

Aneurysm with LSM as a Mechanism of Late Stent Fracture after DES Implantation

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Chicken or Egg?



1st Admission (2003,12)

43 year-old male

Effort related chest pain for 5 months

Hypertension (+) Smoking (+) 20 Pack.years

EKG: sinus bradycardia

Chest PA: normal

Stress [Recon]

06-Dec-2003 09:05:36
Intervals: 1
Pharma: 201 Thallium
UrgVol: 73 ml
TID: 1.22
SSS: 15
Database:

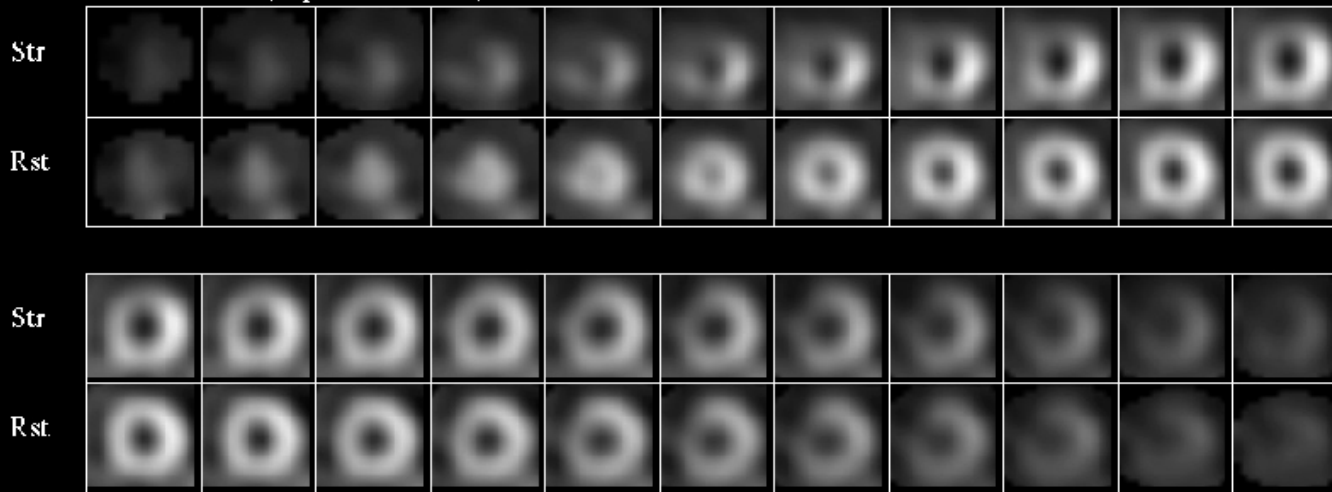
V-RST/TL/NC/M

Rest [Recon]

06-Dec-2003 13:02:27
Intervals: 1
Pharma: 201 Thallium
UrgVol: 60 ml
TID: N/A
SRS: 4
Database:

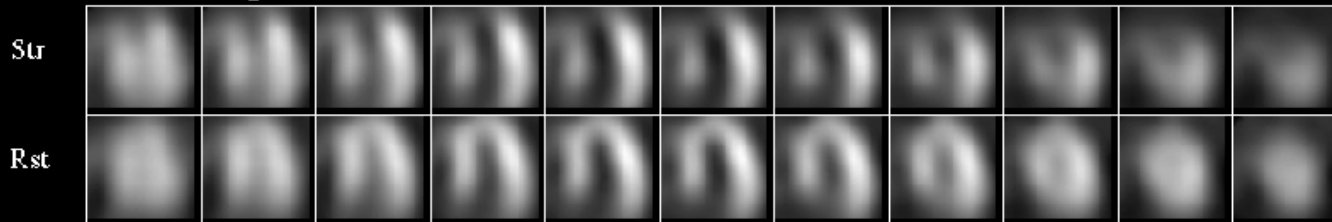
V-RST/TL/NC/M

Short Axis (Apex->Base)

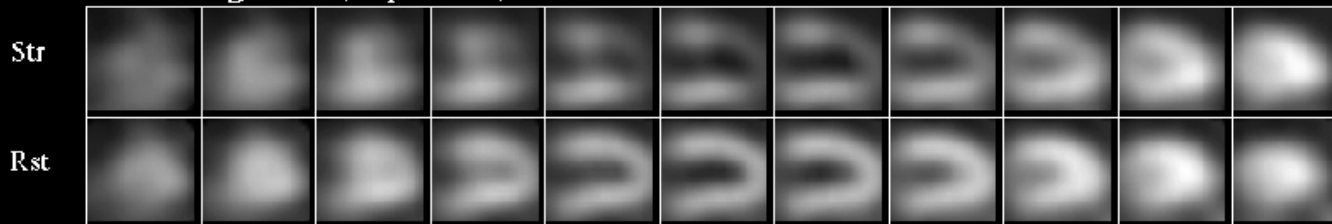


Reversible, large- sized severe perfusion defect in apical-mid anterior, apical septal, mid-basal anteroseptum

Horiz Long Axis (Post->Ant)

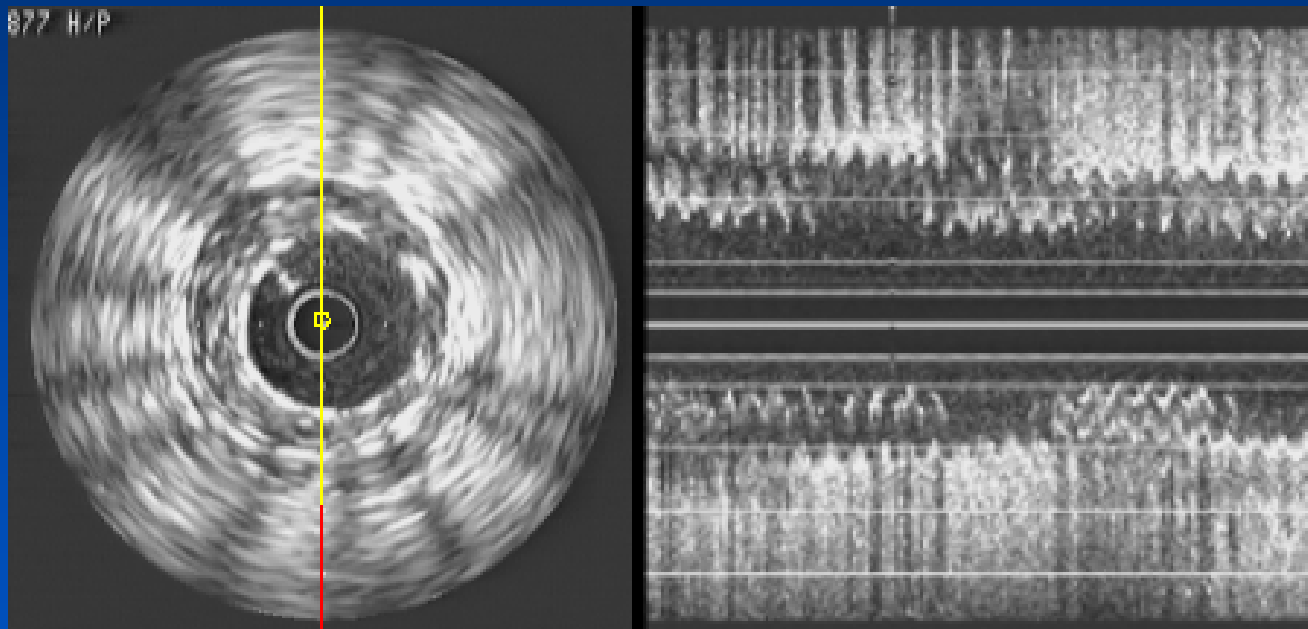


Vert Long Axis (Sep->Lat)

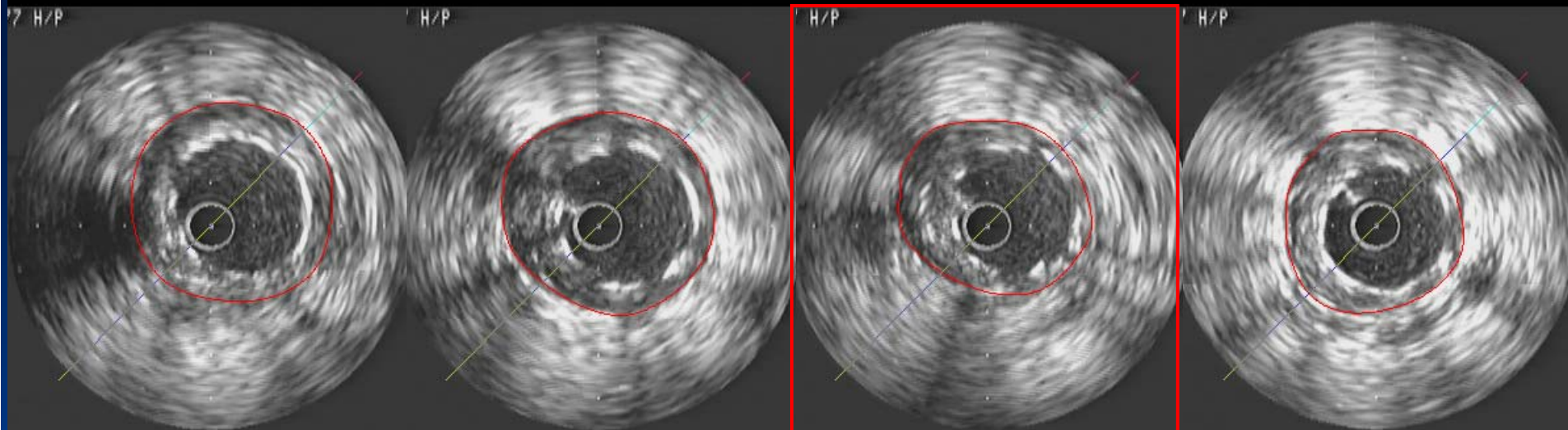


Initial CAG Finding

Diffuse, severe stenosis at p-mLAD with TIMI2 flow
DCA for the lesion with heavy atheroma
Cypher stent 3.5 (33)



Immediate Post-Stenting IVUS

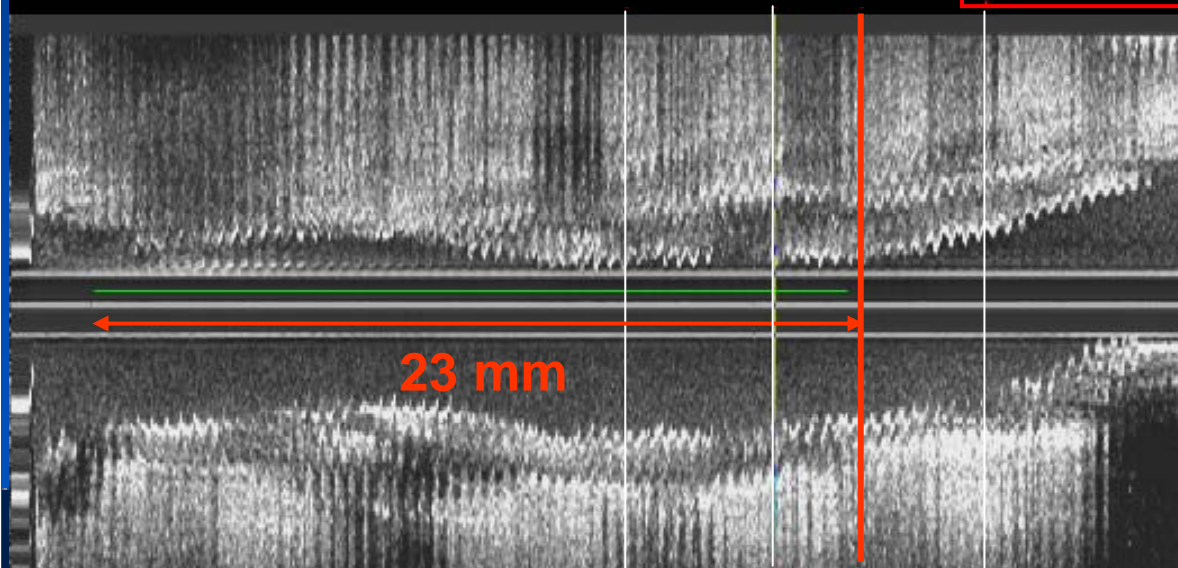


Area (mm ²)	
Lumen	
Vessel	17.12
Stent	

Area (mm ²)	
Lumen	
Vessel	17.47
Stent	

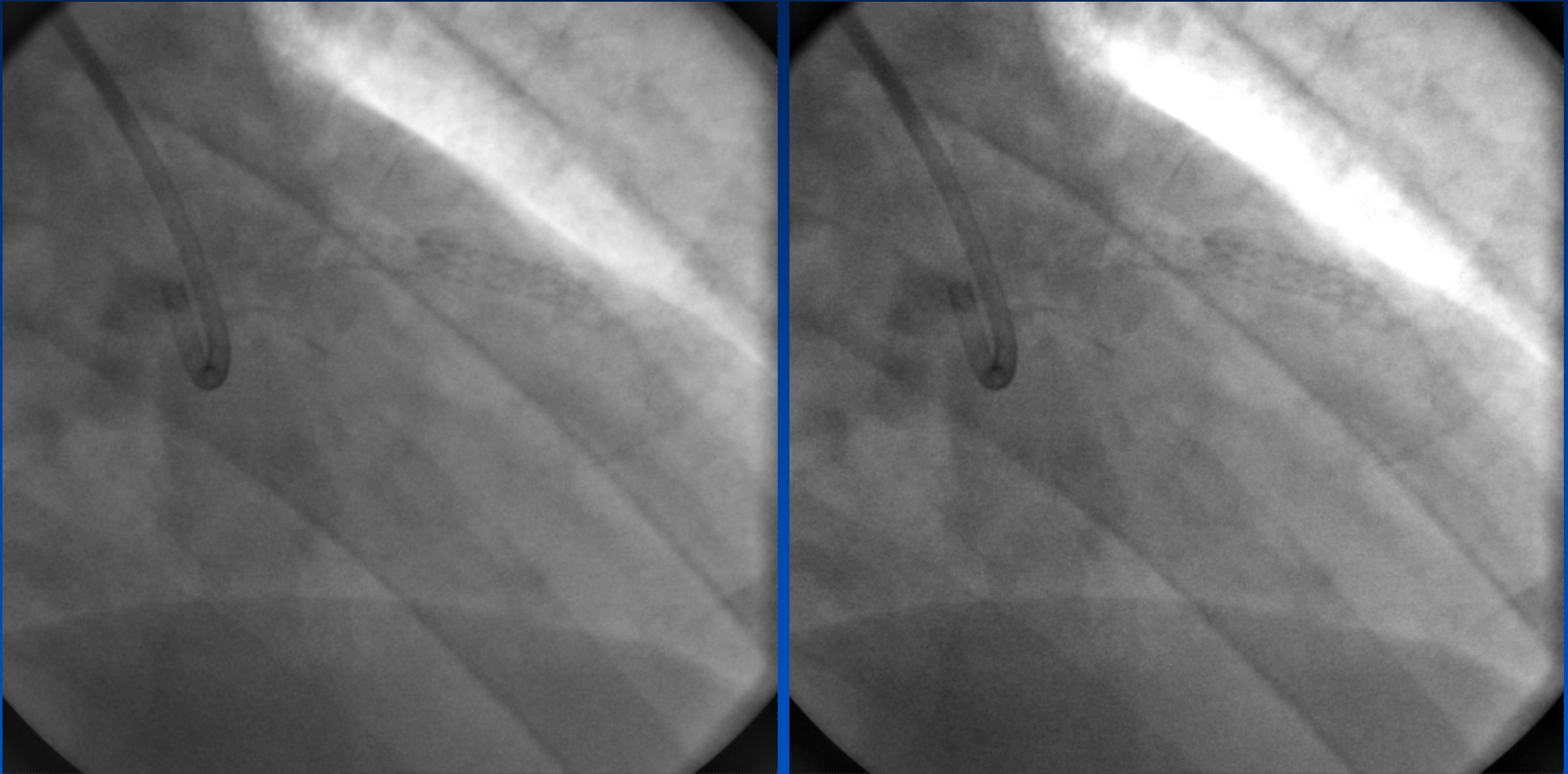
Area (mm ²)	
Lumen	
Vessel	13.93
Stent	

Area (mm ²)	
Lumen	
Vessel	13.71
Stent	

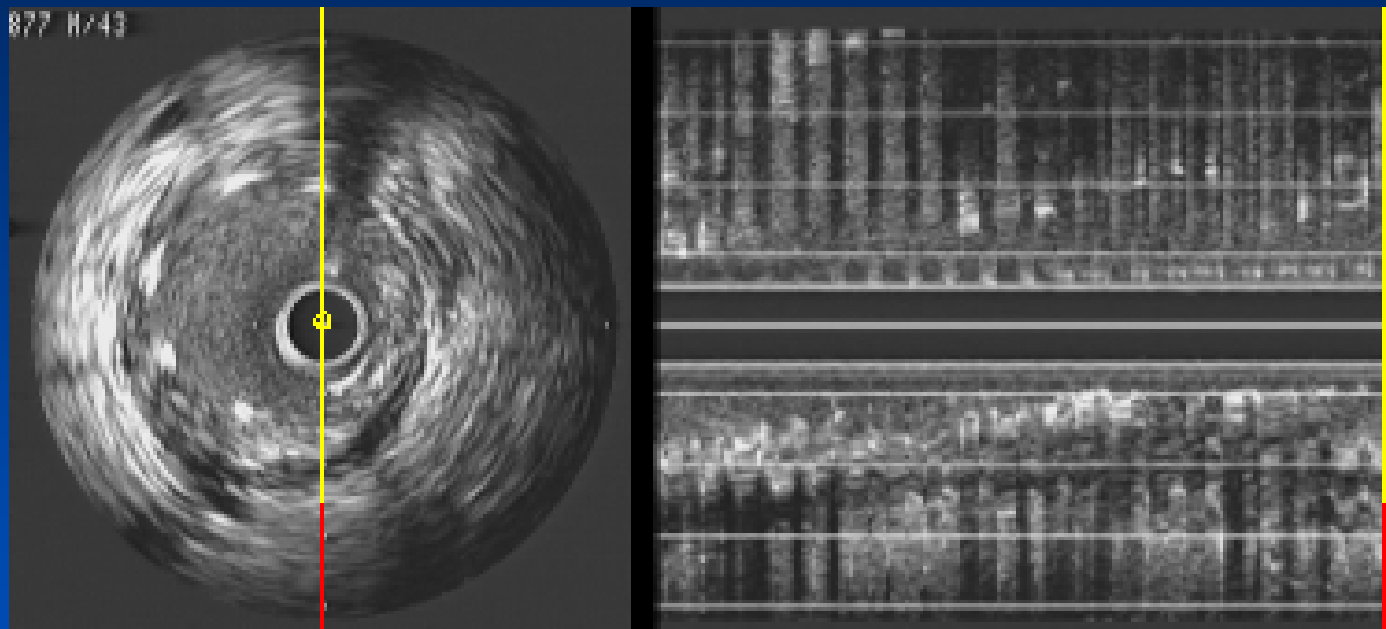


23 mm

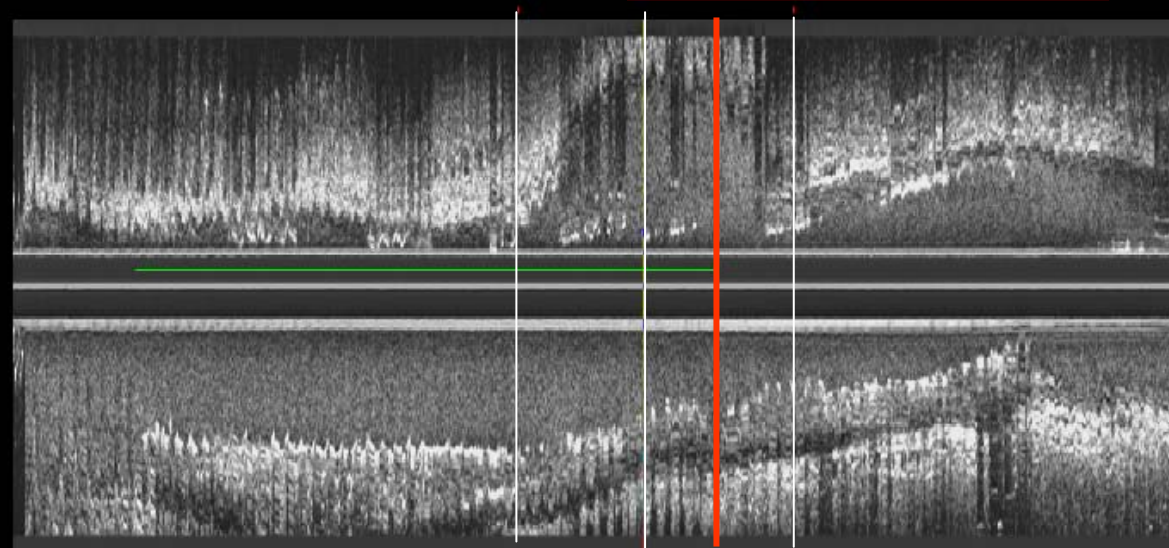
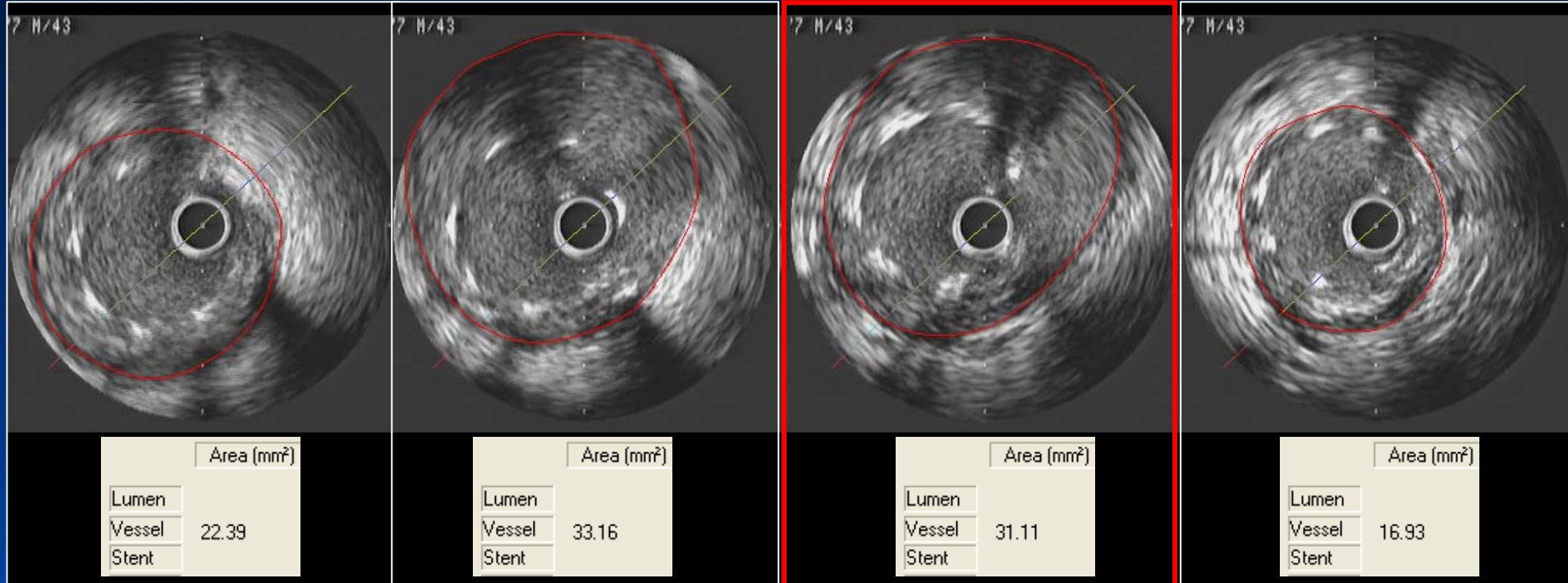
6-Month Follow-up CAG



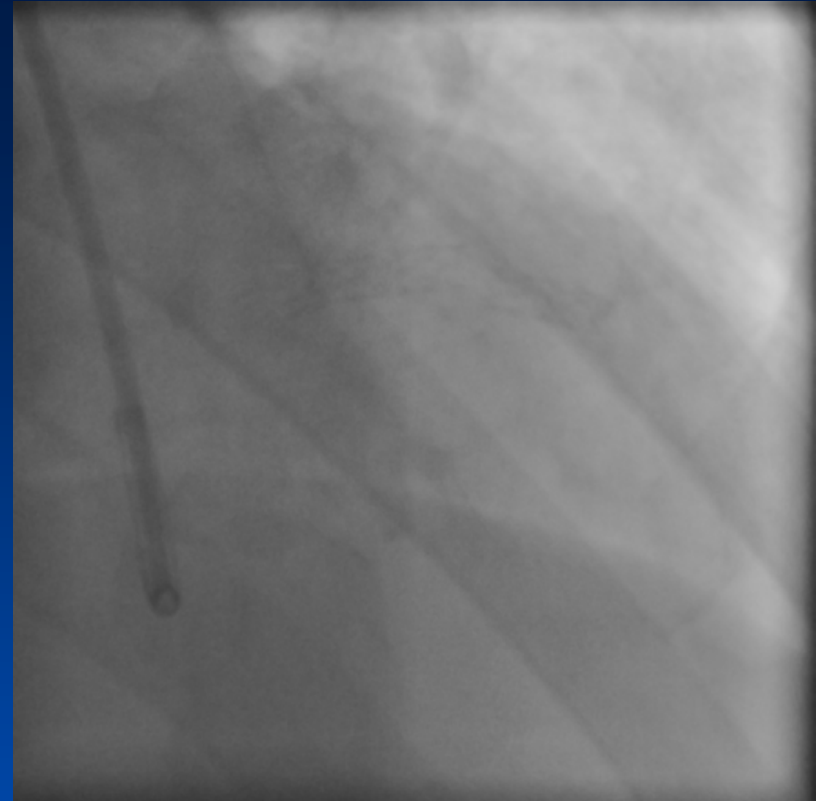
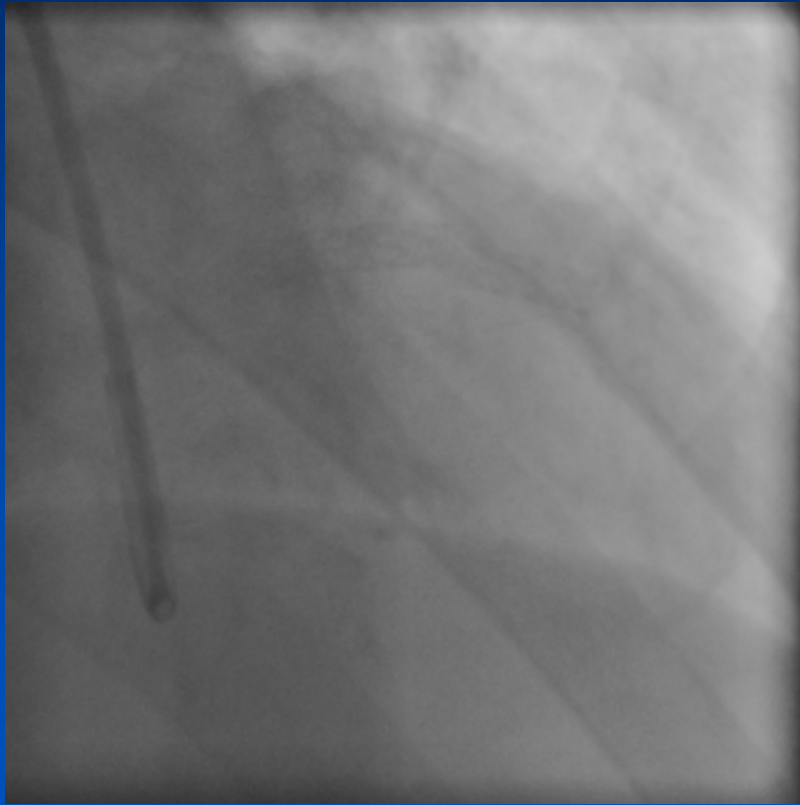
6-Month Follow-up IVUS



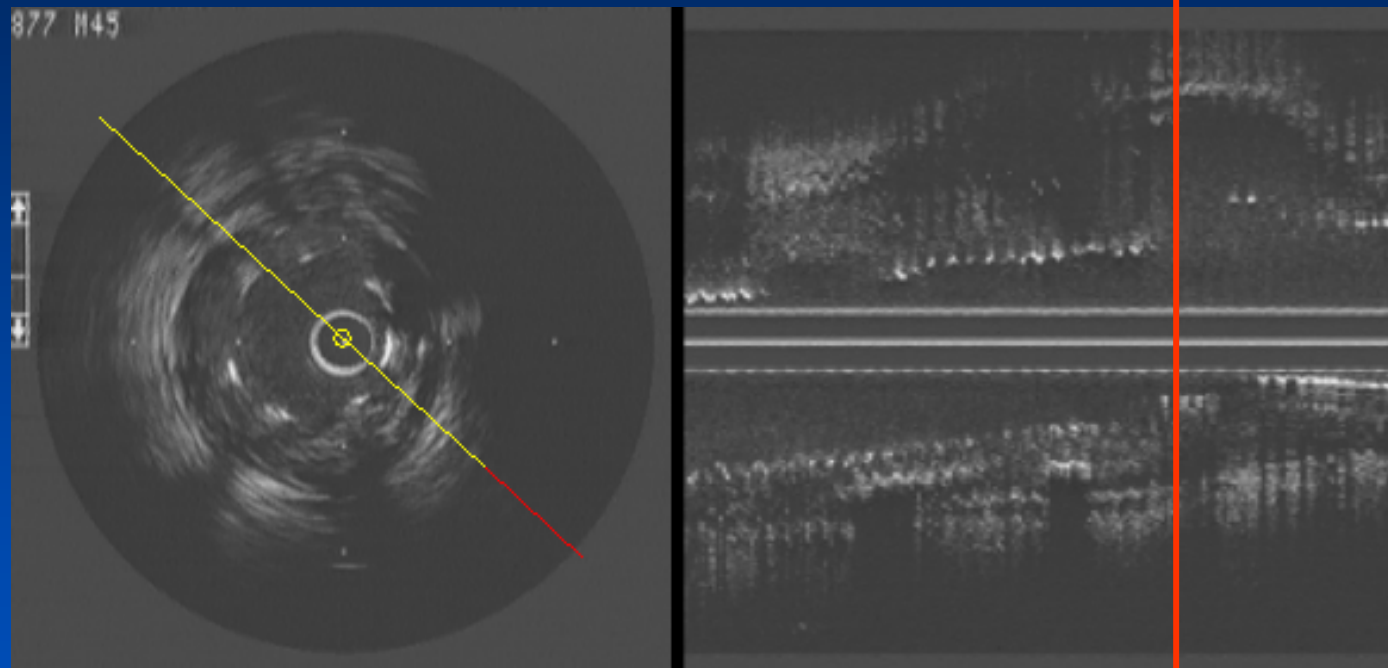
Huge aneurysmal changes with LSM

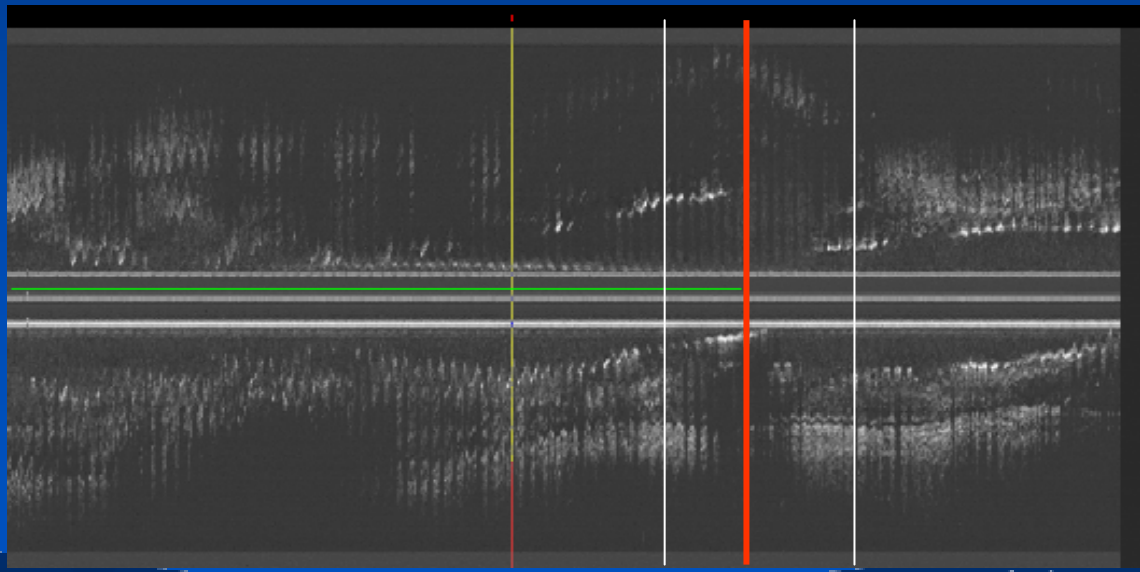
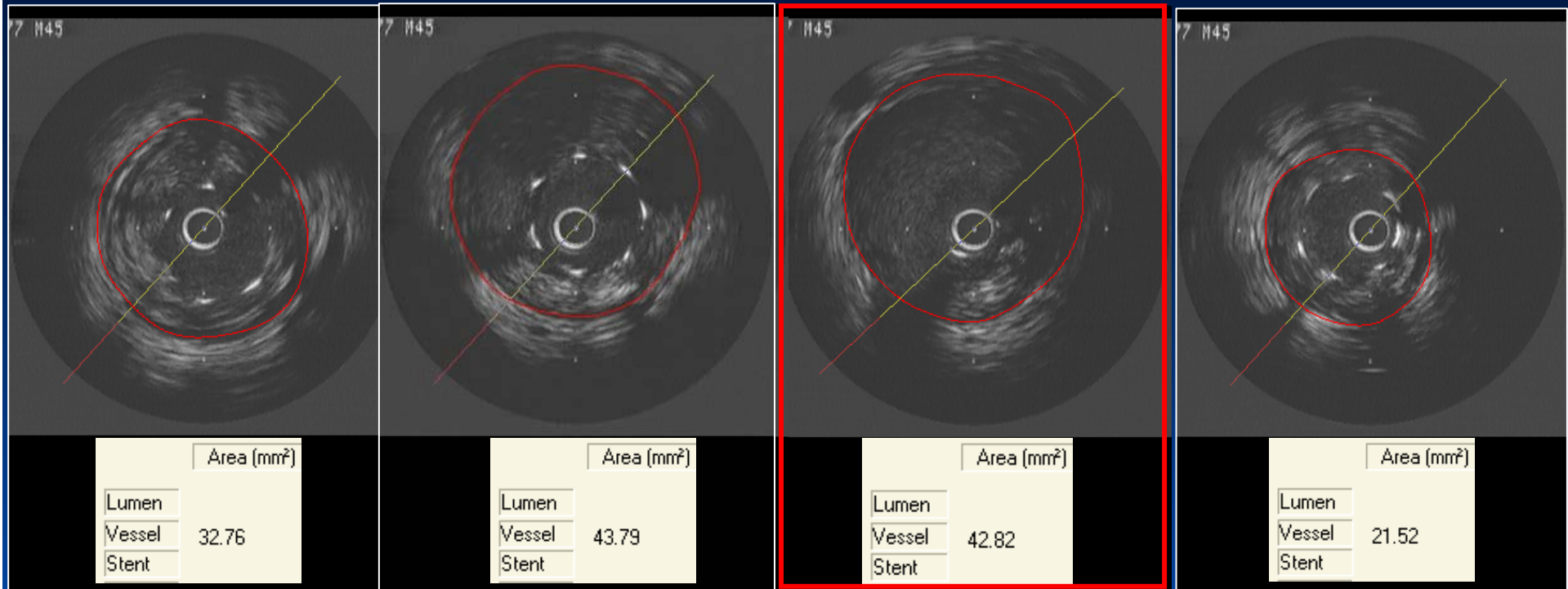


Follow-up CAG at 2-Year

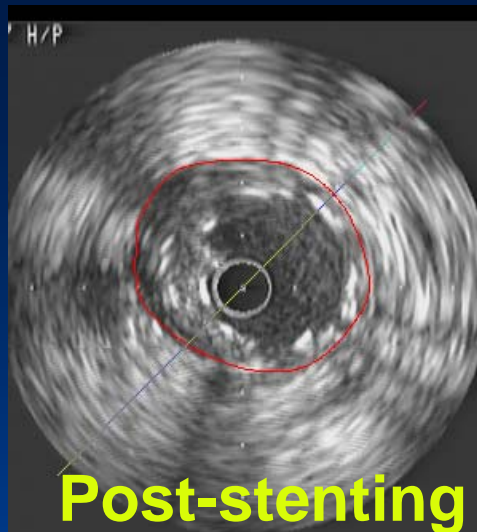


Follow-up IVUS at 2-Year





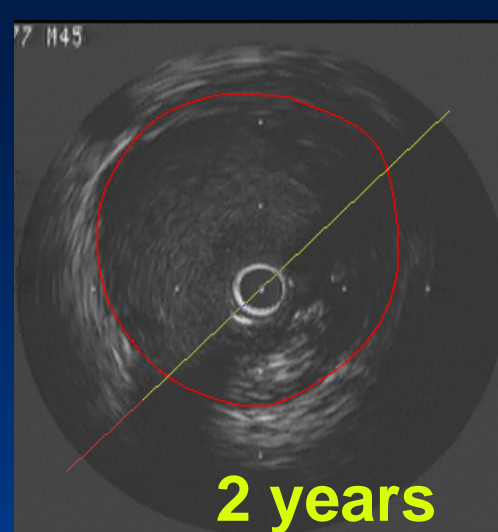
Serial IVUS at the Same Level of Fracture Site



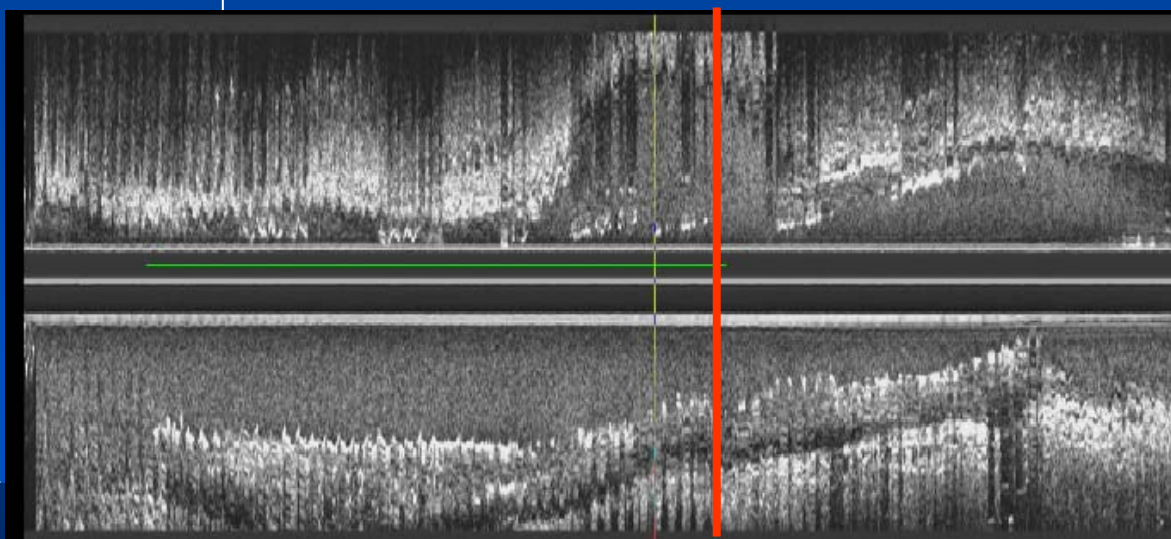
Area (mm ²)	
Lumen	
Vessel	13.93
Stent	



Area (mm ²)	
Lumen	
Vessel	31.11
Stent	

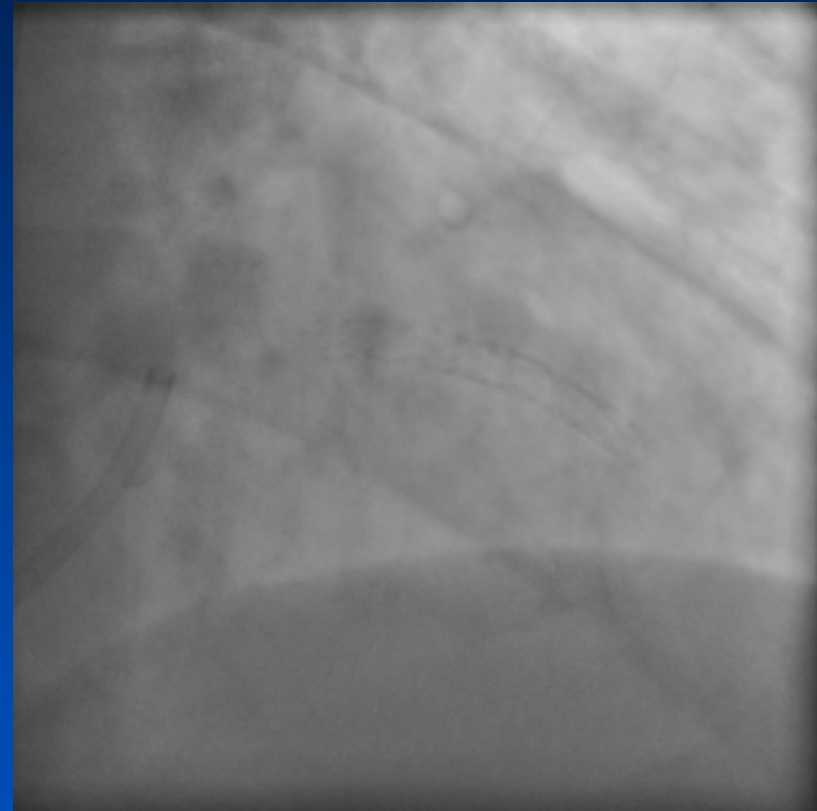


Area (mm ²)	
Lumen	
Vessel	42.82
Stent	



2nd Admission for PCI (2005,12)

Jo Graft 4.0(16) mm at mLAD

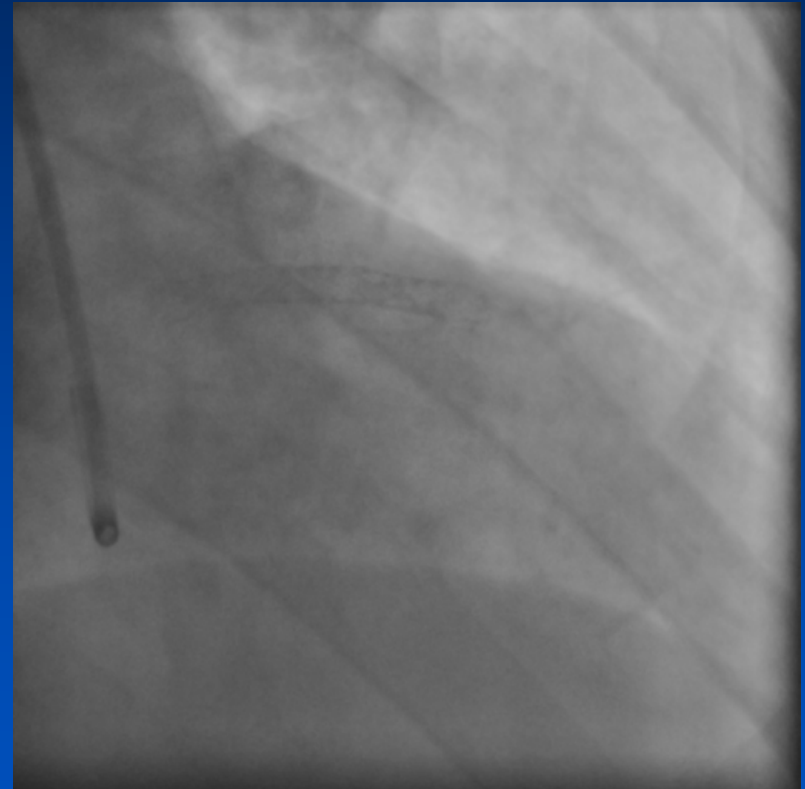


It should not have been treated with stenting...

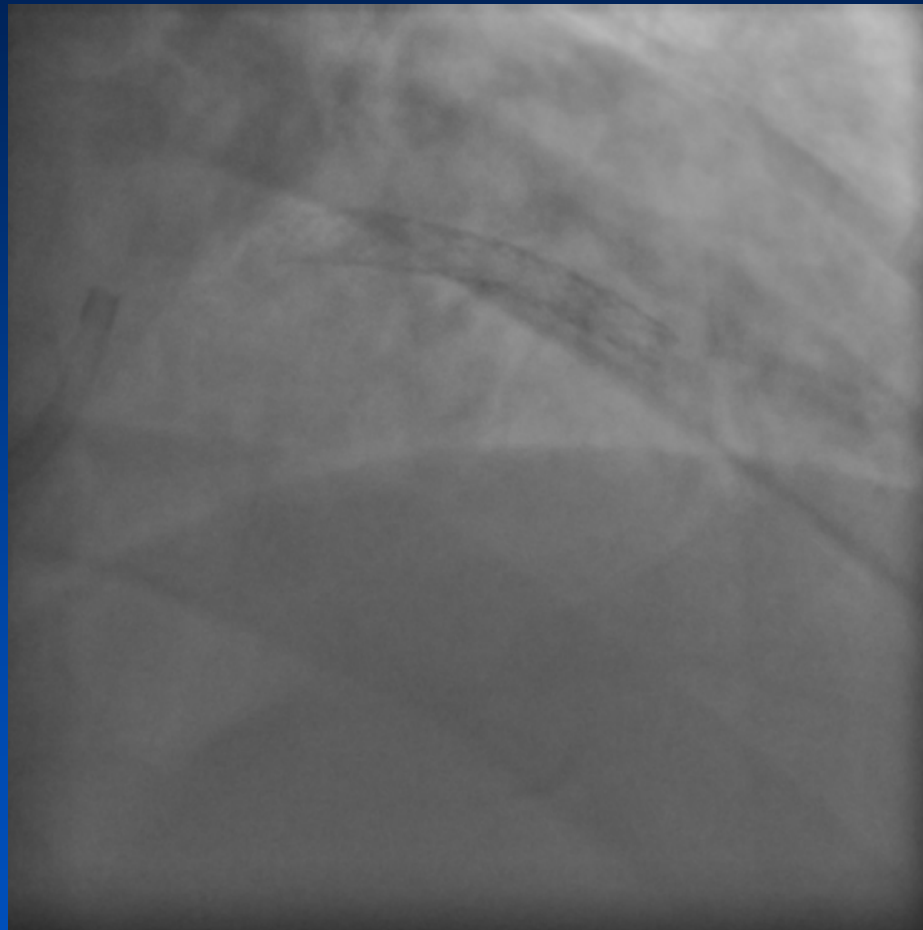
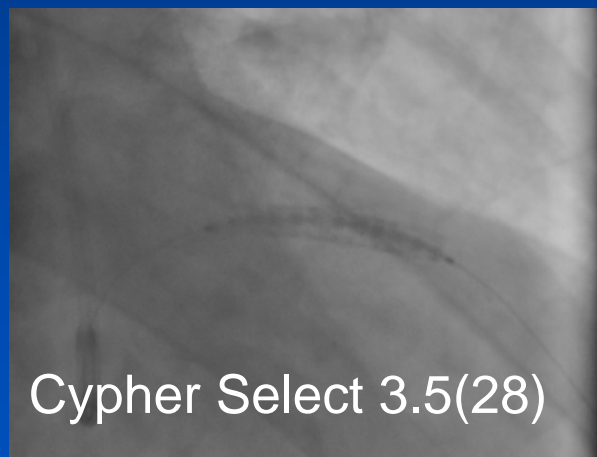
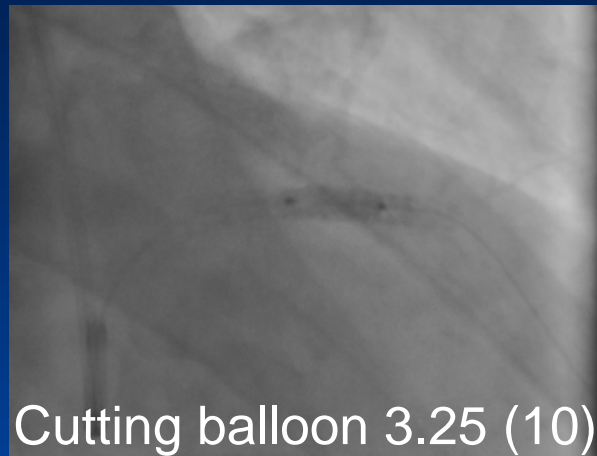
3rd Admission due to NSTEMI (2006,2)

- Sudden chest pain during sleep
- CK 1645 IU/L, CK-MB 92 ng/ml
- Initial EKG: poor R progression
- Echo: akinesia at LAD territories

→ ***NSTEMI***



Treatment for In-Stent Restenosis



Predictors for stent fracture

- RCA location
- longer stent
- overlapped stents
- hinge movement
- Vessel angulation

Related to stent failure.. (ISR, stent thrombosis)

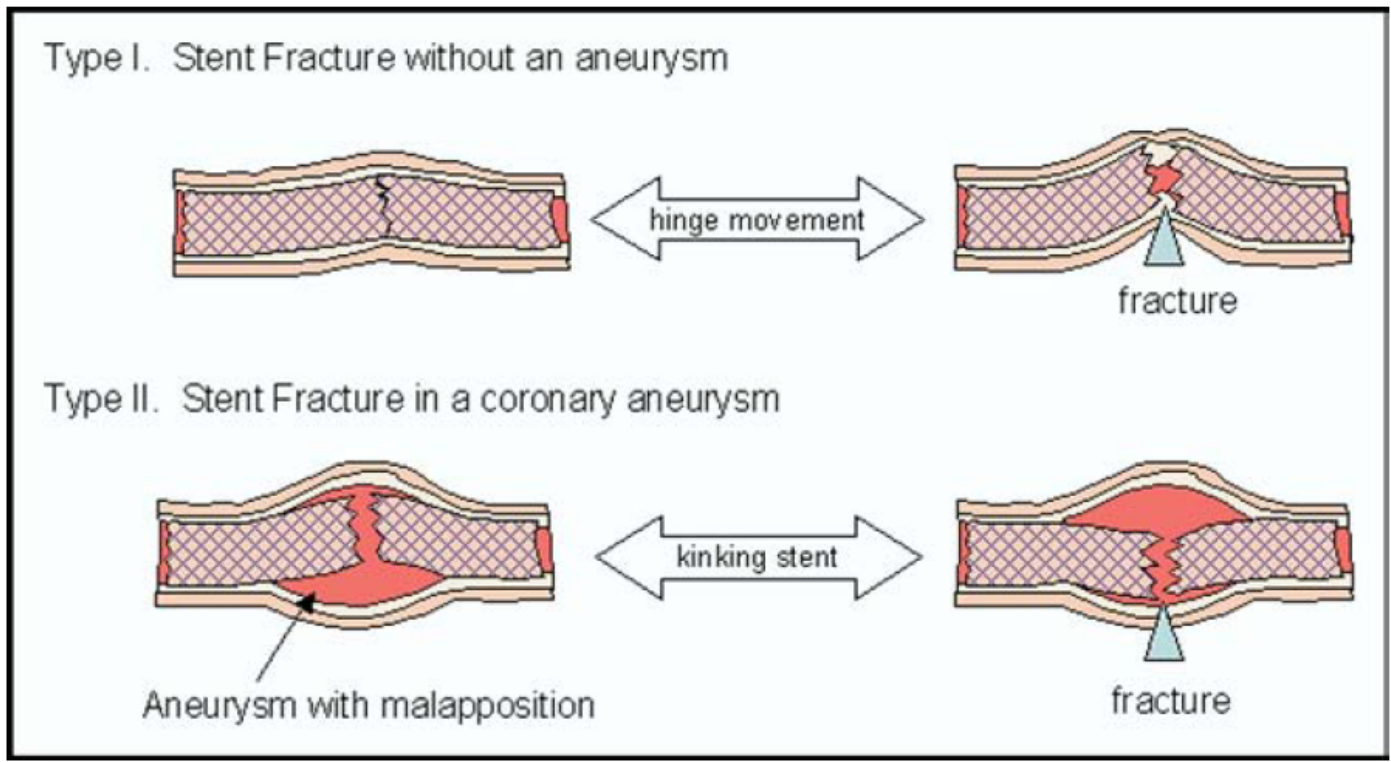


Figure 1. Mechanisms leading to stent fracture. In type I, direct mechanical stress due to vessel hinge movement during systolic cardiac contraction induces stent fracture. In type II, positive vessel remodeling with aneurysm formation causing malapposition allows the stent to kink within the aneurysm, inducing stent fracture.

Maehara et al. Am J Cardiol 2009;103:818–23

Summary

- Serial IVUS examination is helpful to identify stent fracture as a cause of stent failure
- Stent fracture and its injury may lead to positive remodeling and late aneurysm formation as a result
- Alternatively, aneurysm & late stent malapposition allows kinking of the stent within the aneurysm, and could be suggested as a new important mechanism of stent fracture