

Intravascular Imaging in Complex PCI: How to Optimize

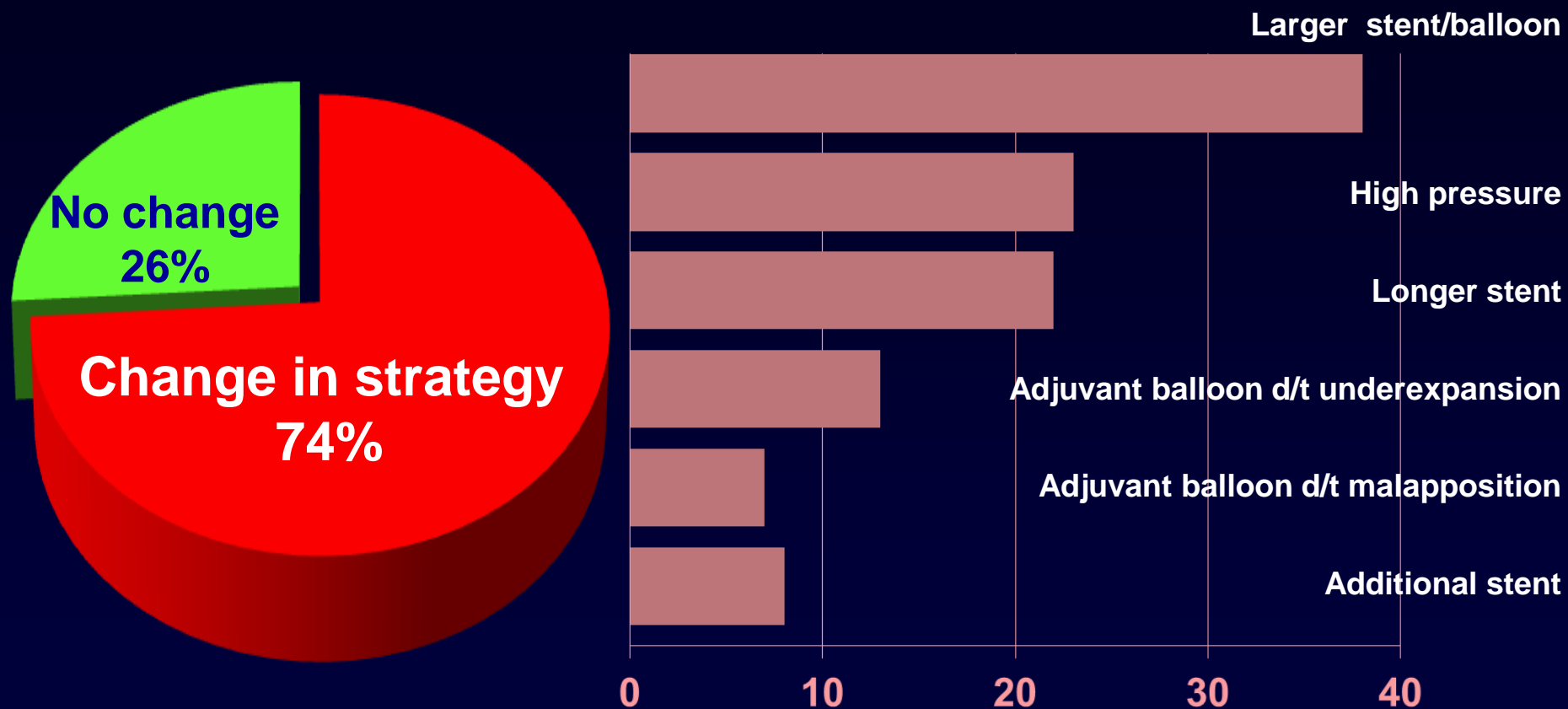
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Conflict of Interest

- I have nothing to disclose

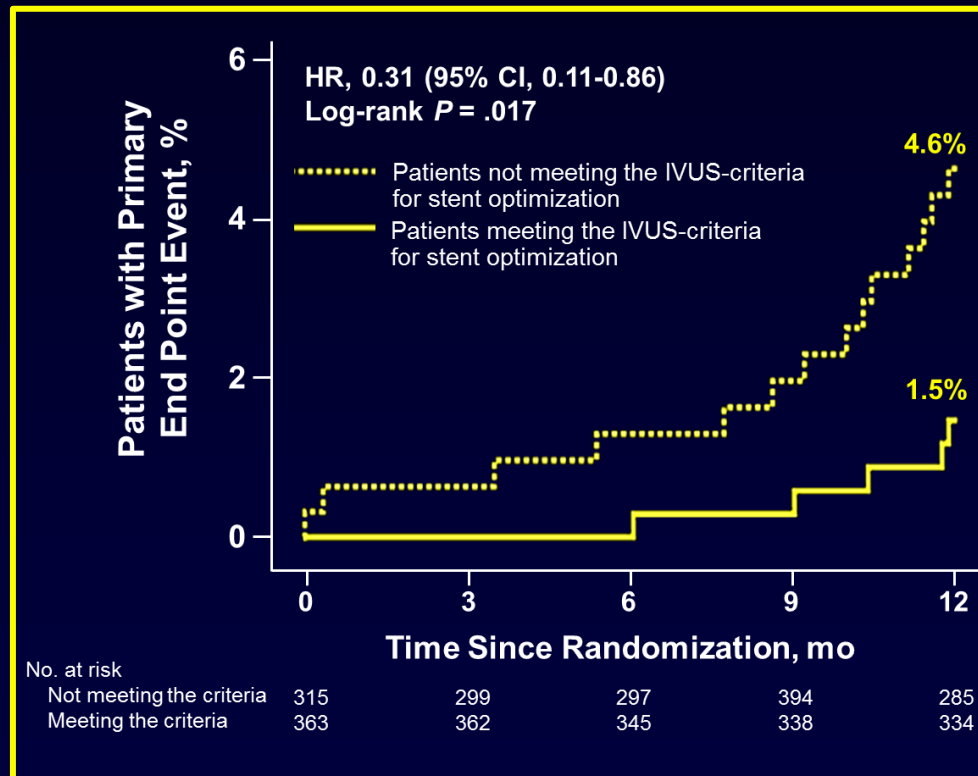
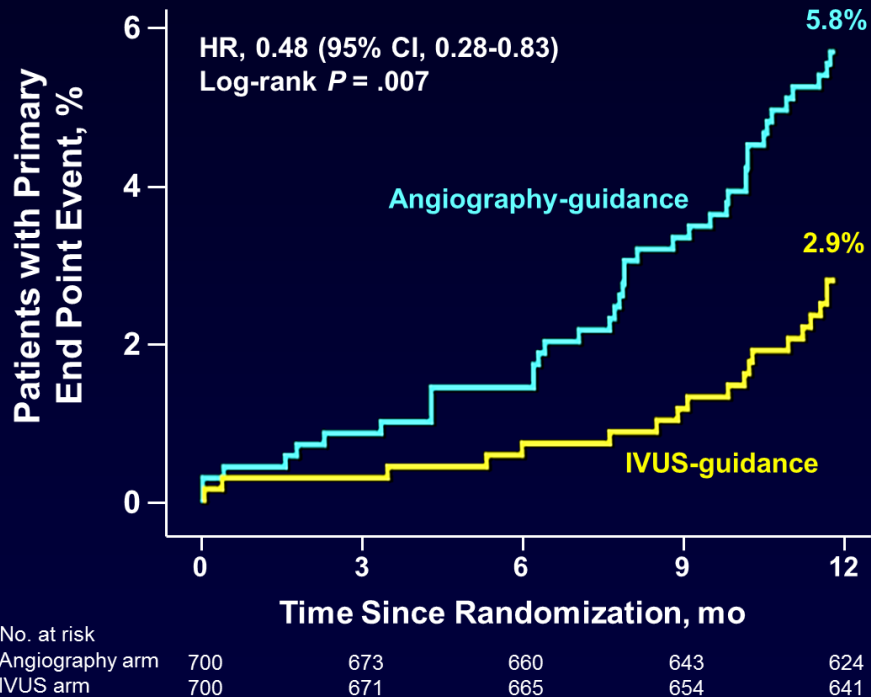
How the IVUS information influenced the procedure? From ADAPT-DES Study



Witzenbichler B et al. Circulation. 2014;129:463-470

Diffuse long lesion: IVUS-XPL randomized trial

MACE: Cardiac death, MI, or TLR at 1 year

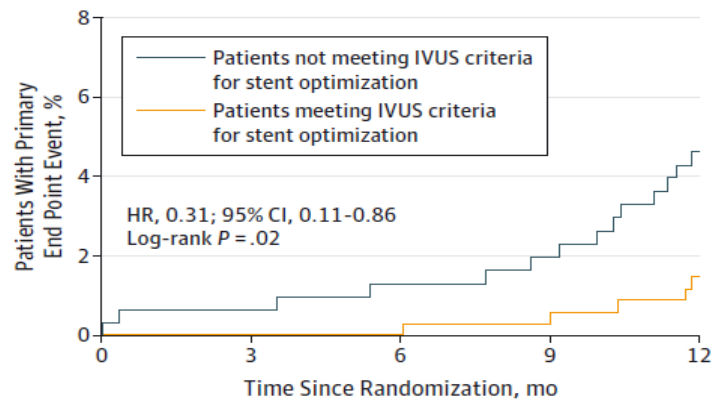


Hong SJ, Hong MK (corresponding author), et al. *JAMA* 2015;314:2155-63

Stent optimization is the matter

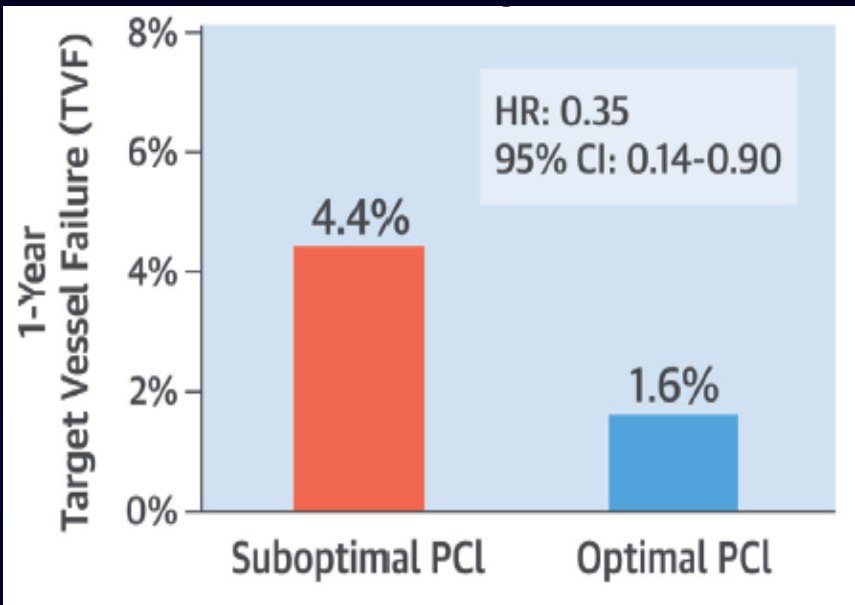
IVUS-XPL

B Patients in IVUS-guided PCI group who underwent IVUS-guided stent implantation^a



No. at risk	0	3	6	9	12
IVUS criteria					
Not meeting	315	299	297	394	285
Meeting	363	362	345	338	334

ULTIMATE

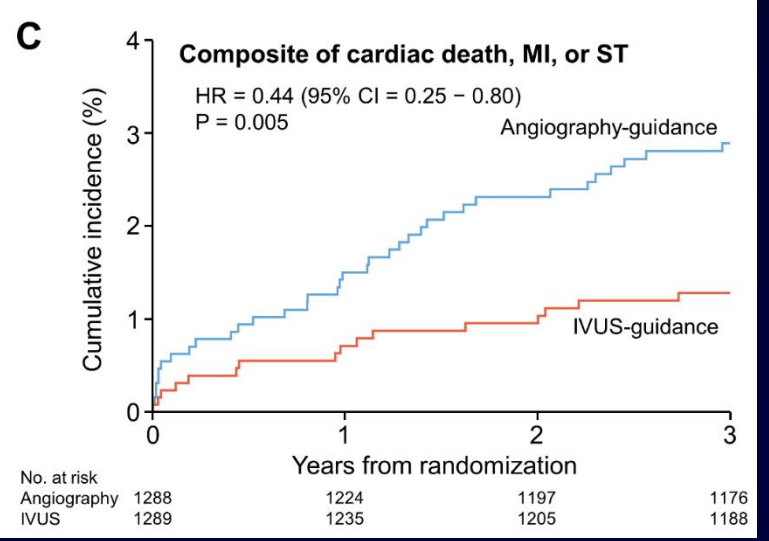
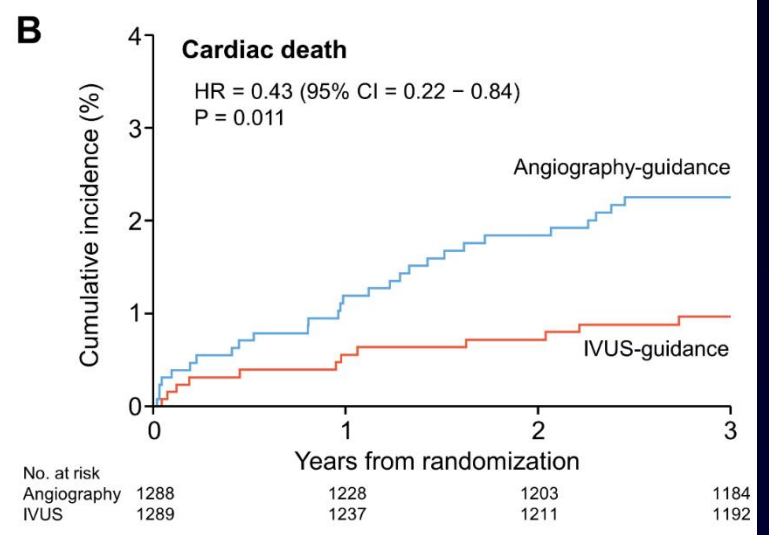
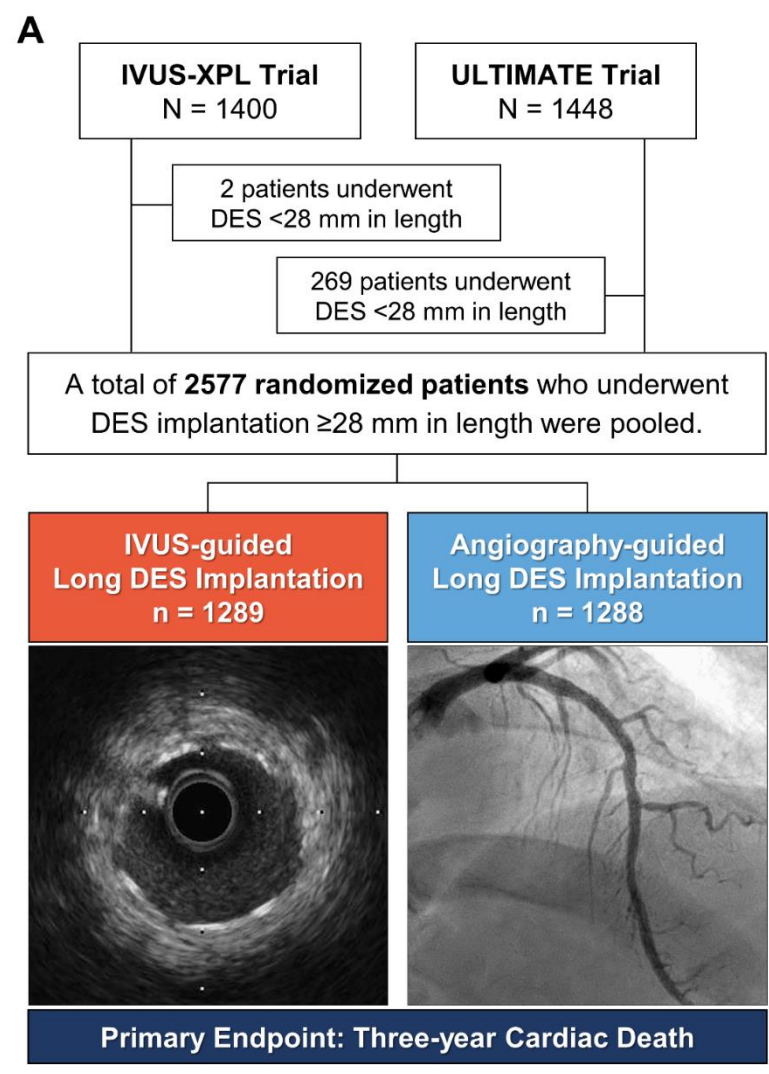


Optimal PCI according to optimization criteria further **improves clinical outcome** compared to suboptimal PCI.

Hong et al. JAMA 20215;314:2155-2163
Zhang et al. J Am Coll Cardiol 2018;72:3126-3137

IVUS XPL and ULTIMATE

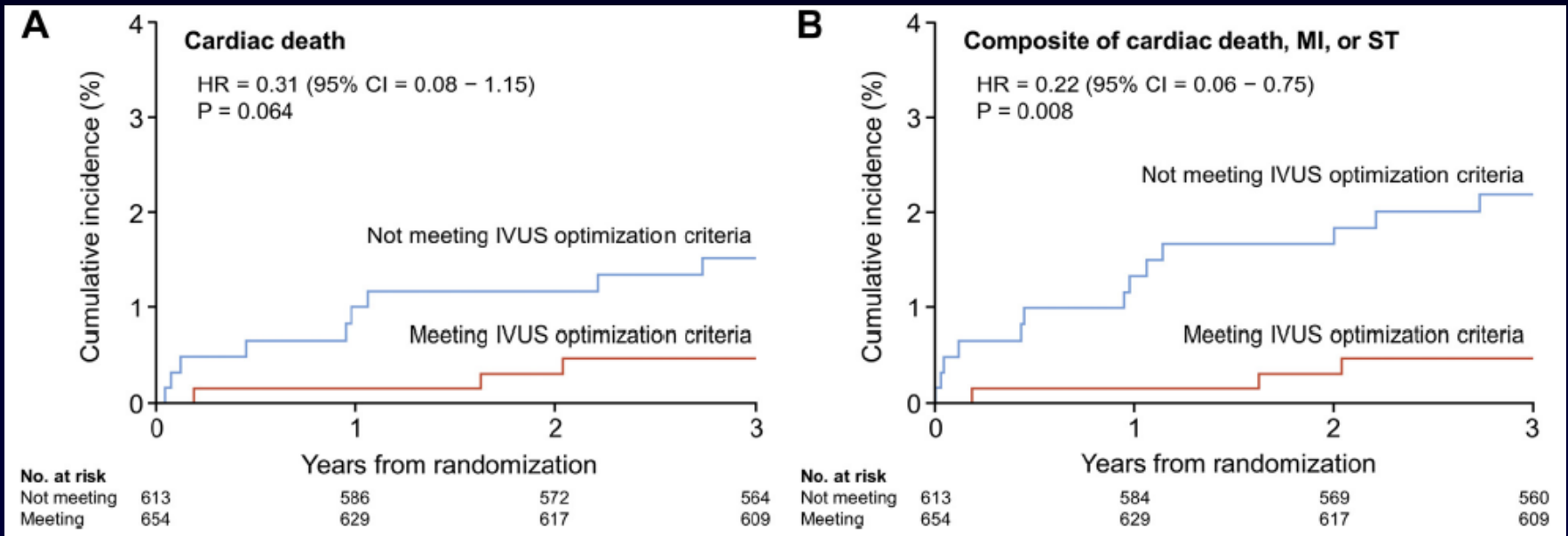
Long lesions



Hong SJ, Zhang JJ, Chen SL (corresponding), Hong MK (corresponding). *JACC Interv* 2022;15:208-216

For long lesion PCI

IVUS-XPL + ULTIMATE



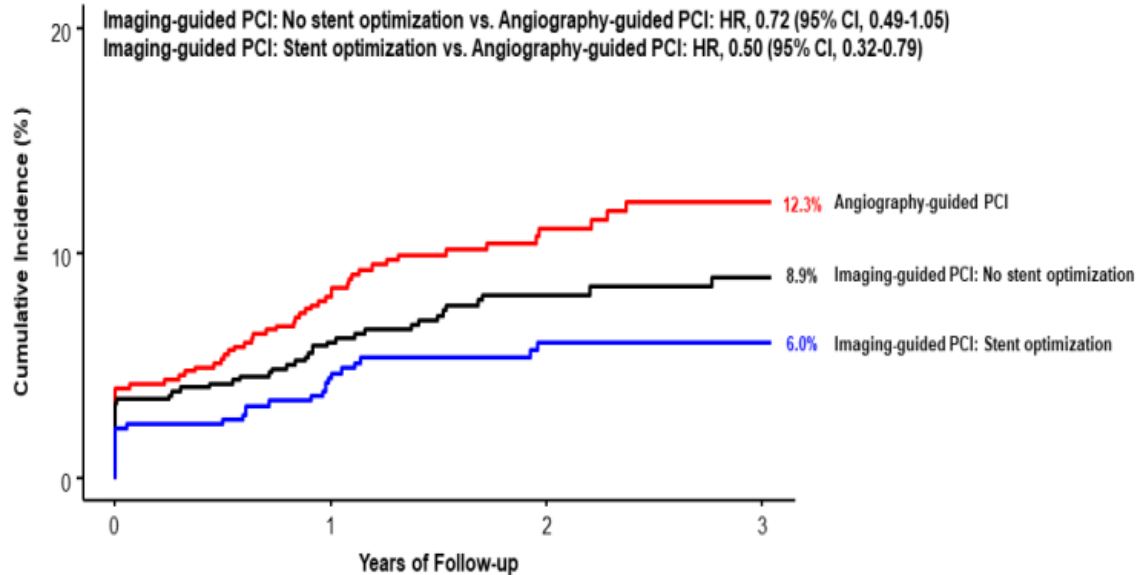
2,577 patients pooled from 2 randomized trials who underwent DES implantation for long coronary lesions.

Patients meeting the IVUS-defined optimization criteria had better clinical outcomes versus those not meeting IVUS-defined optimization criteria.

Hong et al. *J Am Coll Cardiol Intv* 2022;15:208-216

RENOVATE-COMPLEX-PCI trial

Figure S3. Exploratory Analysis According to Treatment Group and Intravascular Imaging-Guided Optimization Results

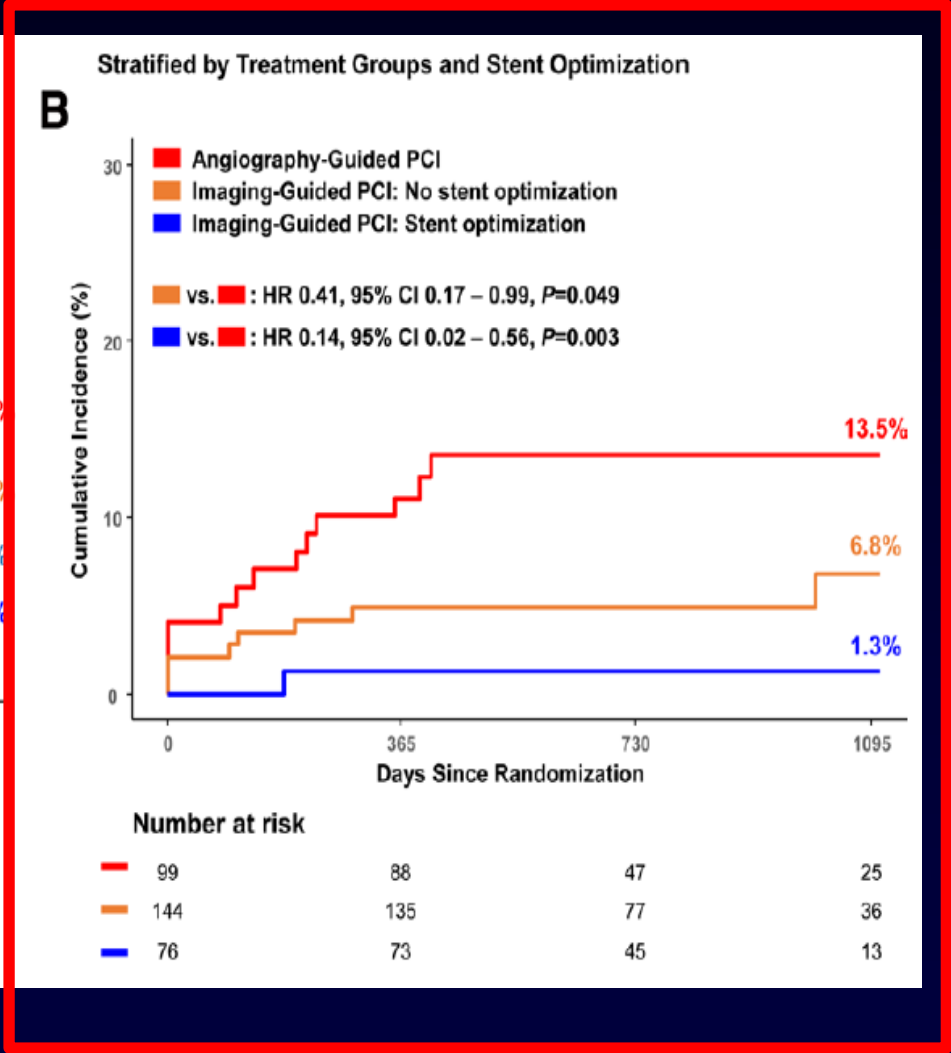
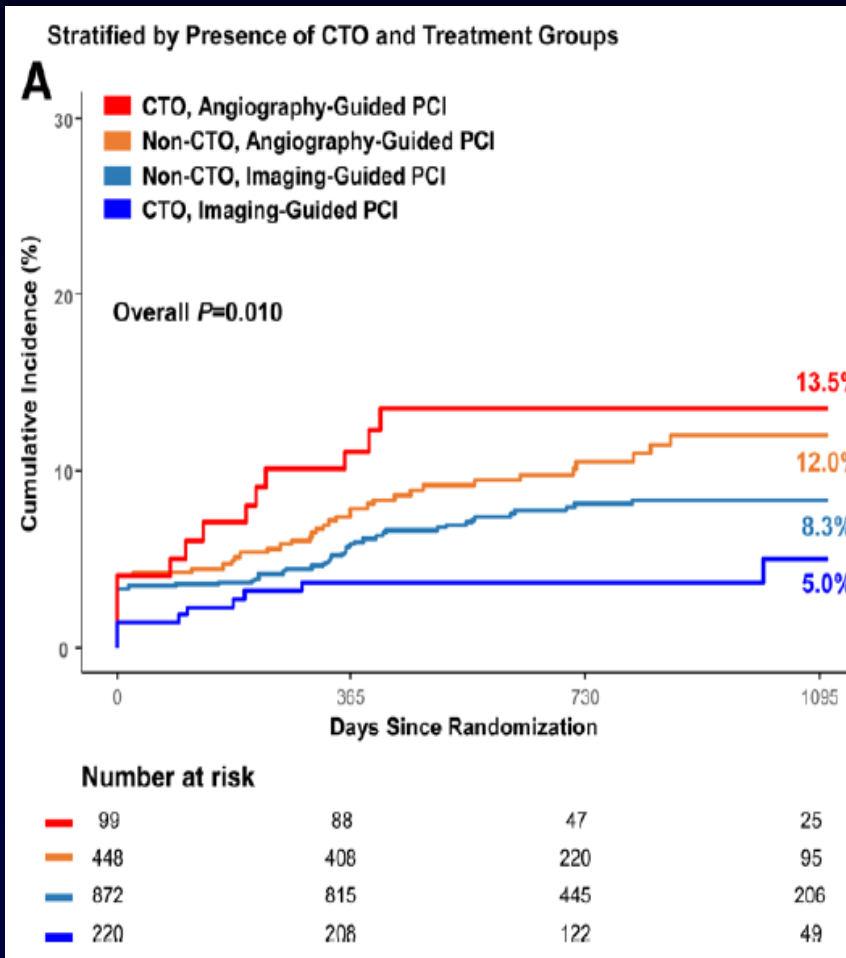


No. at Risk

Angiography-guided PCI	547	496	267	120
Imaging-guided PCI: No stent optimization	596	556	307	152
Imaging-guided PCI: Stent optimization	496	467	260	103

Lee. et al. *N Eng J Med* 2023;388:1668-1679

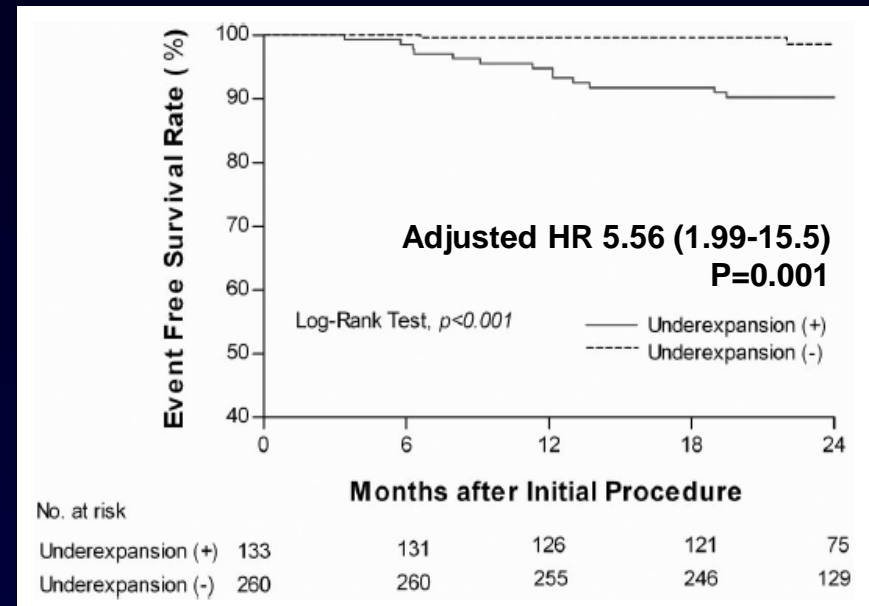
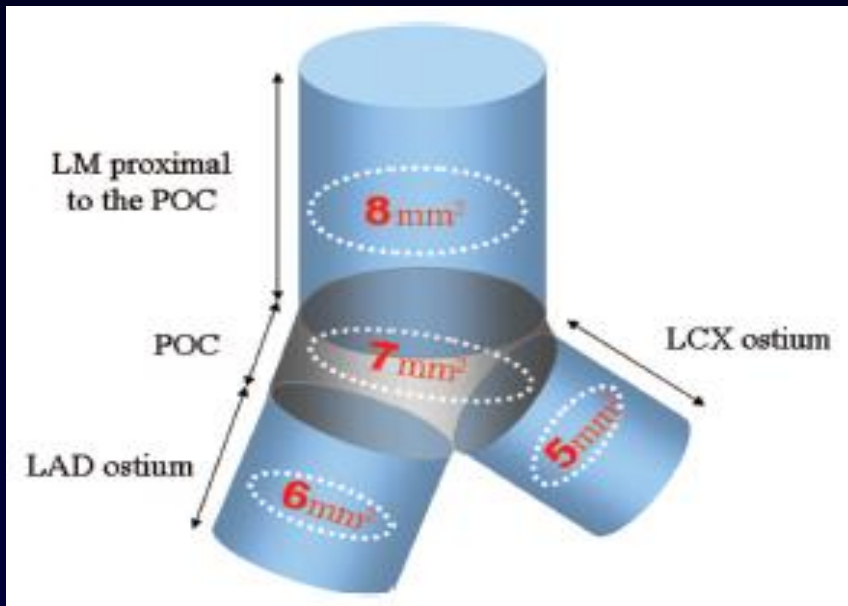
RENOVATE-COMPLEX-PCI: CTO subgroup



Hong D et al. *Circulation* 2023;148:903-905



Role of IVUS for LM PCI



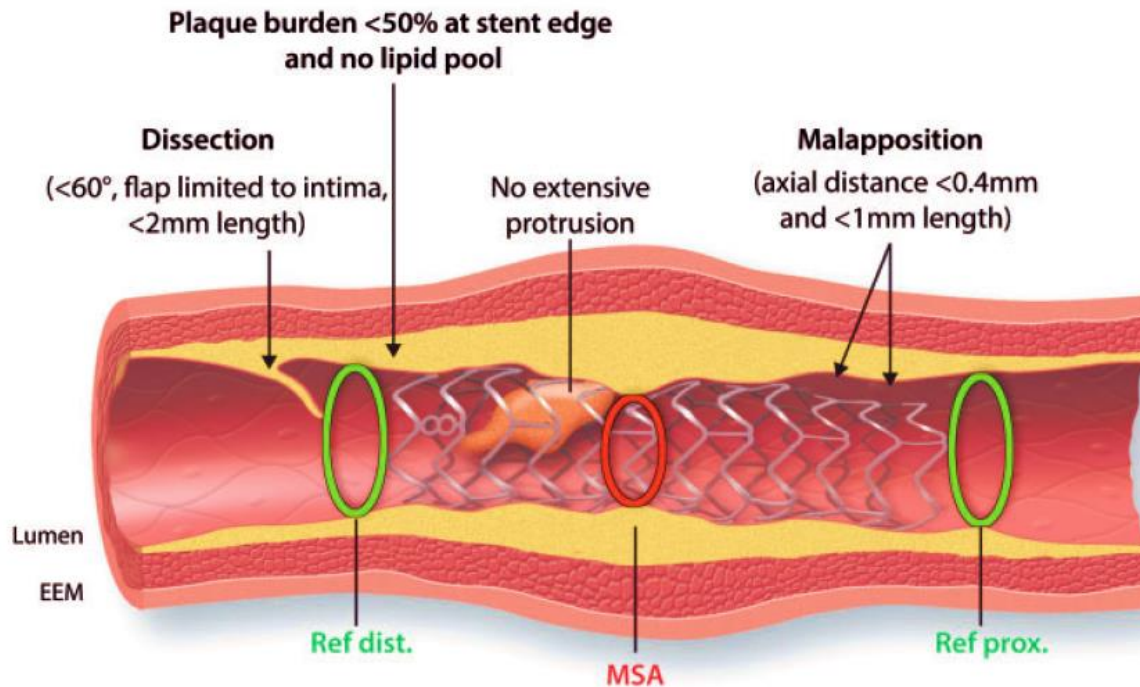
IVUS-based criteria of **stent underexpansion for LM lesion**:

1) LM < 8.2 mm²; 2) POC < 7.2 mm²; 3) LAD ostium < 6.3 mm²; 4) LCX ostium < 5.0 mm²

Stent underexpansion was an independent predictor for the occurrence of MACE.

Stent optimization and failure

Optimization targets after stent implantation



MSA > 5.5mm² (IVUS) and > 4.5mm² OCT

MSA/average reference lumen > 80%

**Minimum
stent area
(absolute)**

**Stent expansion
(relative)**

Malapposition

Tissue prolapse

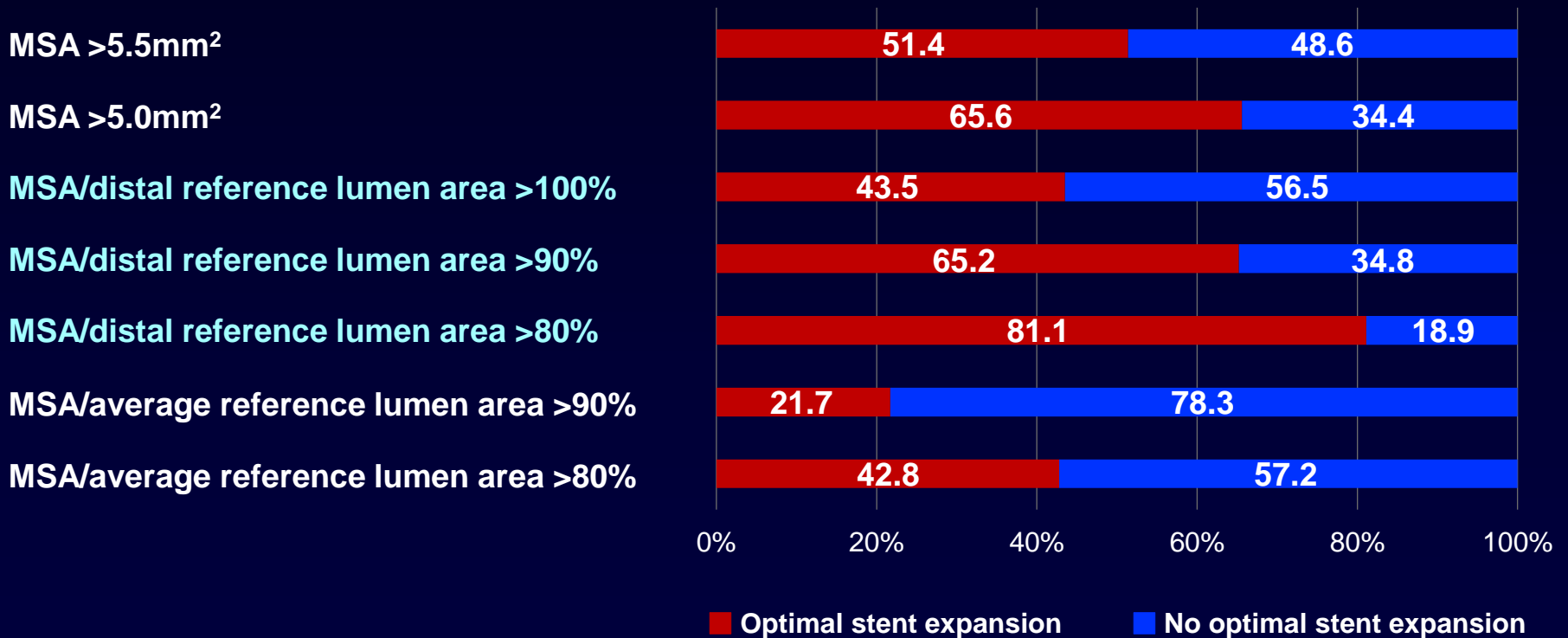
Dissection

Impact of IVUS-guided optimal stent expansion on long-term hard clinical outcomes (IVUS XPL and ULTIMATE)

Long lesions

Primary endpoint: cardiac death, MI or stent thrombosis at 3 years

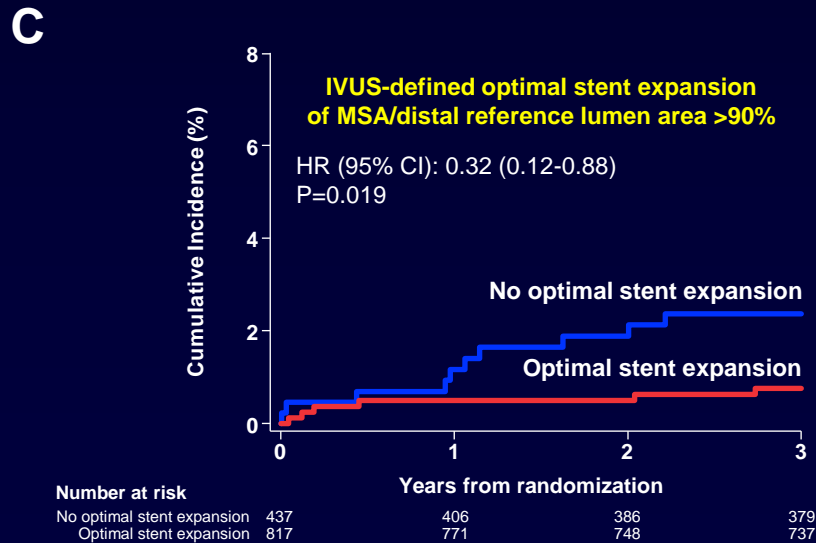
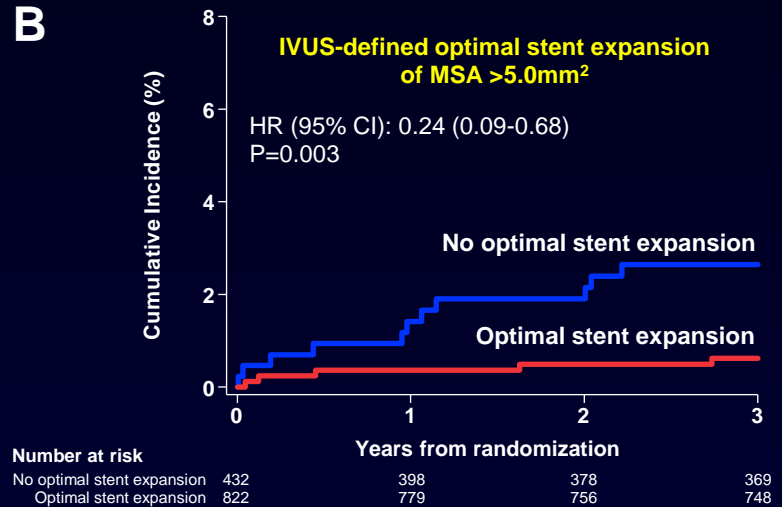
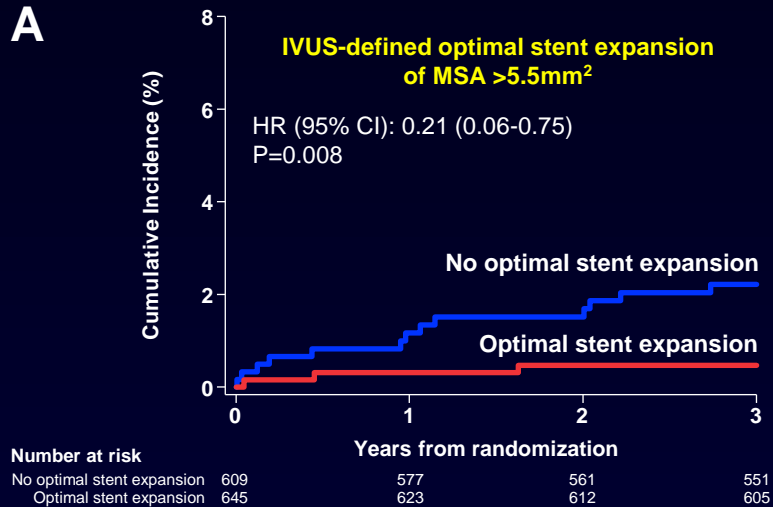
Distribution of patients according to different optimization criteria



Lee YJ, Zhang JJ, Chen SL (corresponding), Hong MK (corresponding). *Circ Cardiovasc Interv* 2021;14:e011124

Primary endpoint at 3 years

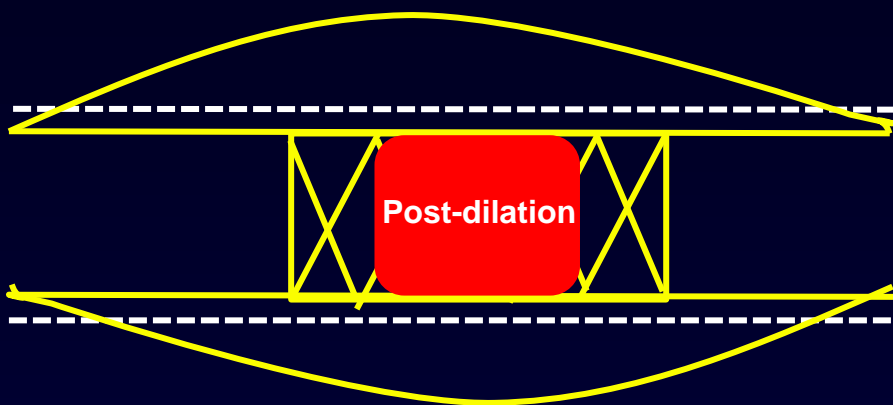
Long lesions



Lee YJ, Zhang JJ, Chen SL (corresponding), Hong MK (corresponding). *Circ Cardiovasc Interv* 2021;14:e011124

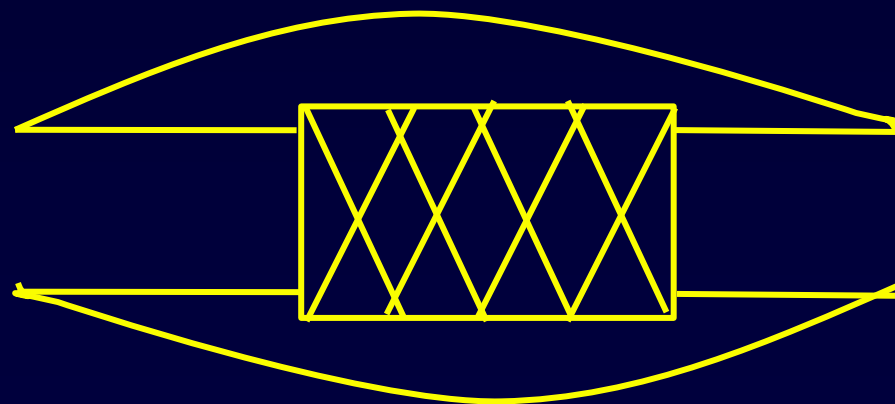
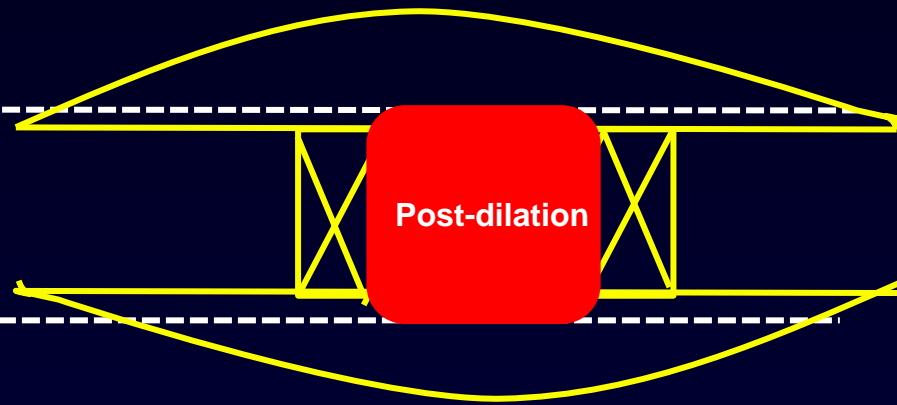
Angiography-guided post-dilation

Stent-to reference vessel diameter ratio between 1.0 and 1.1



IVUS-guided (like) post-dilation

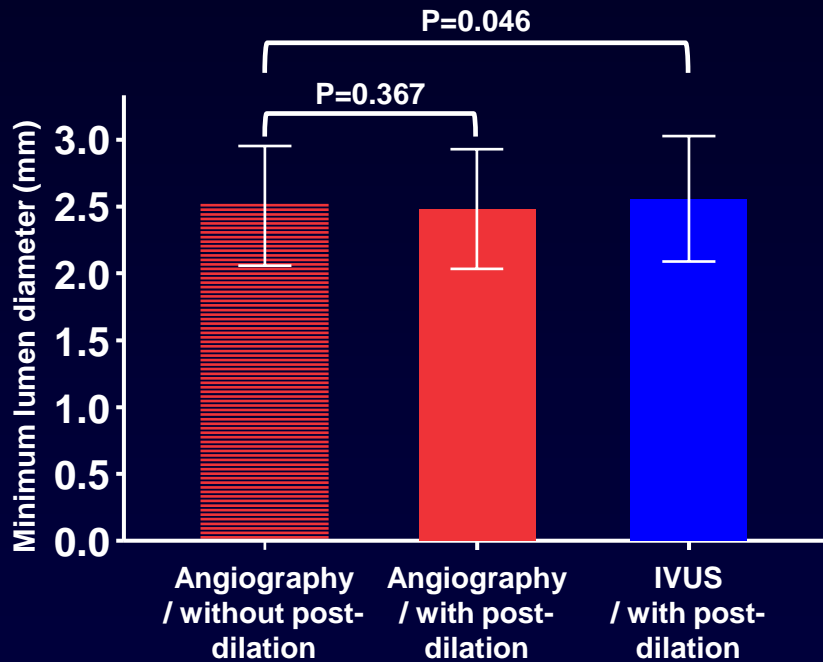
Stent-to reference vessel diameter ratio between 1.1 and 1.3



Is routine post-dilation during angiography-guided stent implantation as good as IVUS-guidance? (from IVUS-XPL and ULTIMATE trials)

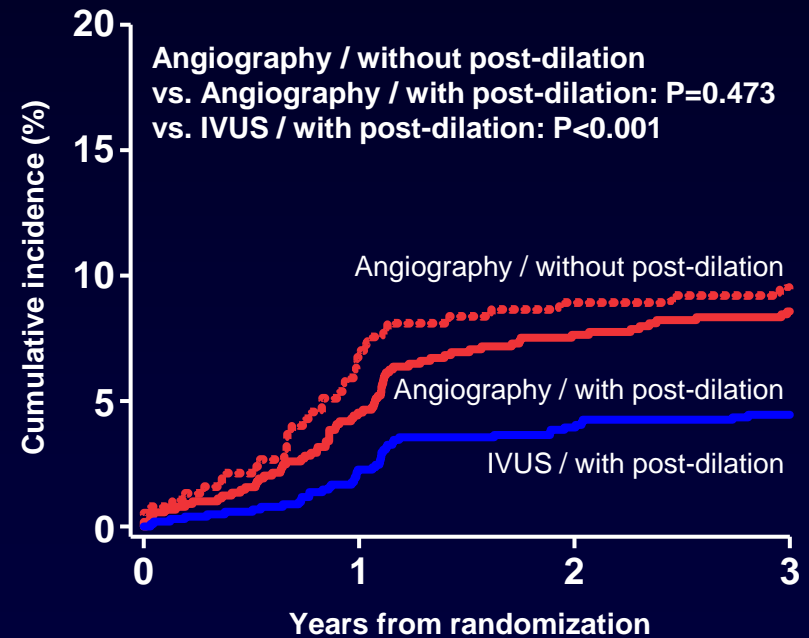
Post-procedural outcomes

Post-intervention MLD



Long-term clinical outcomes

Composite of cardiac death, myocardial infarction, or target lesion revascularization at 3 years




Lee YJ, Zhang JJ, Chen SL (corresponding), Hong MK (corresponding). *Circ Cardiovasc Interv* 2022;15:e011366

Conclusion

- **The bigger by IVUS, the better**
- **DO** intravascular imaging for complex PCI
- **DO** your best to achieve optimal imaging criteria

How to be an intervention master?

Needs for intracoronary imaging	Non-complex PCI	Complex PCI
Interventionist with experience of imaging	No	Yes
Interventionist without experience of imaging	Yes	Yes

Resident of Cardiology  Interventional fellow  Independent Interventionist

Dreams will come true

