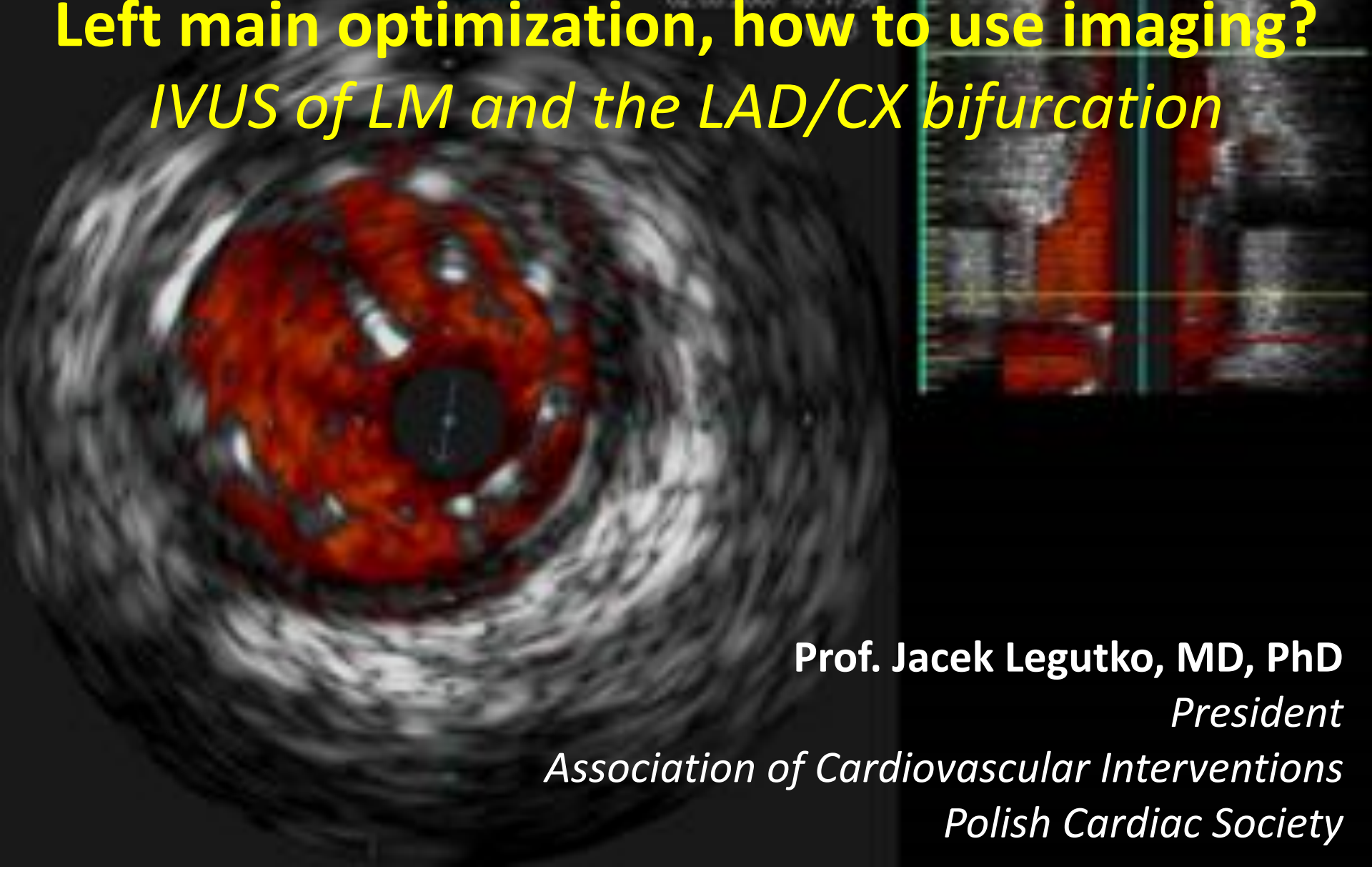
Left main optimization, how to use imaging?

IVUS of LM and the LAD/CX bifurcation



Prof. Jacek Legutko, MD, PhD
President
Association of Cardiovascular Interventions
Polish Cardiac Society

Jagiellonian University Medical College
University Hospital, Kraków, Poland

Potential conflicts of interest

Speaker's name: Jacek Legutko

☑ Lecture fee (Philips Volcano, St. Jude, Terumo, Balton, Astra Zeneca, Medtronic, Abbott, Procardia)

Percutaneous coronary intervention for coronary bifurcation disease: consensus from the first 10 years of the European Bifurcation Club meetings

Adjunctive intracoronary imaging in bifurcation treatment:

EBC consensus:

- IVUS and OCT may be of particular value in guiding bifurcation treatment and are recommended for left main bifurcation treatment **(UPGRADE NEEDED).**
- Wiring of jailed SBs with imaging wires should be avoided due to the risk of distorting the stent **(VALID).**
- Segments overlapping on angiography (often the SB ostium) can be evaluated by intracoronary imaging **(VALID).**
- OCT may be superior to IVUS in evaluation of the SB ostium by MV pullback. **(VALID).**
- Evaluation of wire positions may be of importance whenever crossing stents in single and double stenting **(UPGRADE NEEDED).**
- Intracoronary evaluation of optimal vessel and stent expansion is superior to angiographic assessment **(VALID).**
- Pullbacks in both SB and MV are recommended in evaluation of two-stent techniques if intracoronary imaging is used (**VALID).**

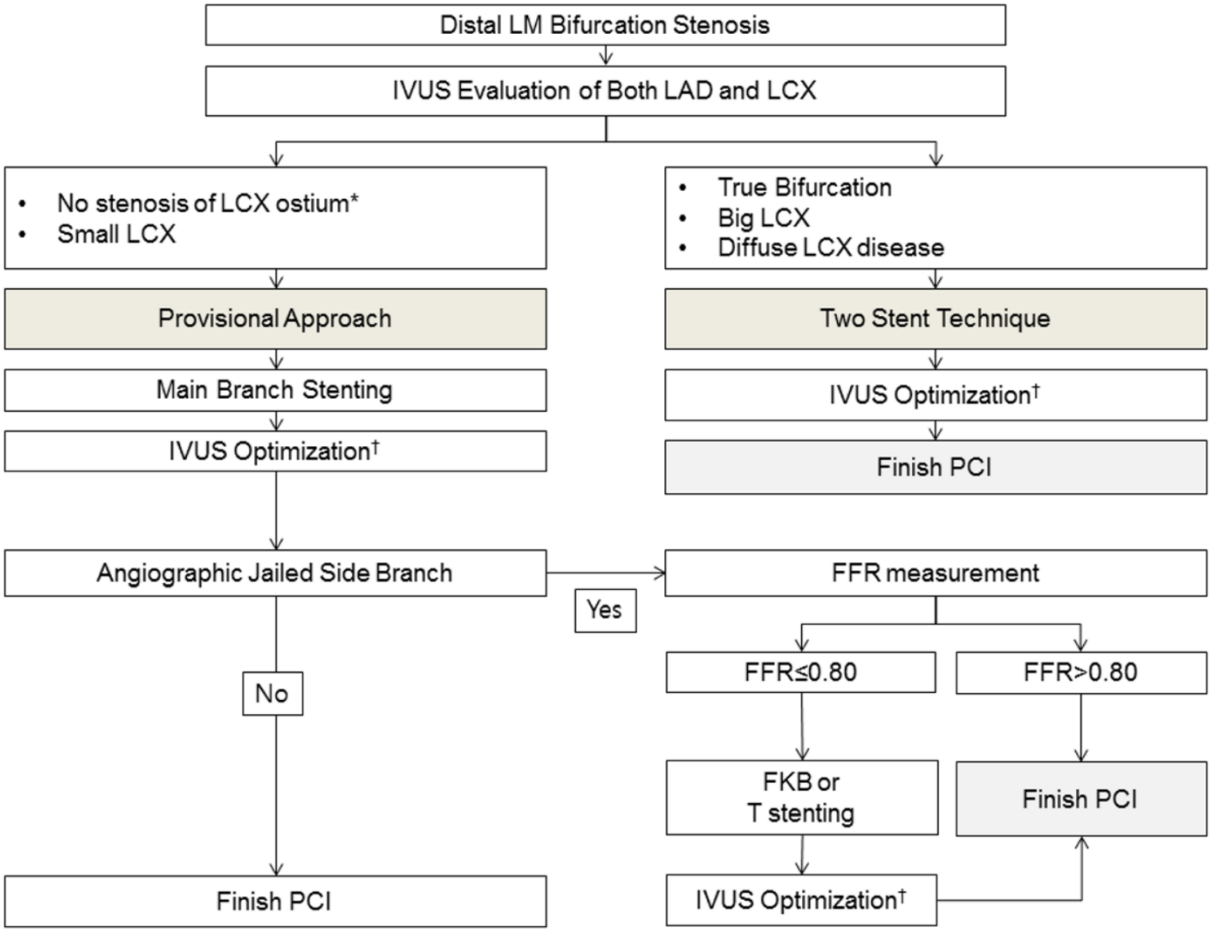
PCI of the unprotected distal left main coronary artery bifurcation:

EBC consensus:

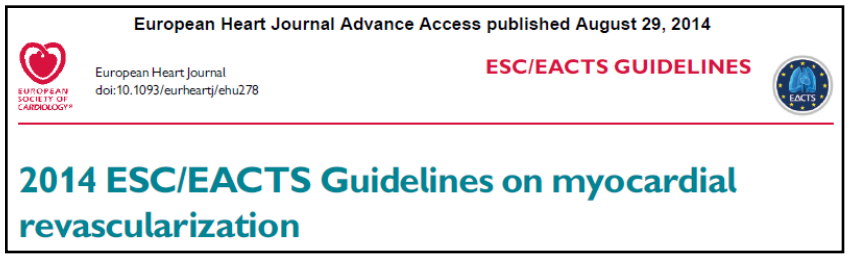
- imaging may be used for evaluating significance and lesion distribution, and is recommended for the sizing of stents **(VALID).**
- Intracoronary imaging is recommended to ensure adequate stent and vessel expansion in all LMCA bifurcation segments **(VALID).**

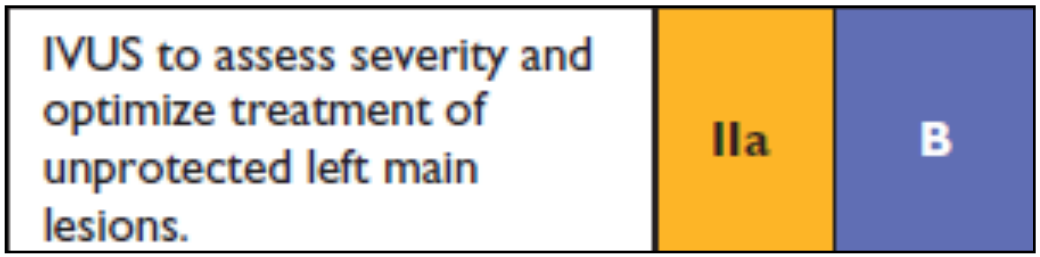
Practical based approach to left main bifurcation stenting

Meticulous evaluation of LM bifurcations using intravascular imaging is crucial in selecting the proper stent strategy and in achieving optimal stent results



Jung-Min Ahn, Pil Hyung Lee and Seung-Jung Park. BMC Cardiovascular Disorders 2016;16:49-57.





Windecker S, et al.. European Heart Journal 2014; doi:10.1093/eurheartj/ehu278

Study	#	Follow-up	Angio-guided	IVUS-guided	HR	95%CI	P-value
Agostoni et al. Am J Cardiol 2005;95:644-7	58	1.5 yrs	20%	8%			0.18
Park et al. Circ Cardiovasc Interv 2009;2:167-77	682	3 yrs			0.31	0.19-0.51	
Propensity score matched	290				0.64	0.39-1.04	0.074
de la Torre Hernandez et al. JACC Cardiovasc Interv 2014;7:244-54*	1010	3 yrs	16.0%	11.7%			0.006
Gao et al. Patient Pref Adherence 2014;8:1-11	1016	1 yr	27.7%	14.8%			<0.001
Propensity score matched	582		24.4%	16.2%			0.014
Tan et al. Saudi Med J 2015;36:549-53**	123	2 yrs	29.3%	13.1%			0.031
Xu et al. http://www.tctmd.com/show.aspx?id=132687	1899	3 yrs	13.2%	11.1%	0.83	0.69-1.00	0.06
Maehara et a. http://www.tctmd.com/show.aspx?id=121499	317	2 yrs	10.2%	5.6%	0.54	0.23-1.26	0.15

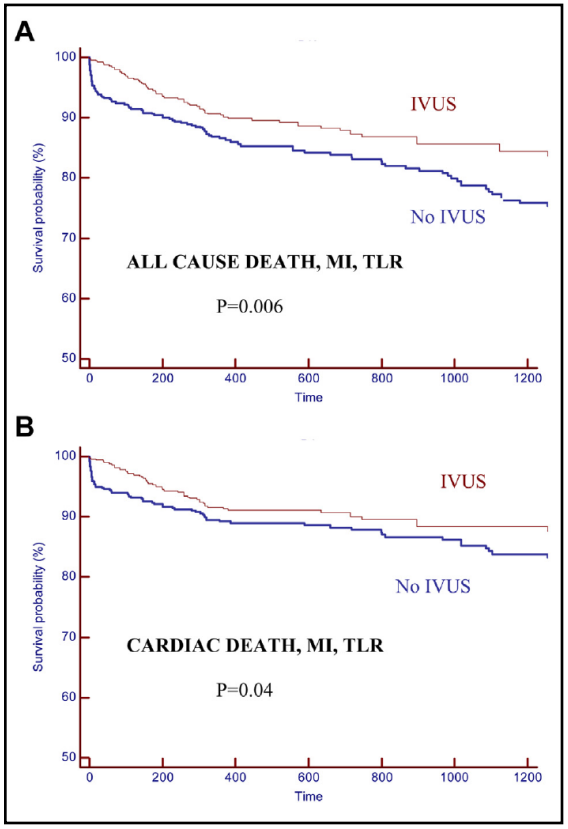
Mints G. https://acc.org/latest-in-cardiology/articles/2016/06/13/10/01/ivus-in-pci-guidance

Angio vs. IVUS-guided Left main PCI

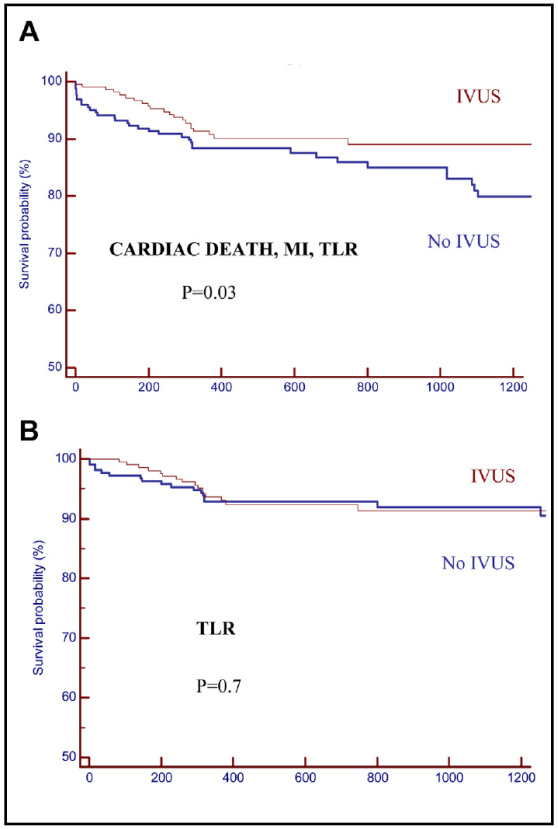
Clinical Impact of Intravascular Ultrasound Guidance in Drug-Eluting Stent Implantation for Unprotected Left Main Coronary Disease

Pooled Analysis at the Patient-Level of 4 Registries

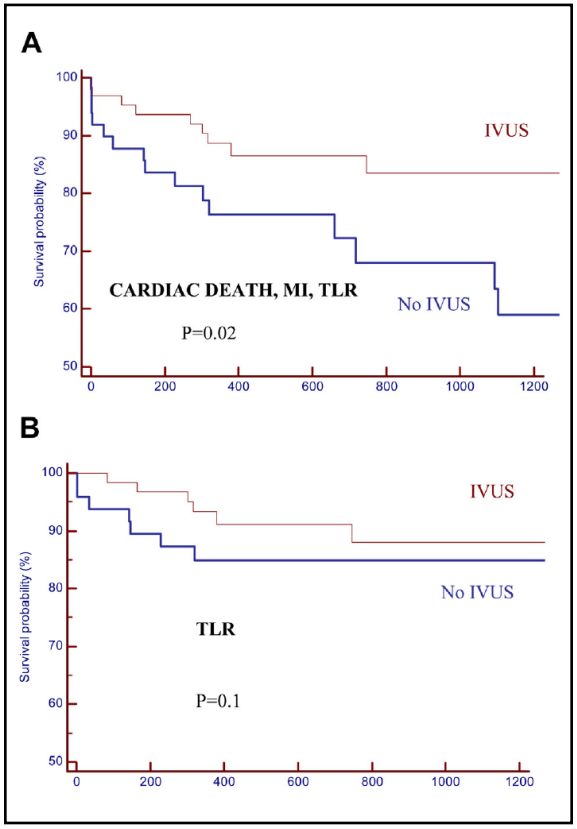
Total population



LM bifurcation 1-stent



LM bifurcation 2-stents



Jose M. de la Torre Hernandez, et al. J Am Coll Cardiol Intv. 2014;7:244-254.

Intravascular ultrasound-guided drug-eluting stent implantation: An updated meta-analysis of randomized control trials and observational studies☆,☆☆,☆☆☆

This meta-analysis included 25 eligible studies, including 31,283 patients, of whom 3192 patients were enrolled in 7 RCTs.

Analysis of all 25 studies:

MACE,	OR 0.76, 95% CI: 0.70–0.82, P < 0.001)
Death	OR 0.62, 95% CI: 0.54–0.72, P < 0.001)
MI	OR 0.67, 95% CI: 0.56–0.80, P < 0.001)
Stent thrombosis	OR 0.58, 95% CI: 0.47–0.73, P < 0.001)
TLR	OR 0.77, 95% CI: 0.67–0.89, P = 0.005)
TVR	OR 0.85, 95% CI: 0.76–0.95, P < 0.001)

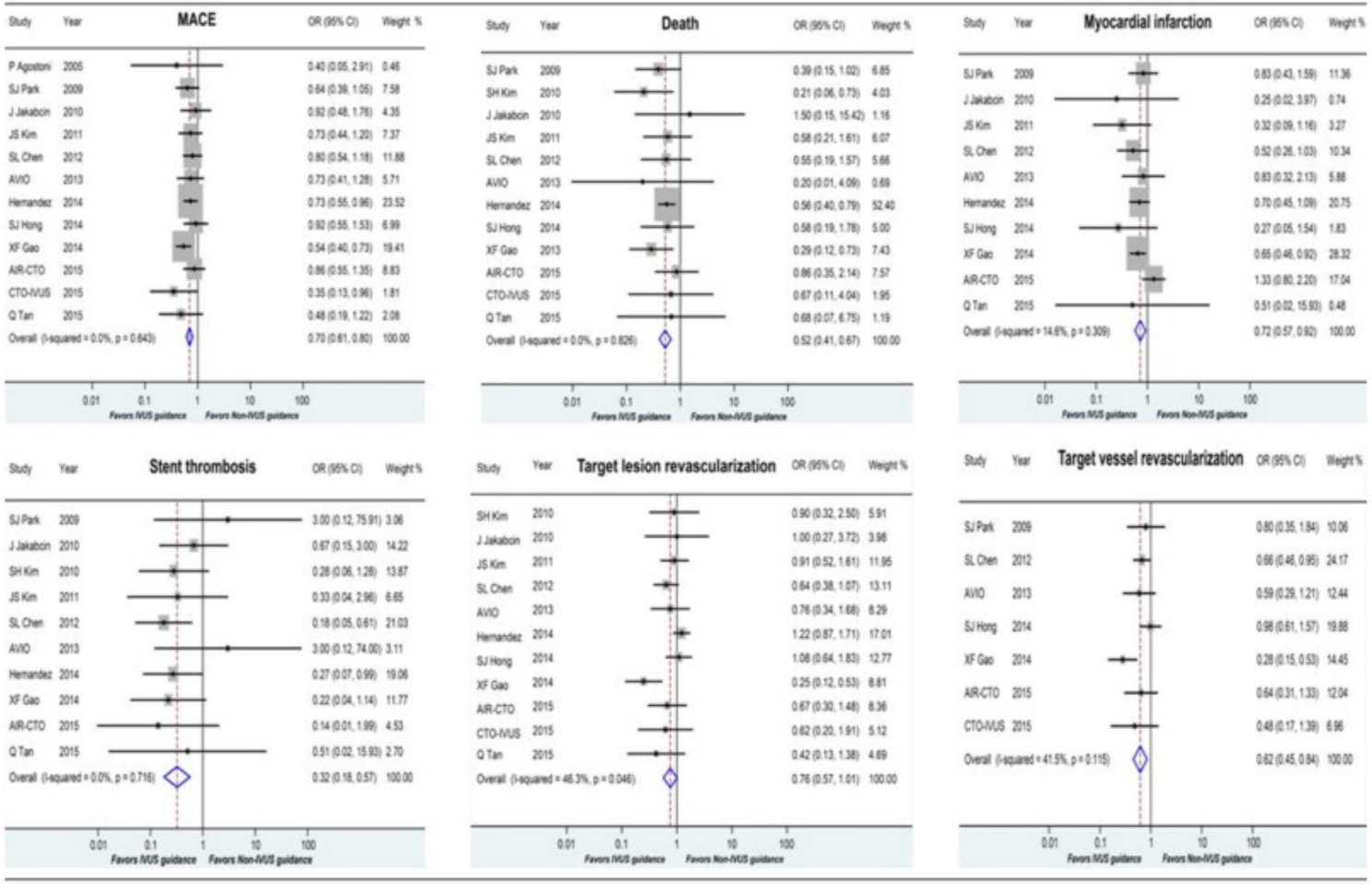
Separate analysis of RCTs:

MACE	OR 0.66, 95% CI: 0.52–0.84, P = 0.001)
TLR	OR 0.61, 95% CI: 0.43–0.87, P = 0.006)
TVR	OR 0.61, 95% CI: 0.41–0.90, P = 0.013)

Steinvil A. et al. International J Cardiol. 2016; 216: 133–139.

Intravascular ultrasound-guided drug-eluting stent implantation: An updated meta-analysis of randomized control trials and observational studies☆,☆☆,☆☆☆

Additional analysis performed for 13 trials addressing IVUS use for complex lesions defined as left main, bifurcation and CTO



Steinvil A. et al. International J Cardiol. 2016; 216: 133–139.

Percutaneous coronary intervention for coronary bifurcation disease: consensus from the first 10 years of the European Bifurcation Club meetings

Adjunctive intracoronary imaging in bifurcation treatment:

EBC consensus:

- IVUS and OCT may be of particular value in guiding bifurcation treatment and are recommended for left main bifurcation treatment **(UPGRADE NEEDED).**

New EBC consensus (proposition):

- IVUS may be of particular value in Left Main PCI and is recommended for distal laft main bifurcation treatment.

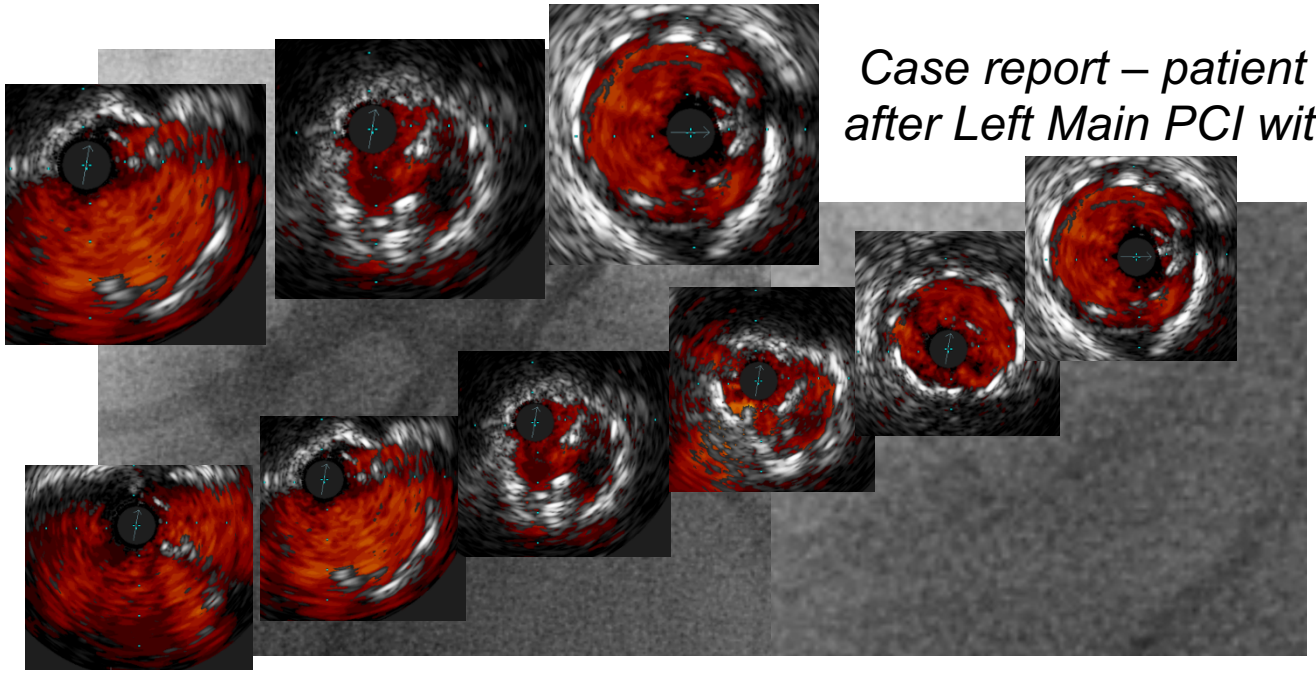
- In case of complex stent strategy or suspected stent failure IVUS-guided stent optimization should be the standard of care for unprotected left main PCI.

Percutaneous coronary intervention for coronary bifurcation disease: consensus from the first 10 years of the European Bifurcation Club meetings

Adjunctive intracoronary imaging in bifurcation treatment:

EBC consensus:

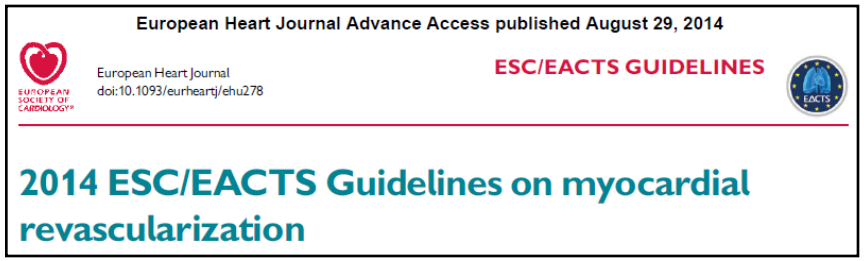
- Evaluation of wire positions may be of importance whenever crossing stents in single and double stenting **(UPGRADE NEEDED).**



Case report – patient with NSTEMI, 5 days after Left Main PCI with 2xDES (Sept. 2016)

New EBC consensus (proposition):

- Evaluation of wire positions may be of **particular importance whenever patient comes back after Left Main PCI for subsequent Left Coronary Artery Intervention.**



Non-emergency high-risk PCI procedures, such as distal LM disease, complex bifurcation stenosis, single remaining patent coronary artery, and complex chronic total occlusions, should be performed by adequately experienced operators at centres that have access to circulatory support and intensive care treatment, and preferentially have cardiovascular surgery on-site.	IIa	C

EBC Consensus (proposition):

- Non-emergency Left Main PCI should be performed by adequately experienced operators at centres **that have access to intravascular imaging**, rotablation, circulatory support and intensive care treatment, and preferentially have cardiovascular surgery on-site.

- Delayed IVUS-guided stent optimaztion should be considered in all patients after emergency, angio-guided Left Main PCI.