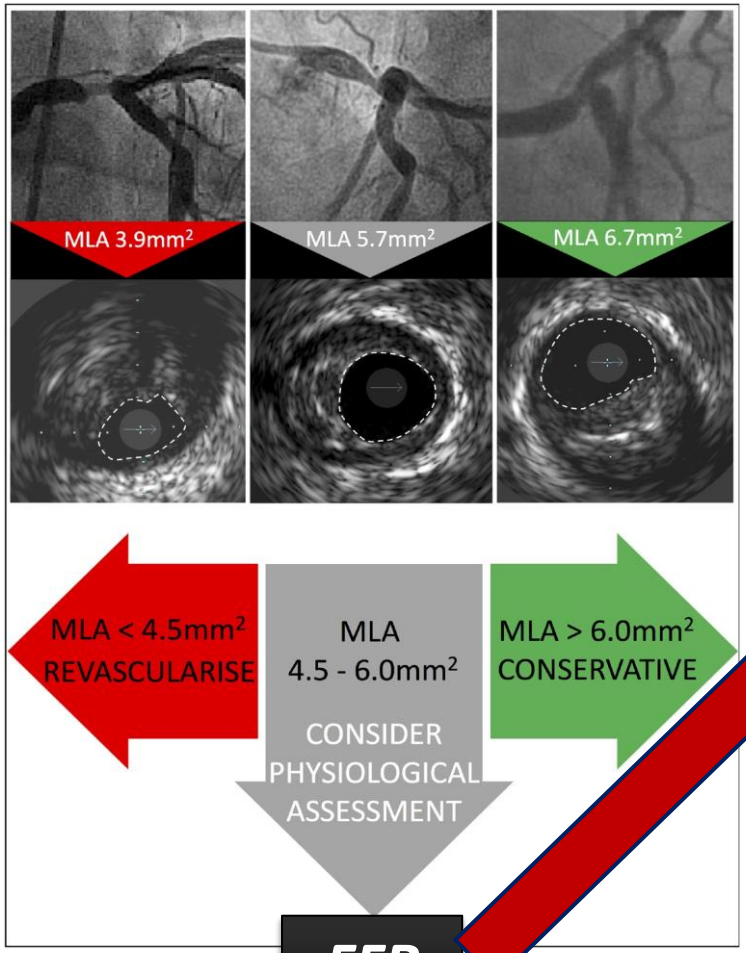
Recommendations	Class	Level
IVUS should be considered to assess the severity of unprotected left main lesions.	IIa	B

Neumann F et al. 2018 ESC/EACTS Guidelines on myocardial revascularization. European Heart Journal. 2019.

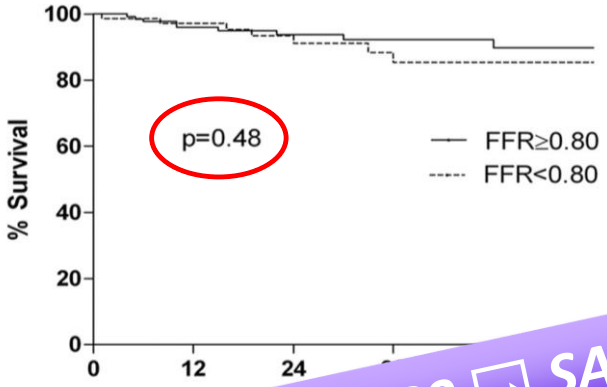
COR	LOE	Recommendation
2a	B-NR	1. In patients with intermediate stenosis of the left main artery, intravascular ultrasound (IVUS) is reasonable to help define lesion severity.[1-5]

Lawton JS et al. 2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Circulation. 2021.

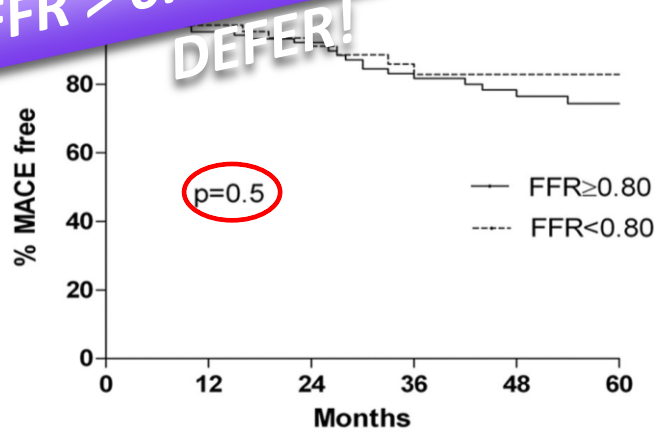
LESION SEVERITY



Johnson TW et al. Clinical use of intracoronary imaging. Part 2: acute coronary syndromes, ambiguous coronary angiography findings, and guiding interventional decision-making: an expert consensus document of the EAPCI. Eur Heart Journal. 2019.



FFR > 0.80 ⇨ SAFELY DEFER!

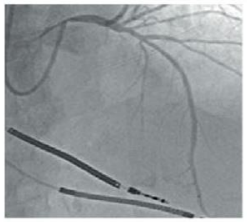


Hamilos M et al. Long-term clinical outcome after fractional flow reserve-guided treatment in patients with angiographically equivocal left main coronary artery stenosis. Circulation. 2009.

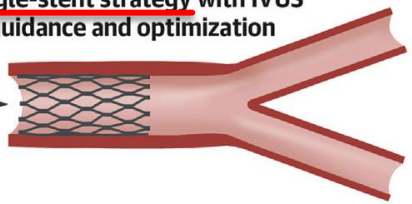
TECHNICAL ASPECTS

30%

Ostial or mid-shaft (nonbifurcation)



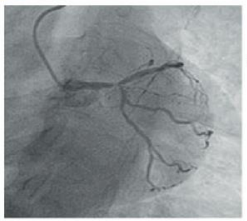
Ostial or mid-shaft (nonbifurcation): Single-stent strategy with IVUS guidance and optimization

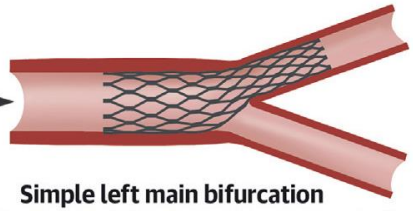


These lesions show improved outcomes in comparison to distal (bifurcation) lesions because of their large lumen dimensions and decreased probability of plaque displacement and restenosis.

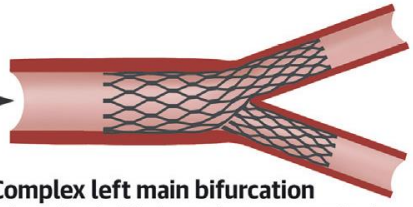
70%

Distal left main bifurcation (eg Medina 1,1,1 or 0,1,1)





Simple left main bifurcation (and low-risk of side branch compromise): Provisional single-stent strategy with IVUS guidance or optimization



Complex left main bifurcation (and high-risk of side branch compromise): Up-front 2-stent strategy (eg, DK-Crush, Culotte, T-and-Protrusion) with IVUS guidance and optimization to include KBI and POT

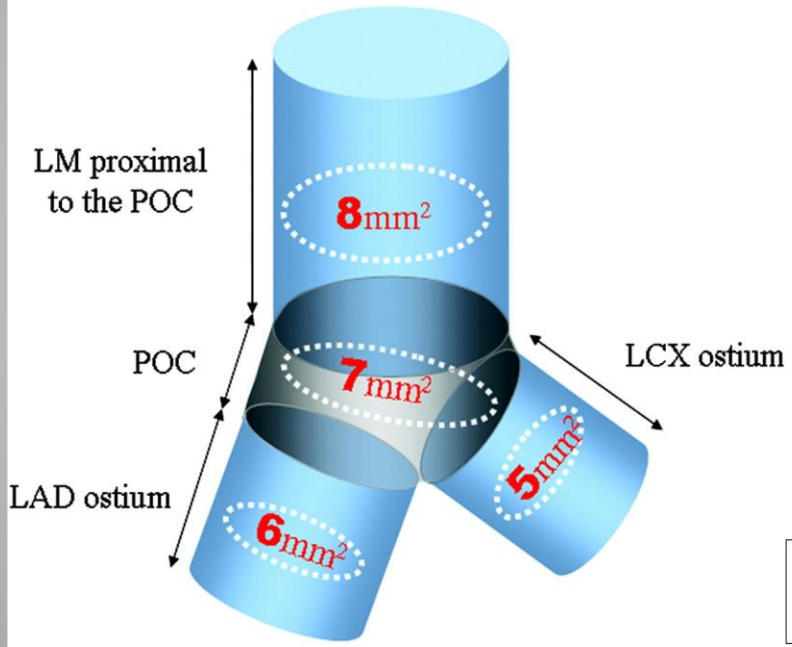
The choice of strategy is based on vessel, lesion characteristics and operator experience. In particular, consideration of the presence of significant SB stenosis and disease beyond the ostium, SB angulation and size of LCx (dominant and/or >2.5mm).

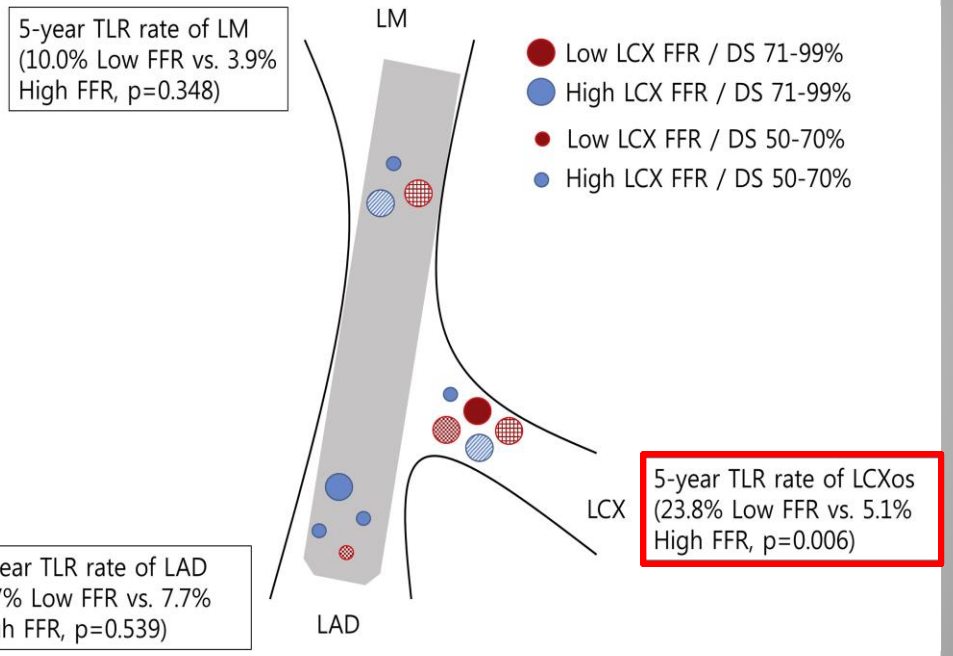
Davidson LJ et al. A Practical Approach to Left Main Coronary Artery Disease: JACC State-of-the-Art Review. J Am Coll Cardiol. 2022.

TECHNICAL ASPECTS

Post-PCI IVUS and FFR applications include:

- ***IVUS: ensure stent optimization (post-dilatation) and identify procedural complications.***
- ***FFR: assessment for jailed branches (LCx).***





Kang SJ et al. Comprehensive intravascular ultrasound assessment of stent area and its impact on restenosis and adverse cardiac events in 403 patients with unprotected left main disease. Circ Cardiovasc Interv. 2011.

Lee CH et al. 5-Year Outcomes According to FFR of Left Circumflex Coronary Artery After Left Main Crossover Stenting. JACC Cardiovasc Interv. 2019.

CONCLUSIONS

- ***Advances in PCI techniques assessed in recent randomized trials show that PCI for LMCA… …fe option with similar long-term su… …G surgery;***

- ***Howev… …clinical … …need for repeat …***

- ***… a heart team approach for shared …cision-making should be the standard of care for all cases of LMCAD.***

Tailored and patient centered approach

THANK YOU