

Evaluation of Neointima in DES

Quantitative and Qualitative

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Neointima Evaluation

- **Quantitative Measurement**

- **Qualitative Measurement**

Neointima Evaluation

- Quantitative Measurement

- Qualitative Measurement

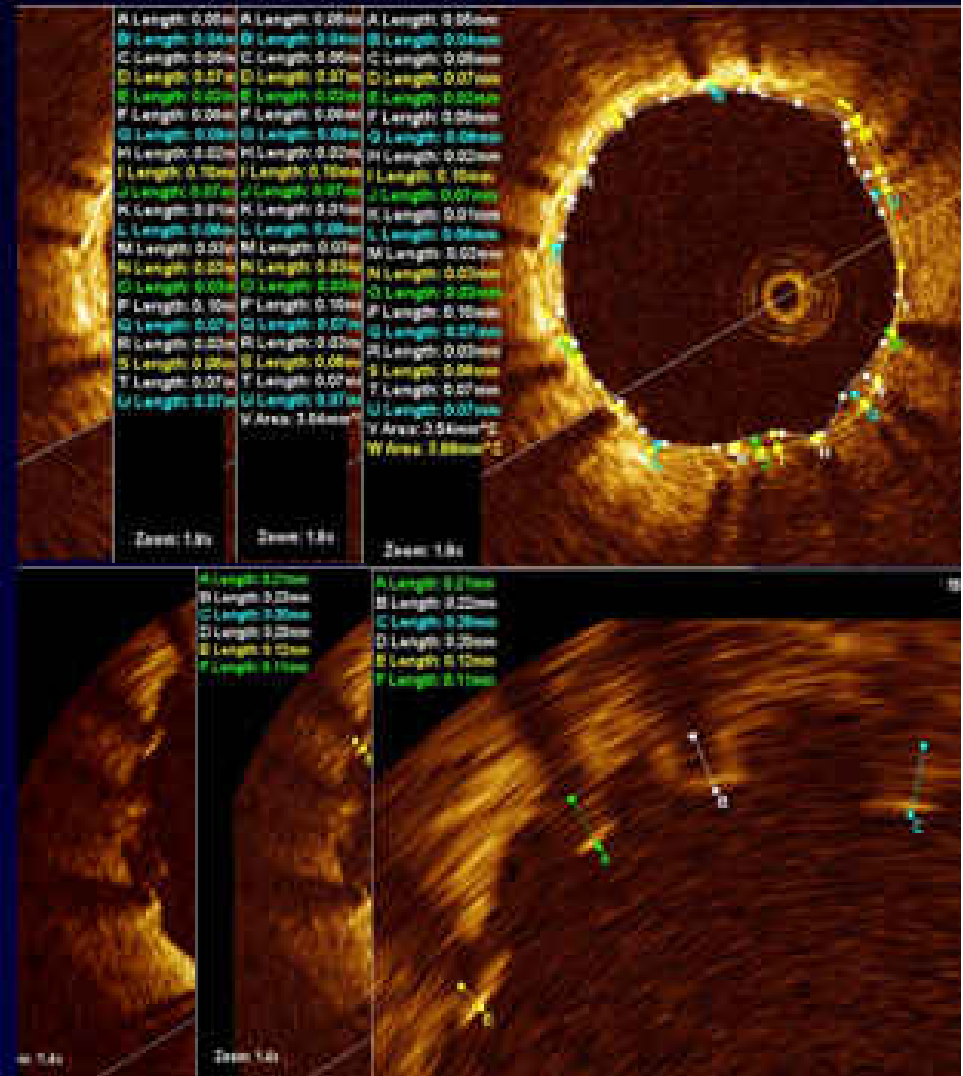
Optical Coherence Tomography Image Analysis

1. Neointimal thickness

The distances between the endo-luminal surface of neointimal and the strut reflection

2. Stent apposition

The distances between the endo-luminal surface of the strut reflection and the vessel wall



M/58

Lee JW

C.C. Chest pain for 3 hours

Risk factor **DM(+)**, HTN(-), Smoking(-)

Lab CK/CK-MB/TnT 116 / 3.43 / < 0.01
=> f/u **CK-MB 314.30 (6 hour)**

ECG ST elevation V2~V5

Diagnosis **STEMI**

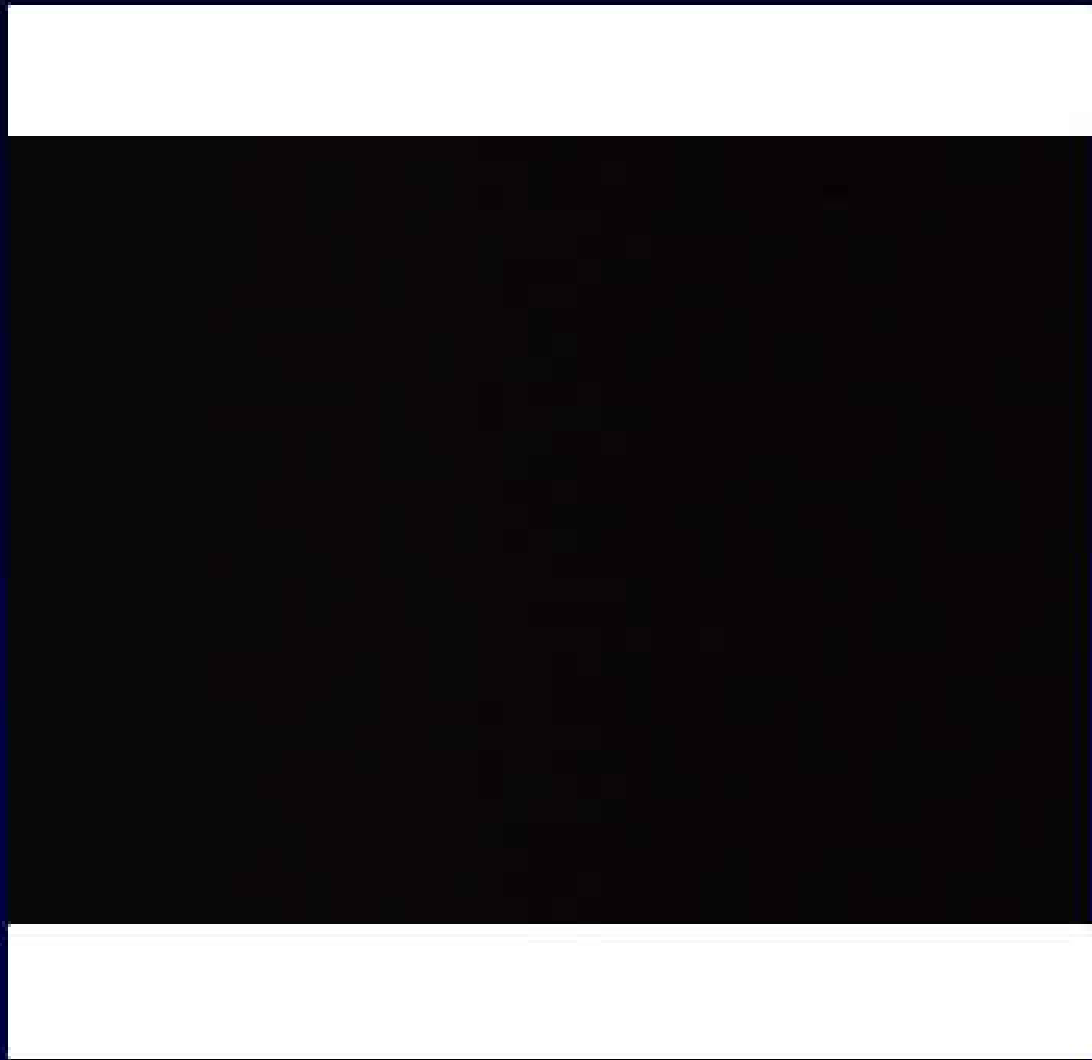
Primary PCI



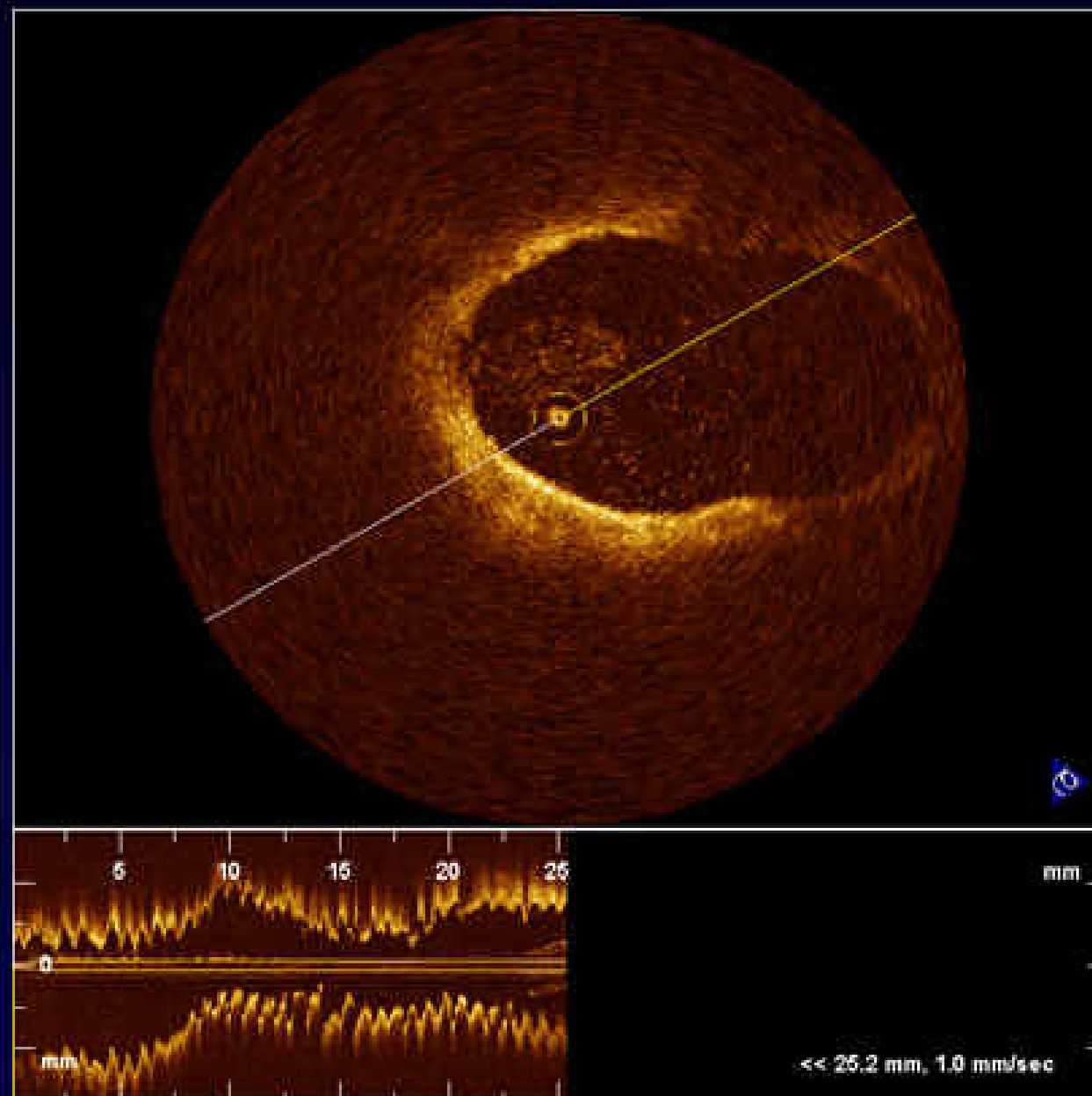
Guiding : JLG 7-4, GW : Pilot
Balloon predilation : 2.5 x 20mm
Stent : Cypher 3.0 x 18 mm

F/U CAG (9 month)

Patent M-LAD stent



**9 mo-FU
OCT
after SES**



F/69

Kim YJ

C.C Squeezing chest pain for 2hrs

Risk HTN(+) 12YA, PO

Factor DM(+) 12YA, PO

Smoking(-)

PHx N-C

Progress CK/CK-MB/TnT : 144 IU/mL / 12.8 / 0.149ng/mL

NT-proBNP 1020 pg/mL

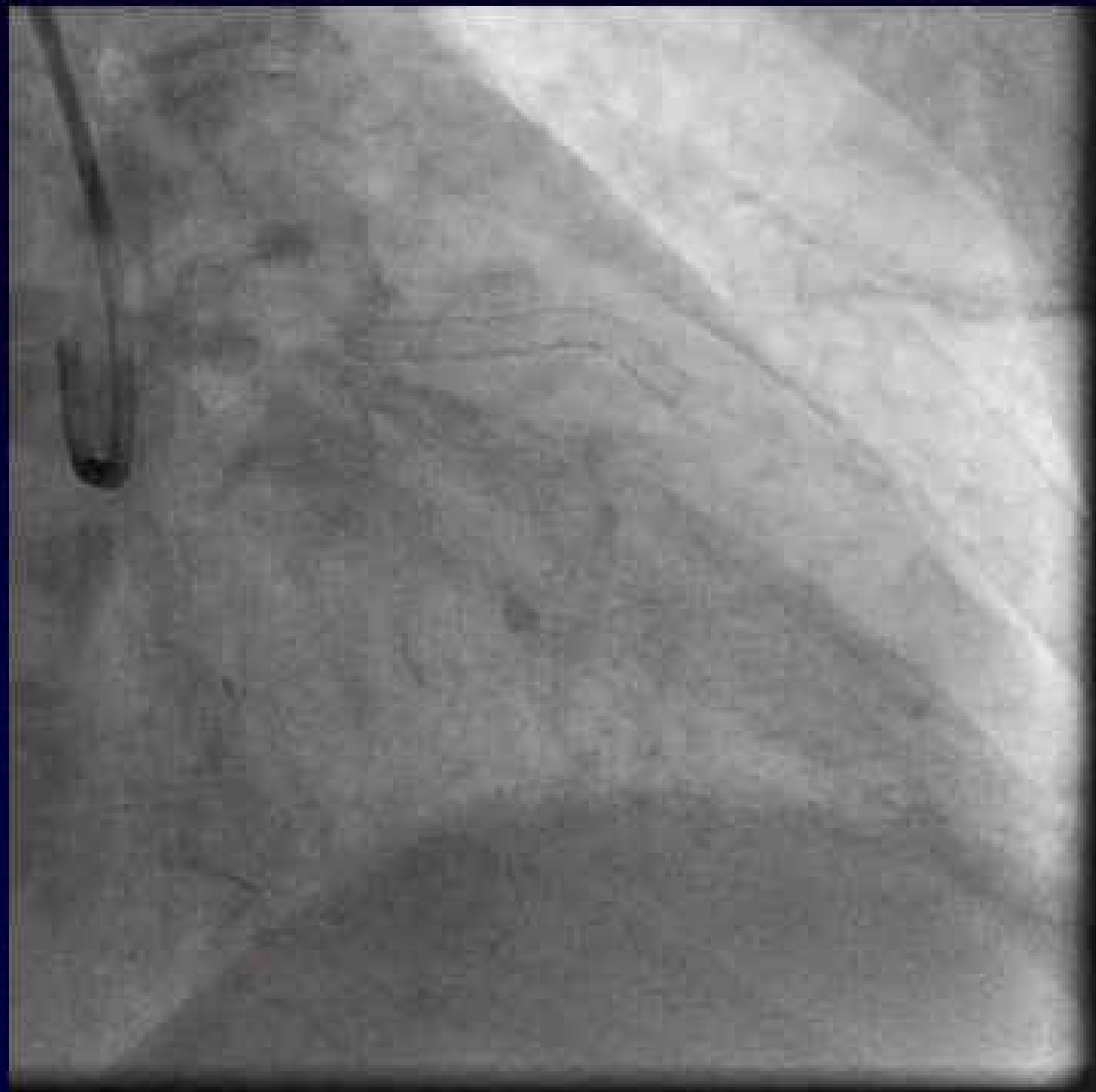
Primary PCI



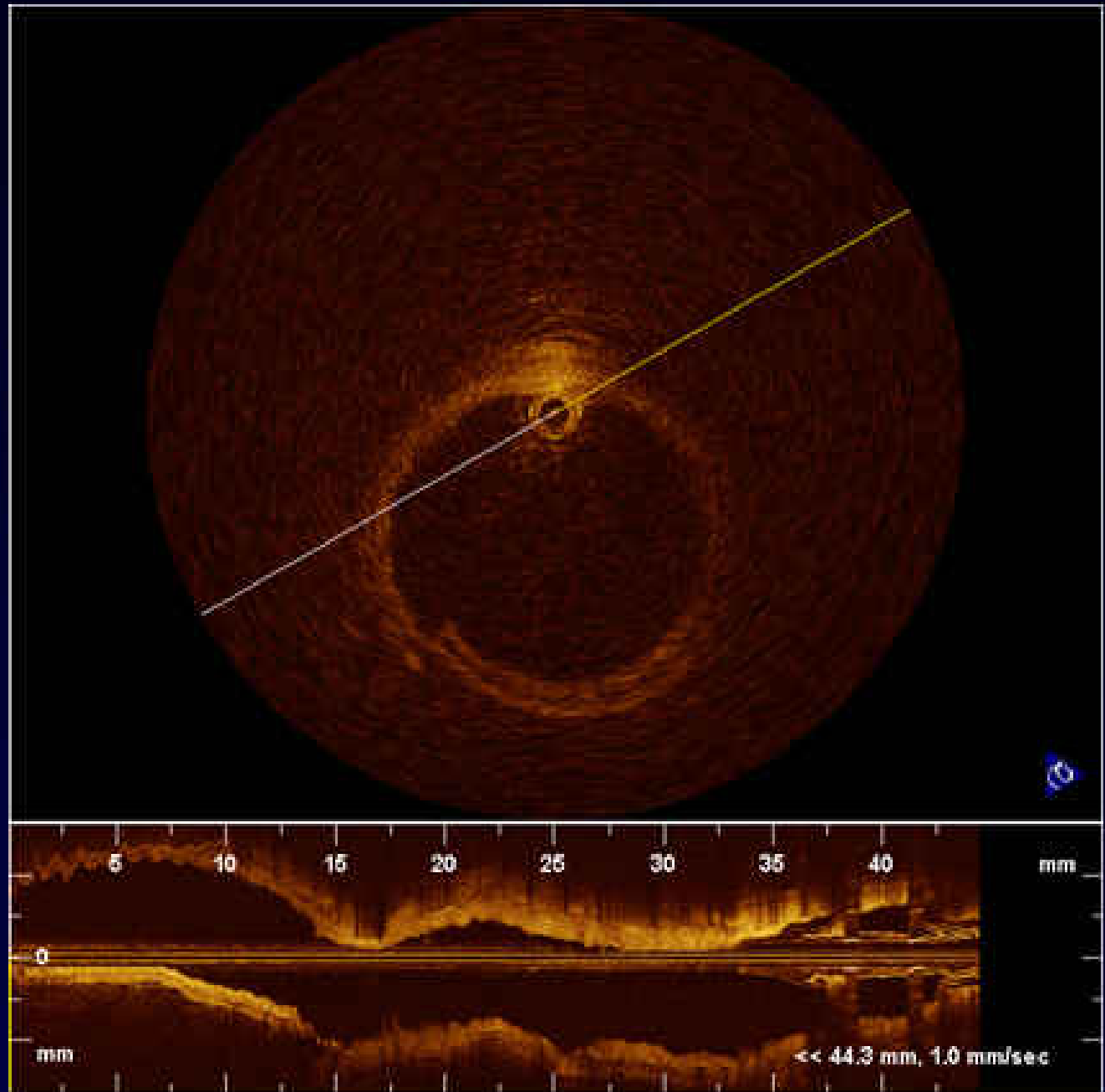
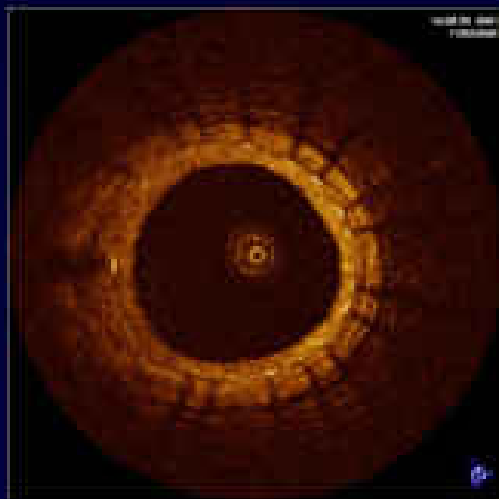
Guiding : EBU 7-3.5
Balloon predilation : 2.5 x 20mm, 10 atm
Stent : Endeavor 3.0 x 30 mm

F/U CAG (9 month)

Patent mLAD stent



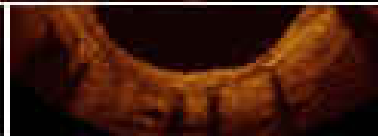
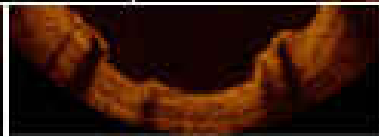
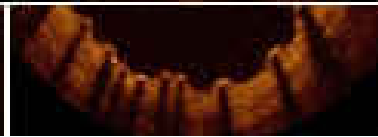
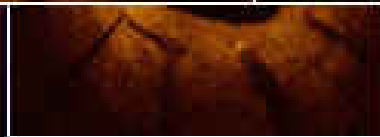
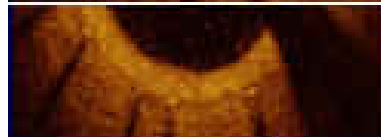
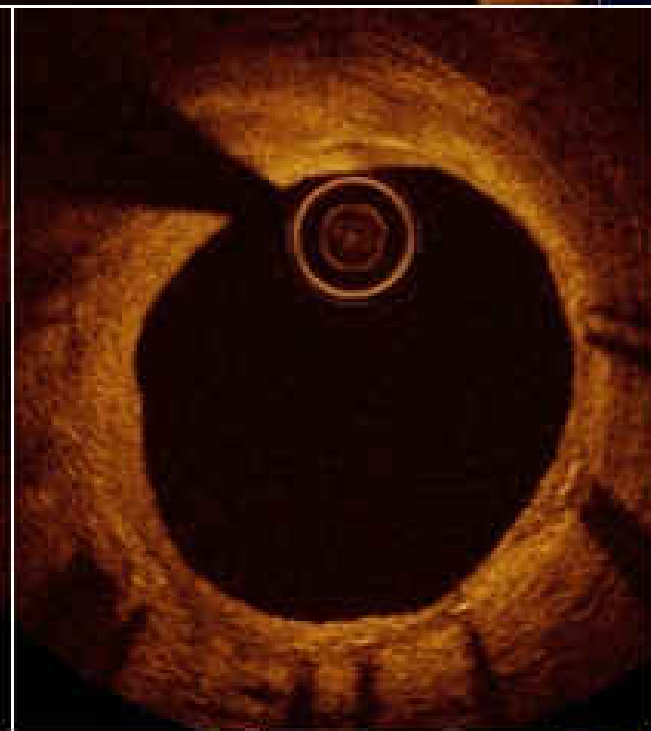
9 mo OCT ZES sprint



Endeavor™

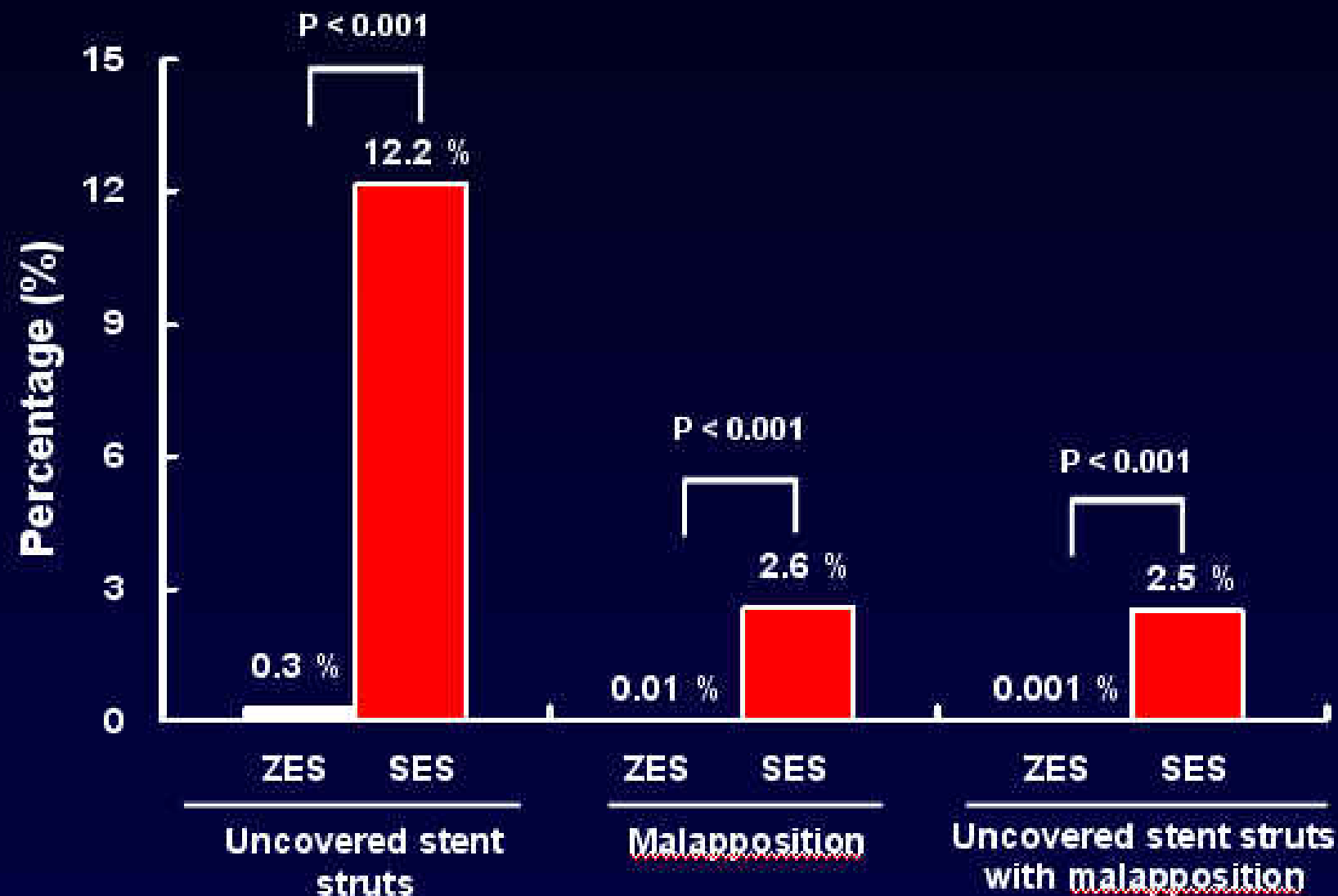
Cypher™

Taxus™



Courtesy by Guagliumi G

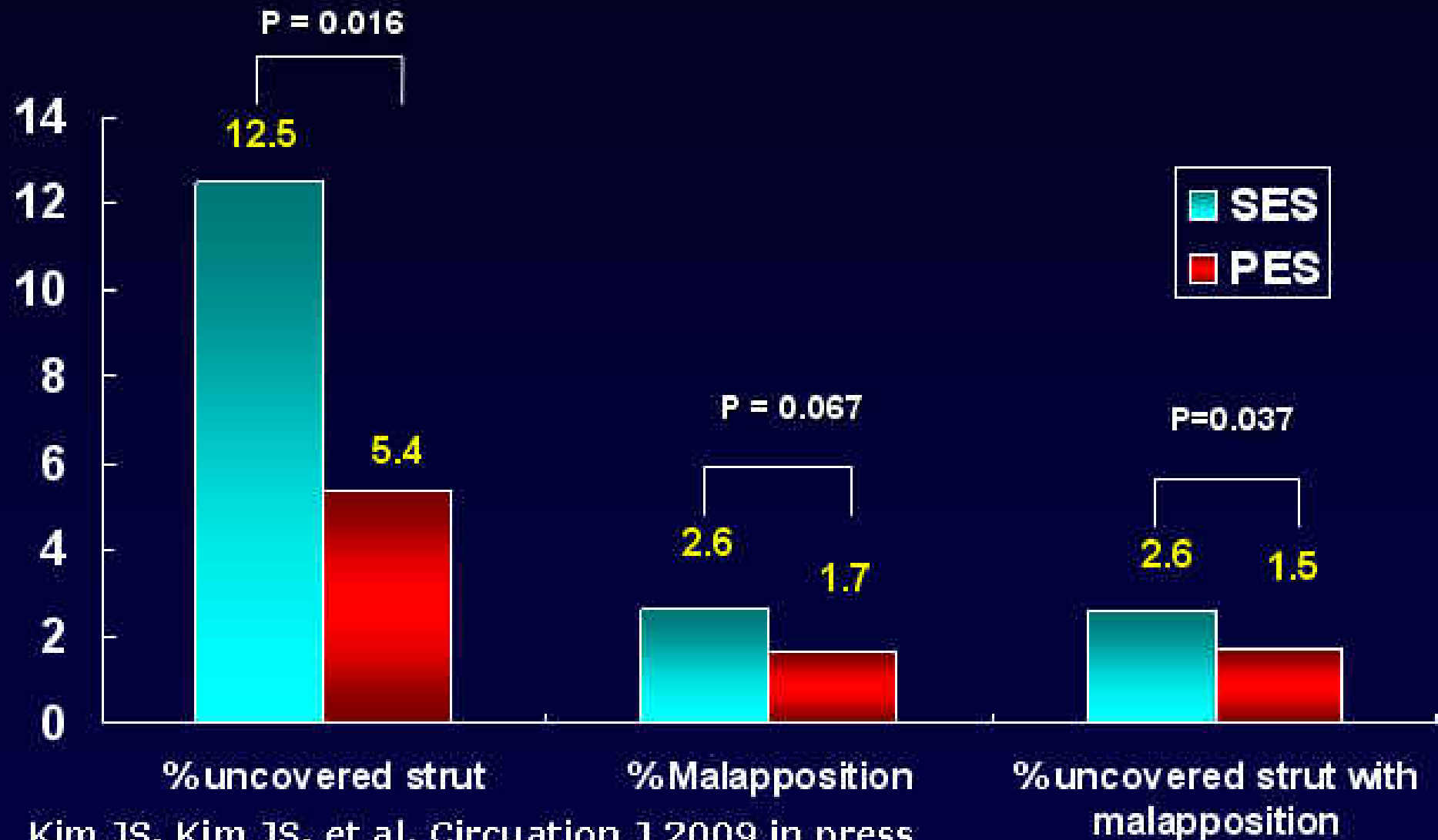
OCT Evaluation of ZES at 9 Month FU



Kim JS, Jang Y et al. Heart 2009 in press

OCT findings 68 patients (33 SES and 24 PES)

1379 mm in stent length including 11,837 struts

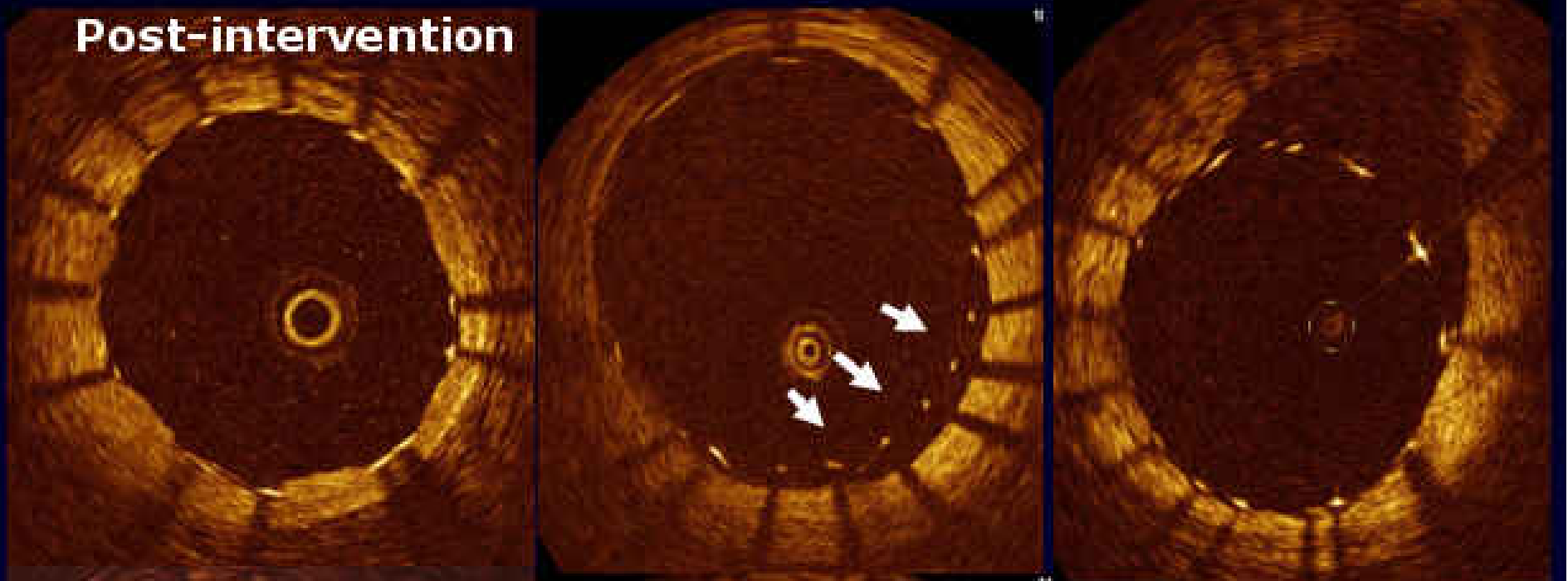


Neointima Evaluation

- Quantitative Measurement

- Qualitative Measurement

Post-intervention



3-Month follow-up



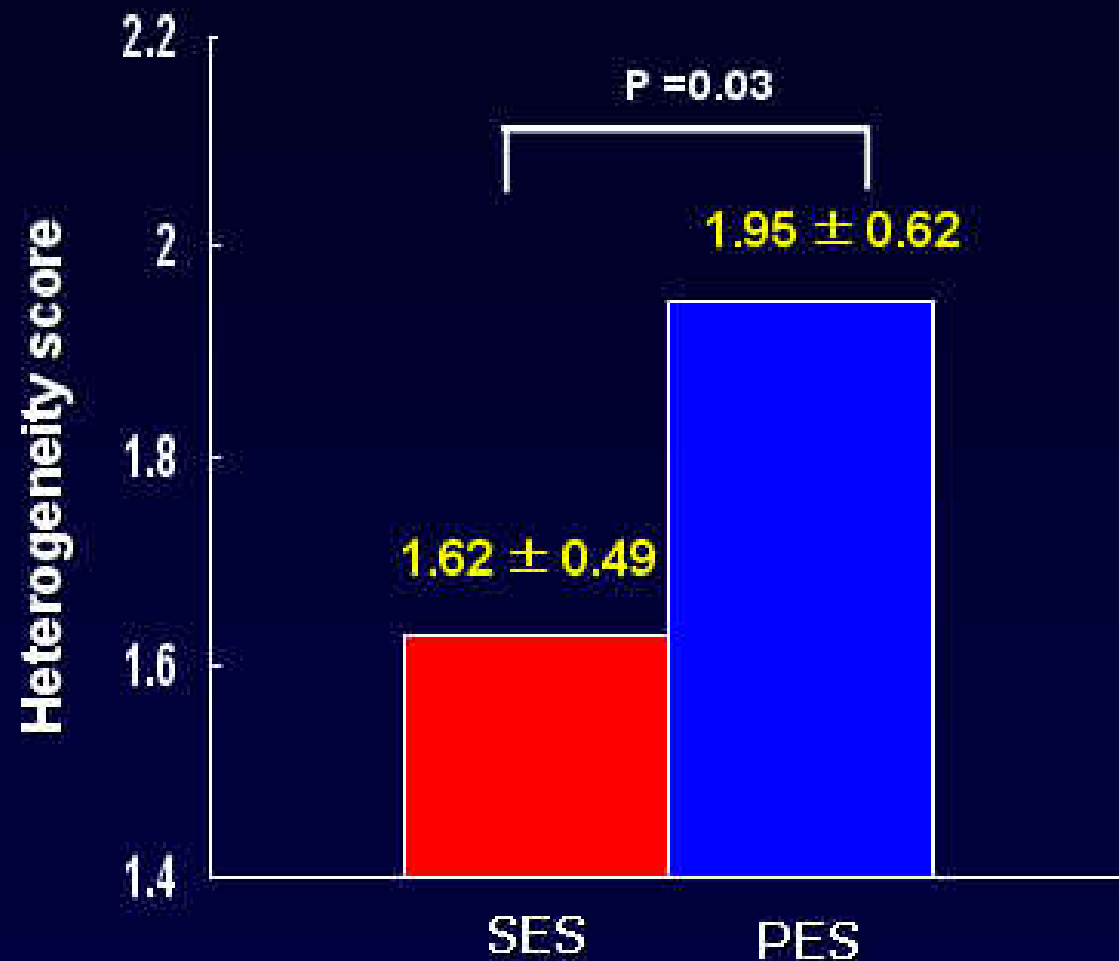
Kim JS, Jang Y et al. J Am Coll Cardiol Intv 2009 in press

Qualitative Measurement

Heterogeneous pattern of neointima



The heterogeneity score between SES and PES



Heterogeneity score was defined as subtraction between maximal and minimal neointimal grade

The status of NIH thickness at each cross section was divided into 4 grades;

Grade 0: exposed strut

Grade 1: NIH thickness < 100 μ m ,

Grade 2: NIH thickness between 100 and 200 μ m,

Grade 3: NIH thickness over 200 μ m.

The grade was determined as minimal grade including ≥ 10 % of stent struts at each stent

Kim JS, Kim JS, et al. Circulation 3 2009 in press

Pattern of restenotic tissue

Restenotic tissue structure



Homogeneous: restenotic tissue has uniform optical properties and does not show focal variations in backscattering pattern.

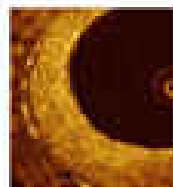


Heterogeneous: restenotic tissue has locally changing optical properties and shows various backscattering patterns.



Layered: restenotic tissue consists of concentric layers with different optical properties; an adluminal high scattering layer and an abluminal low scattering layer.

Restenotic tissue backscatter

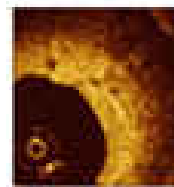


High: the majority of the tissue shows high backscatter and appears bright.



Low: the majority of the tissue shows low backscatter and appears dark or black.

Microvessels visible

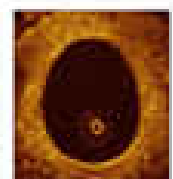


Yes: microvessels appear as well delineated low backscattering structures less than 200 microns in diameter that show a lumen within the vessel.



No

Lumen shape

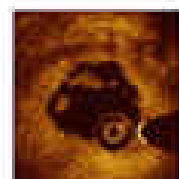


Regular: lumen border is sharply delineated, smooth and circular.

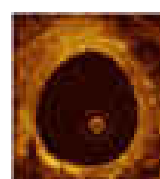


Irregular: lumen border irregular with tissue protrusions from the vessel wall into the lumen.

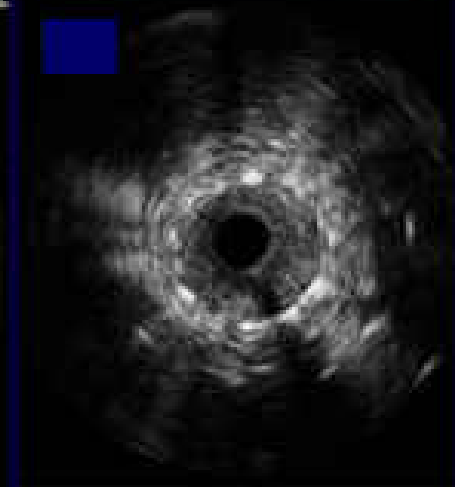
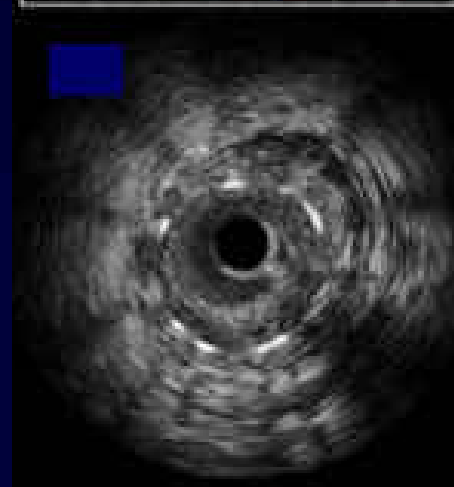
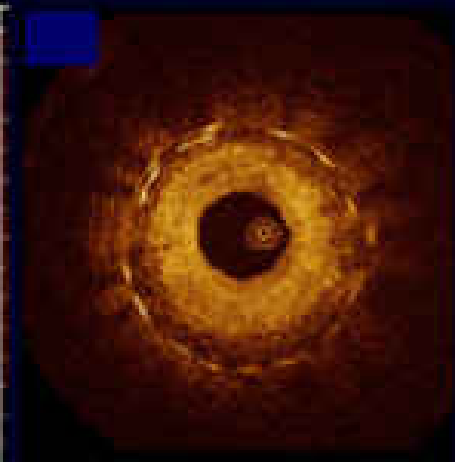
Presence of intraluminal material



Yes: there is visible material inside the vessel lumen.



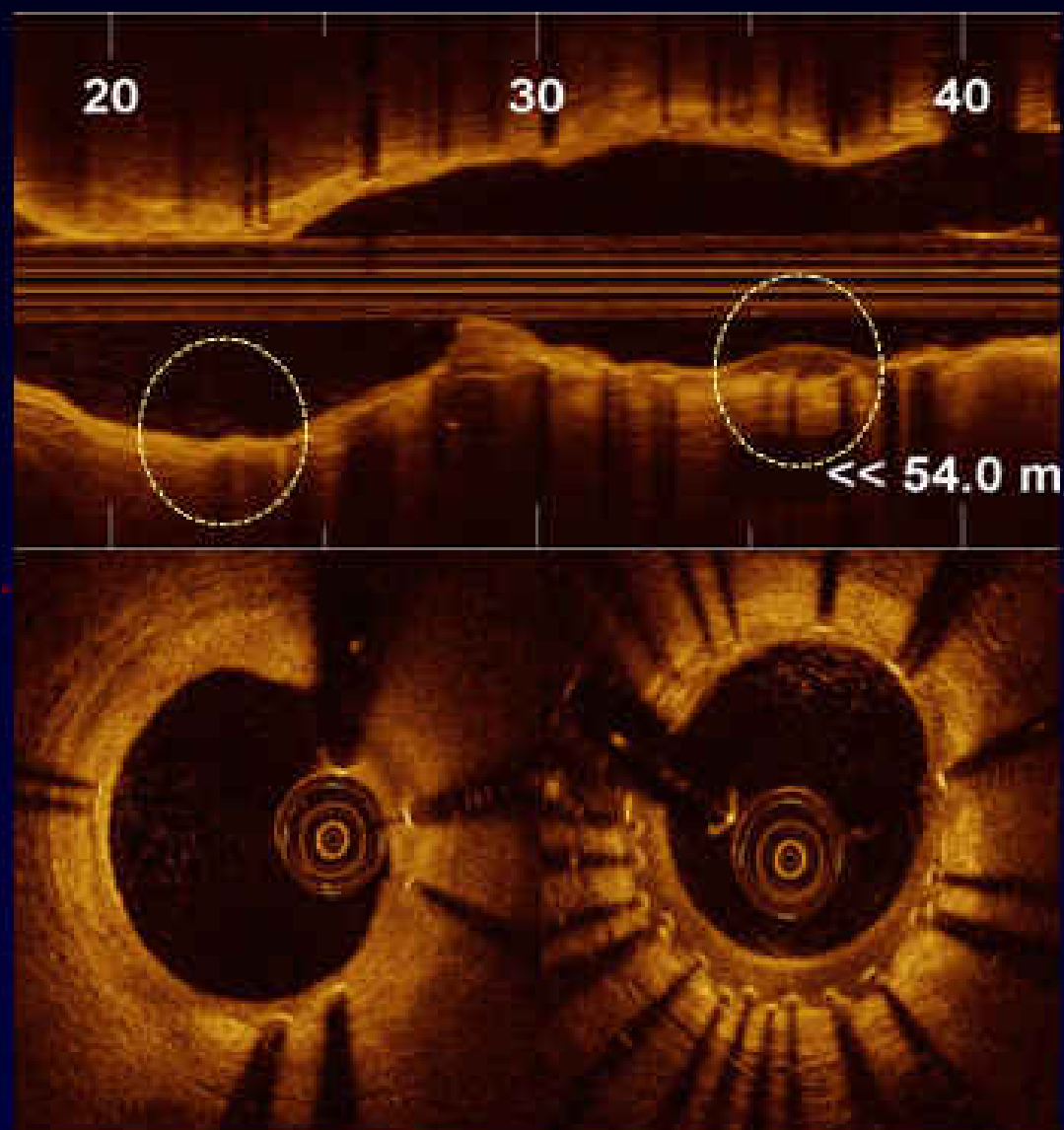
No



Gonzalo N et al, Am Heart J 2009 158: 284-93

2nd generation DES 3.0/18 +3.0/18 mm

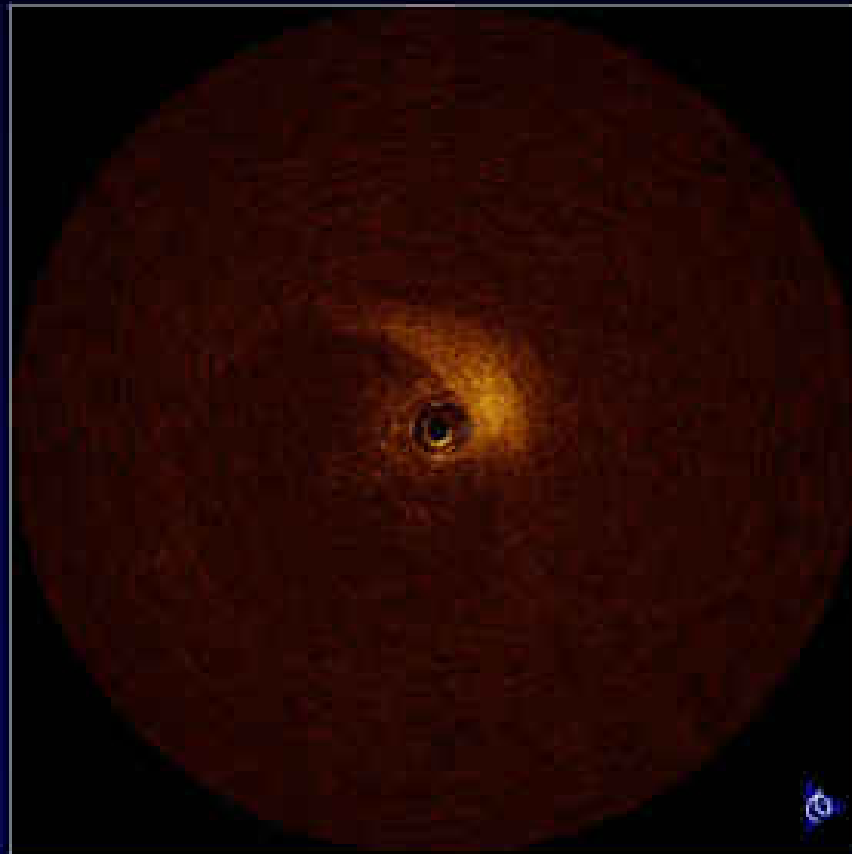
3 mon FU



Courtesy by Guagliumi G

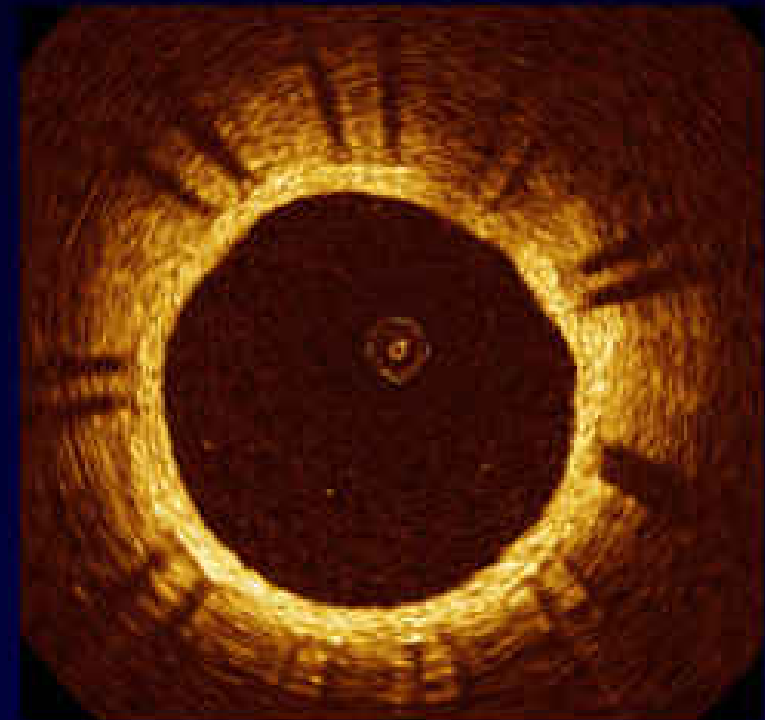
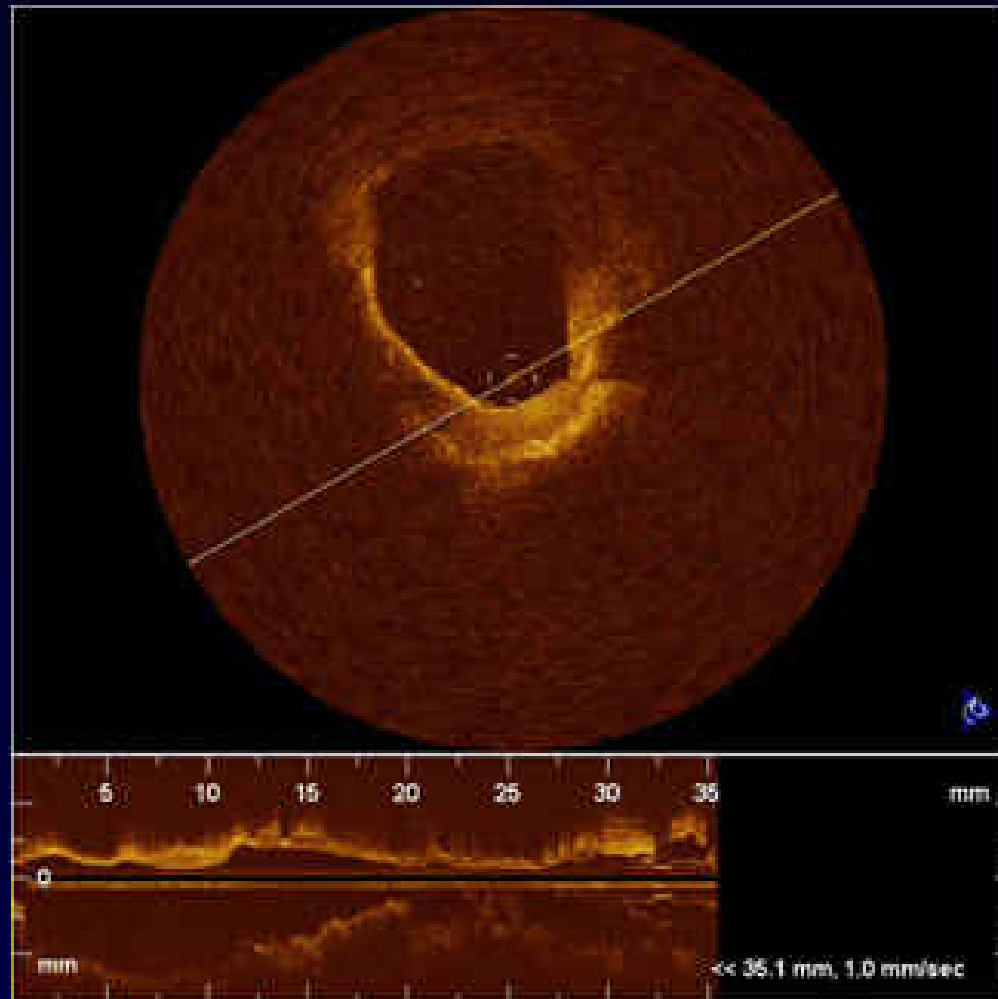
Quality of Neointima

Abnormal pattern of neointima



Quality of Neointima

Abnormal pattern of neointima



Summary

- OCT can better visualize and estimate thin neointima after DES implantation.
- The pattern of vascular healing was somewhat different depending on the types of DES.
- Clinical implications of various OCT findings needs to be investigated in further studies.
- Definition of tissue characterization and stent evaluation needs to be standardized.