# Optimize stents with IVUS

Optimize short- and long-term patient outcomes using a defined pre- and post-stent criteria with Philips IVUS.[1-2]

The treatment of coronary lesions with DES is complicated by the challenges of suboptimal post stent results, such as stent under expansion, incomplete stent apposition, edge dissection and geographic miss, which may contribute to the risk of stent failure. [3]
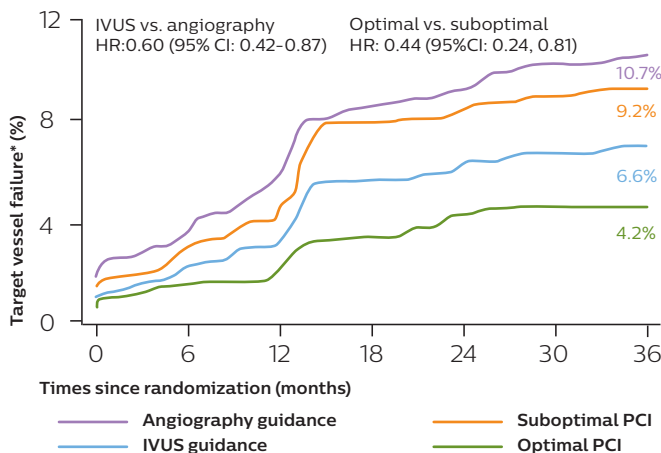
Recent publications suggest angiography alone is not enough and that that the use of IVUS to guide stent planning and optimization delivers enduring reduction in MACE and TVF.

Geographic miss   **Underexpansion and mal apposition**   **Edge dissection**
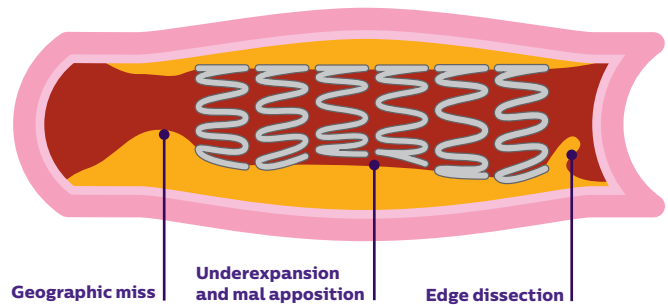
ULTIMATE trial[1]

Compared to angiography-guided PCI alone, in all comer patients, ULTIMATE shows that IVUS-guided PCI significantly reduces clinically driven Target Lesion Revascularization (TLR). This benefit was sustained over three years.

Only 1.6% TVF* at 12 months and 4.2% TVF at 3 years when optimal IVUS-guided PCI criteria was met.

IVUS vs. angiography HR:0.60 (95% CI: 0.42–0.87)
Optimal vs. suboptimal HR: 0.44 (95%CI: 0.24, 0.81)

- 10.7%
- 9.2%
- 6.6%
- 4.2%

Target vessel failure* (%) — Times since randomization (months)

— Angiography guidance
— IVUS guidance
— Suboptimal PCI
— Optimal PCI

*TVF categorized as cardiac death, target vessel MI and clinically driven TVR
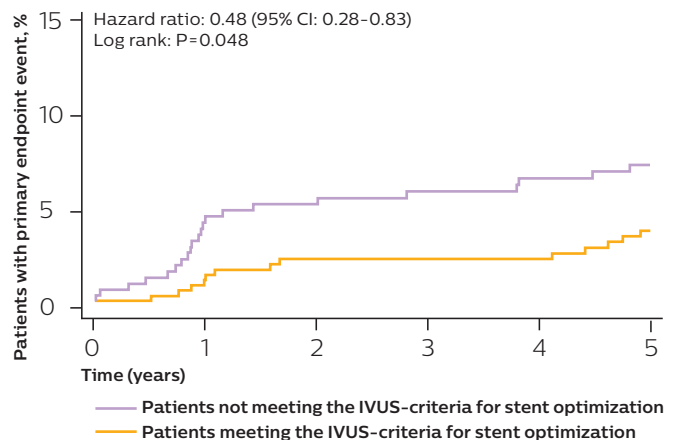
Study outcomes were strongest when specified criteria for an optimal PCI procedure were met.

IVUS-XPL 5-yr follow up[2]

Patients in the IVUS-guided stent group who did not meet IVUS criteria for stent optimization had a significantly higher incidence of MACE at 5 years compared with those who met IVUS criteria for stent optimization.

MACE 7.4% vs 4.0% (p=0.048)

**Only 1.5% MACE at 12 months and 4.0% at 5 years when optimal IVUS-guided PCI criteria was met.**

Patients with primary endpoint event, % — Time (years)

Hazard ratio: 0.48 (95% CI: 0.28–0.83)
Log rank: P=0.048

— Patients not meeting the IVUS-criteria for stent optimization
— Patients meeting the IVUS-criteria for stent optimization

Number at risk					
315	285	276	270	261	253
363	334	326	320	313	292

Plan, land and expand

Plan the procedure with pre-stent IVUS to size stents and identify the optimal landing zone.
Perform post-stent IVUS to confirm good stent expansion, apposition and no edge dissection.
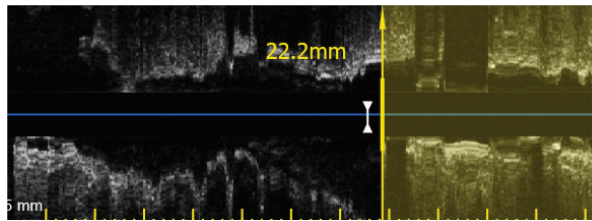
Plan

Pre-stent IVUS to guide procedural planning
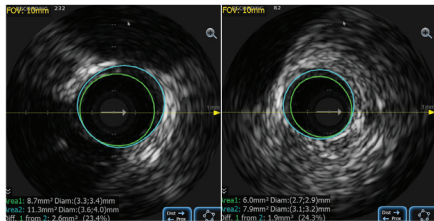
Stent/vessel diameter

· Measure distal reference and
  determine stent diameter

· Measure proximal reference to
  guide post stent dilation

Landing zone/stent length

Identify most normal segments adjacent to target
lesion, with plaque burden <50% at 5mm. Measure
distance between distal and proximal reference
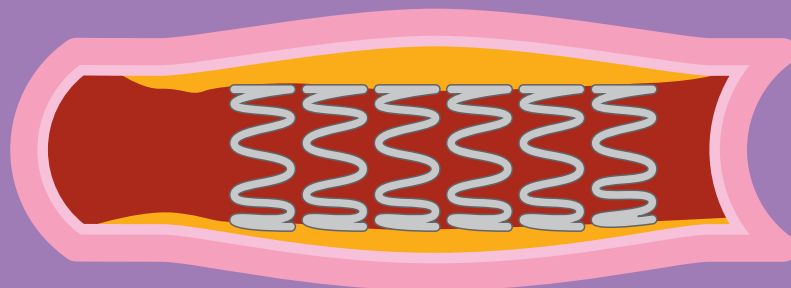point, round up to the nearest stent length.
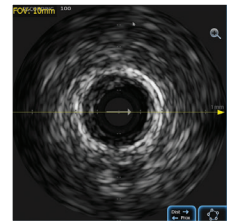
Lesion

Assess lesion
characteristics
to guide plaque
modification
strategy.

Land and expand

Post-stent IVUS to guide and confirm stent optimization

Criteria used for IMPact on Revascularization Outcomes of intraVascular Ultrasound Guided
Treatment of Complex Lesions and Economic Impact (IMPROVE) trial. Shlofmitz et al.[4]

Landing zone
Plaque burden <50% at 5 mm
proximal and distal to stent edge.

Expansion and apposition
MSA ≥90% of the distal reference
lumen area and full stent apposition
throughout.

Stent edges
No edge dissection involving media
with length > 3mm and arc ≥ 60°.

1. Zhang J et al. Three year outcomes of the The ULTIMATE trial. Intravascular Ultrasound-Guided Versus Angiography-Guided
   Implantation of Drug-Eluting Stent in All-Comers. Presented at TCT Connect, 15th October 21.

2. Hong et al. 5-Year Follow-Up of the IVUS-XPL Randomized Trial. JACC; 13 Jan, 2020:62 –7 1.

3. N. Pal, J. Din. Et al Contemporary Management of Stent Failure: Part OneInterventional Cardiology Review 2019;14(1):10–6.
   DOI:https://doi.org/10.15420/icr.2018.39.1

4. Shlofmitz et al. IMPROVE trial: Study design and rationale. AHJ; (2020) Oct, Vol 228, doi.org/10.1016/j.ahj.2020.08.002