

IVUS Guided PCI *Case presentation*



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Patient characteristics

- **Female**
- **65 years old**
- **Stable angina class II, previous MI (2001)**
- **CV risk factors – arterial hypertension, family history, no smoking, cholesterol 4,4mmol/l**
- **Angiography – RCA long chronic calcified lesion**

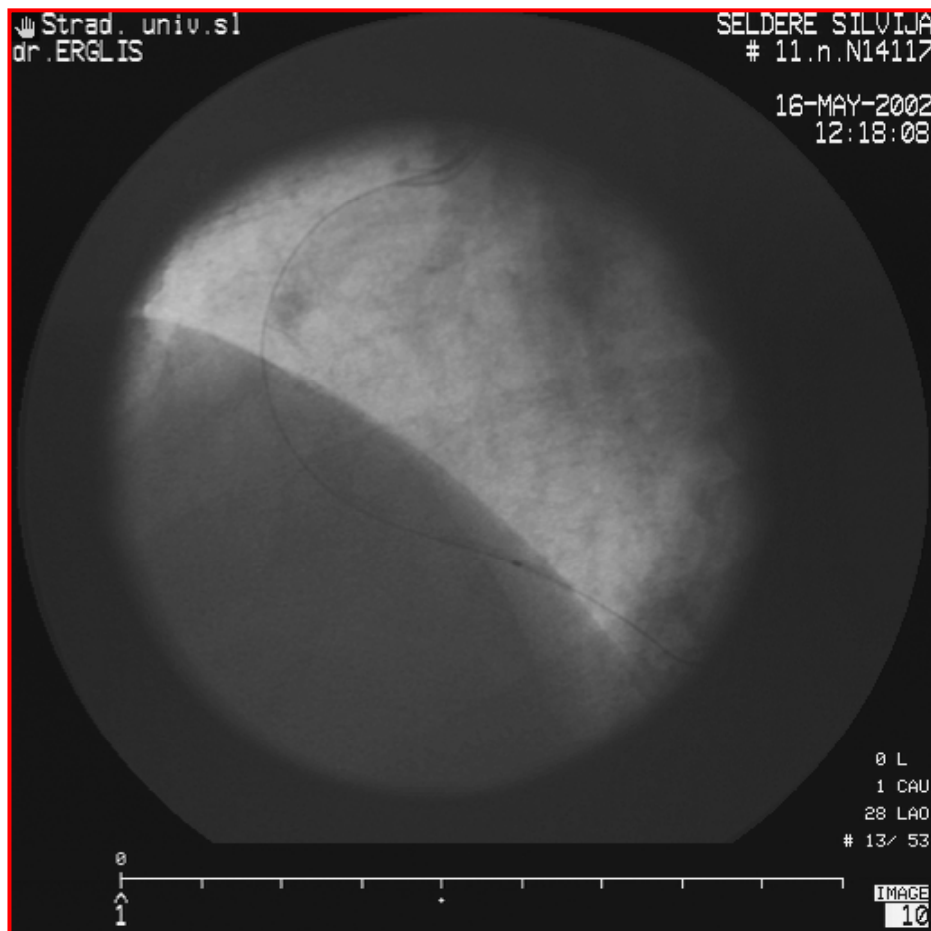


Angiography before intervention

***RCA long chronic
calcified lesion***



Pre-dilatation with Maverick 1.5-20 mm 7atm



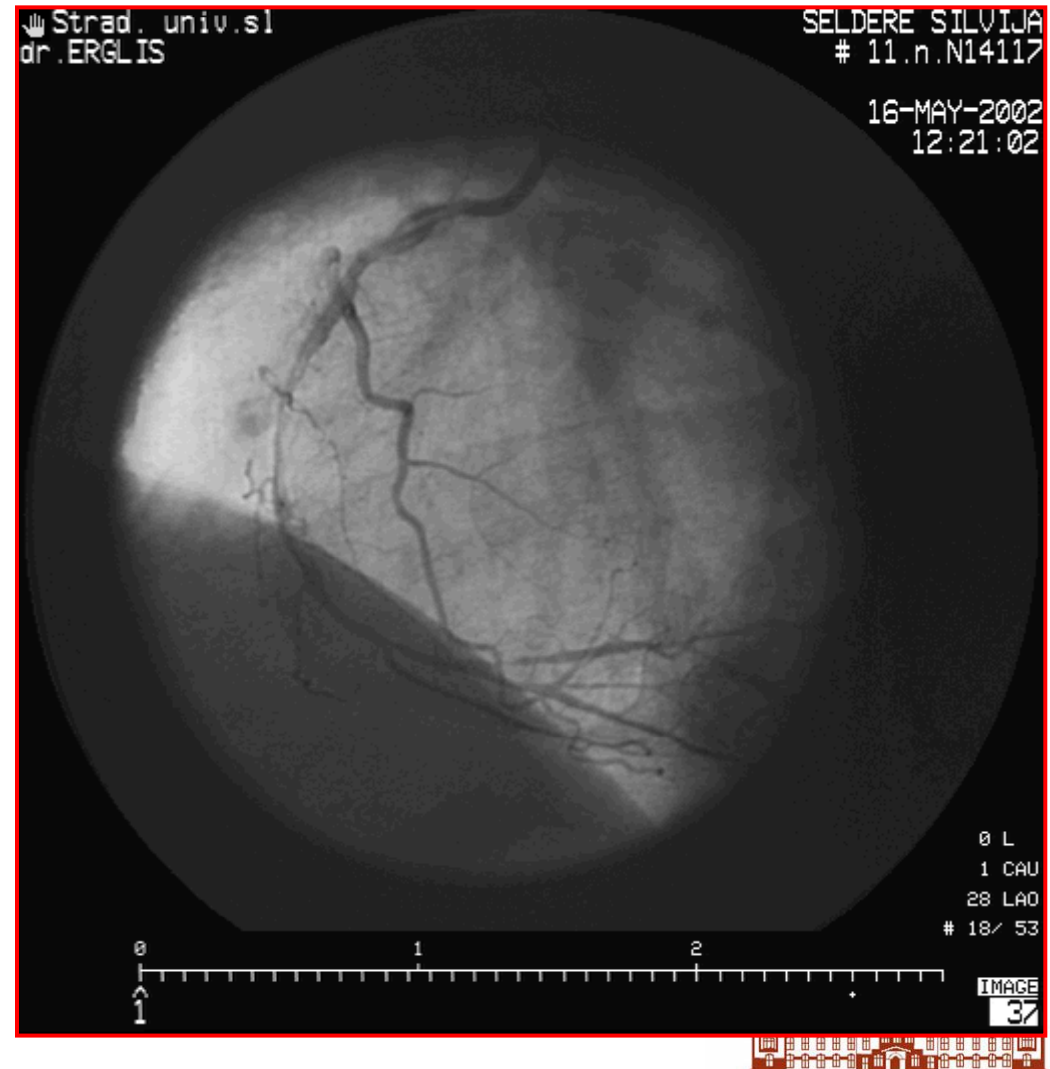
Angiography after pre-dilatation with Maverick 1.5-20 mm 7atm

QCA results:

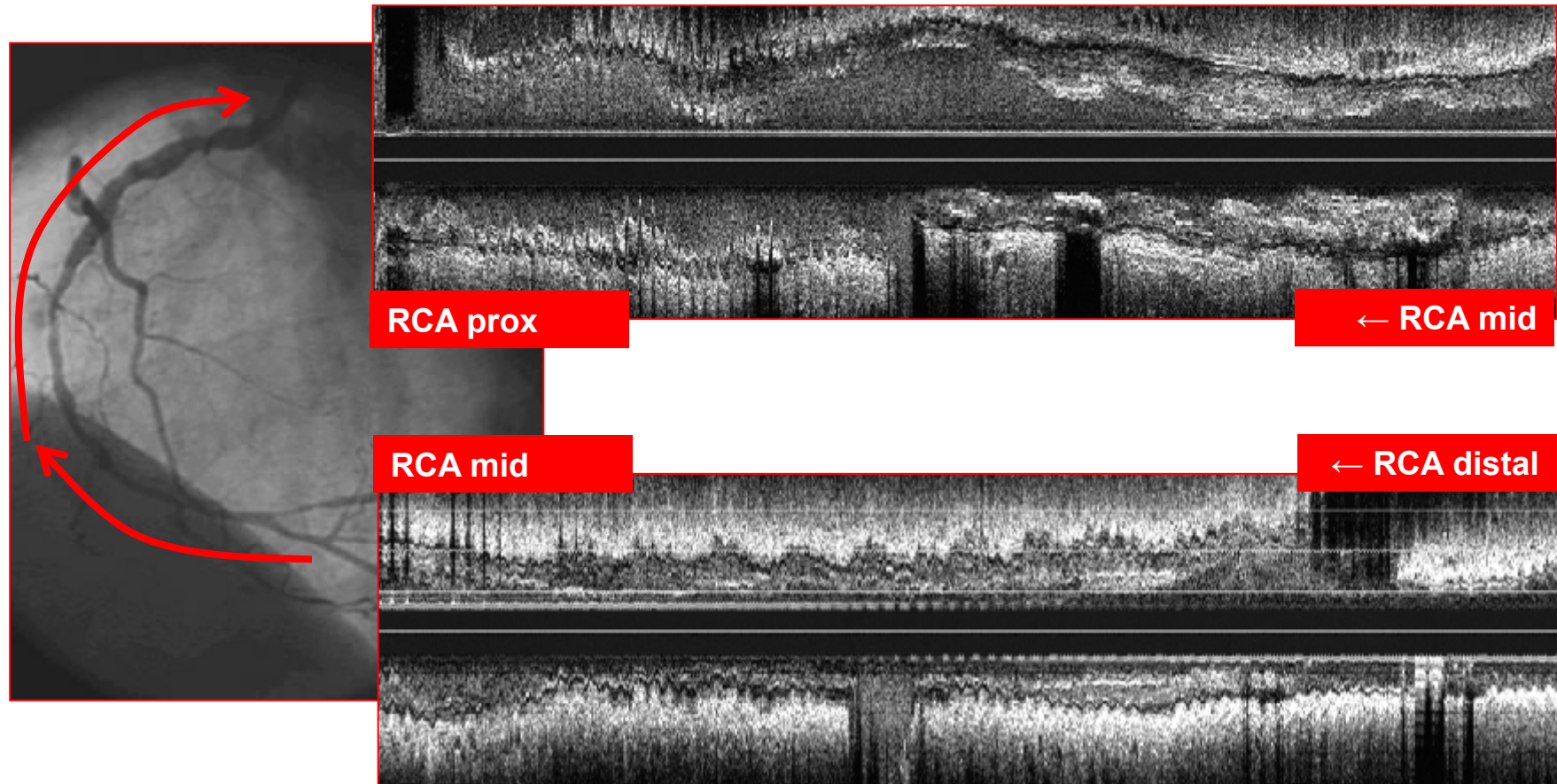
MLD=1.34 mm

MSA=1.41 mm²

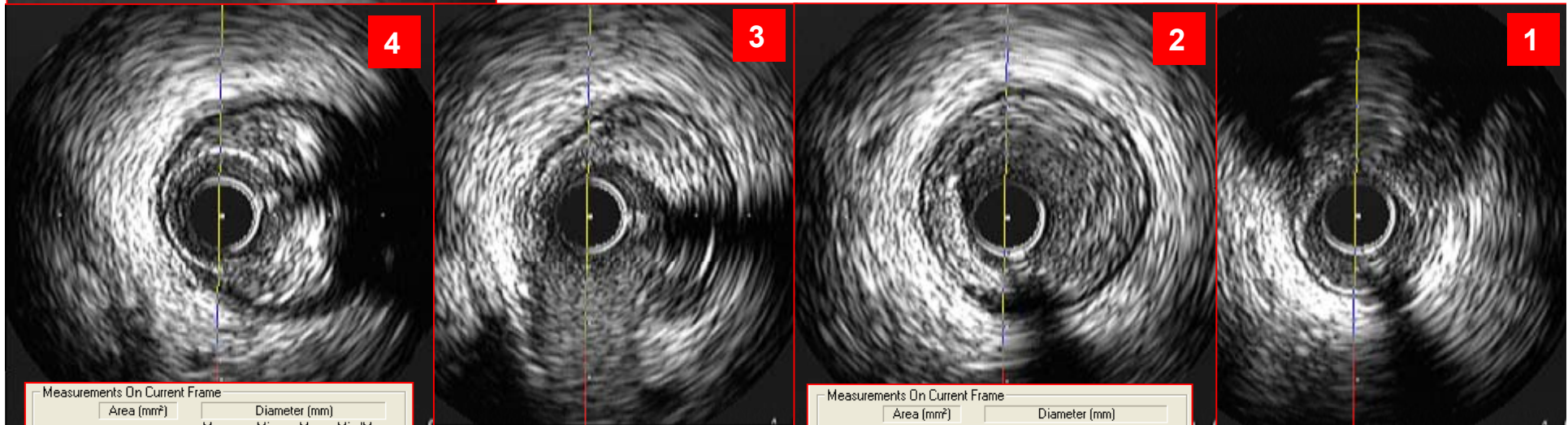
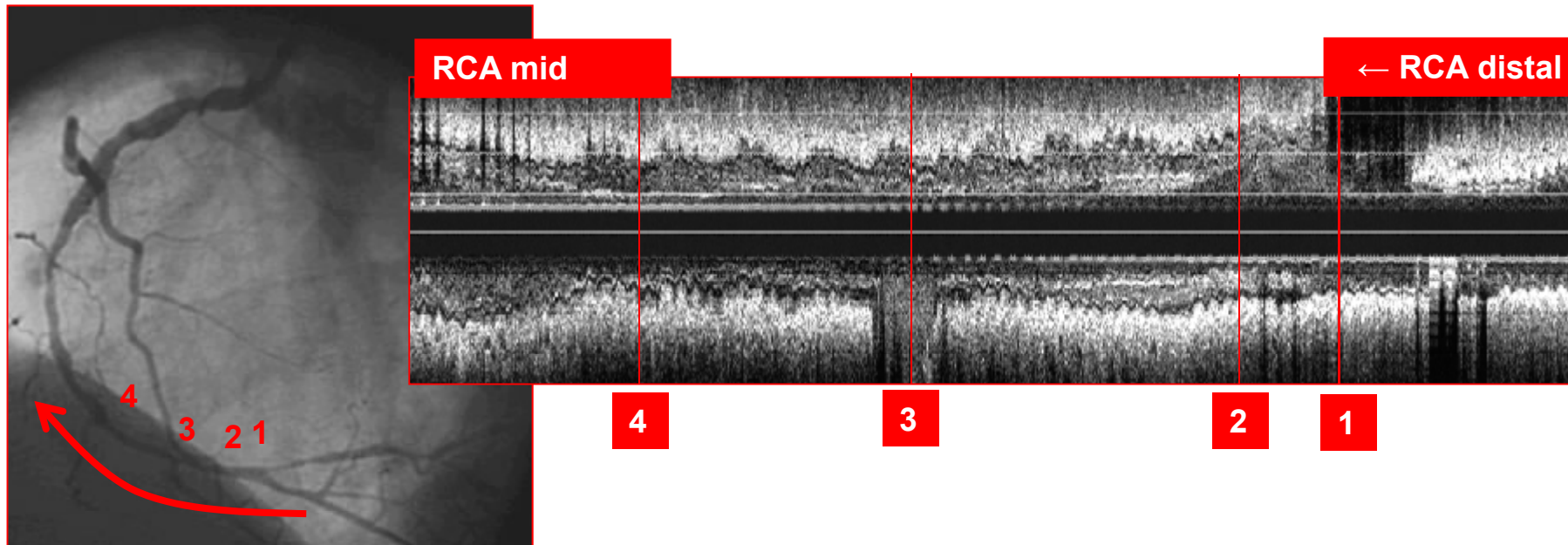
**Difficult to select the
size of balloon/sten**



IVUS after predilatation with Maverick 1.5/20 mm 7atm



IVUS distal to mid part of RCA



Measurements On Current Frame

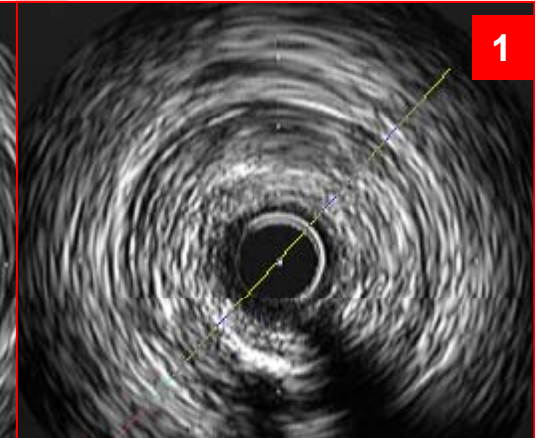
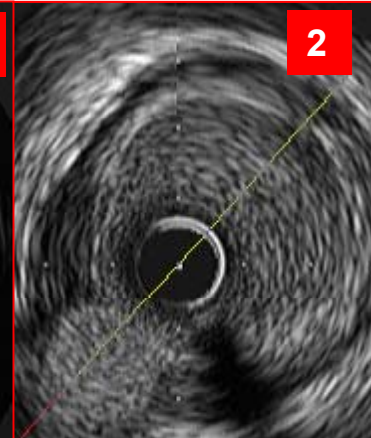
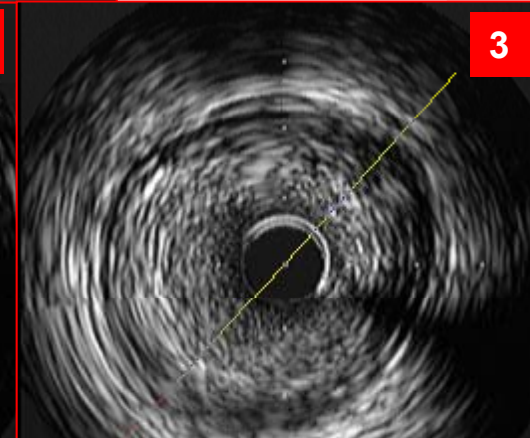
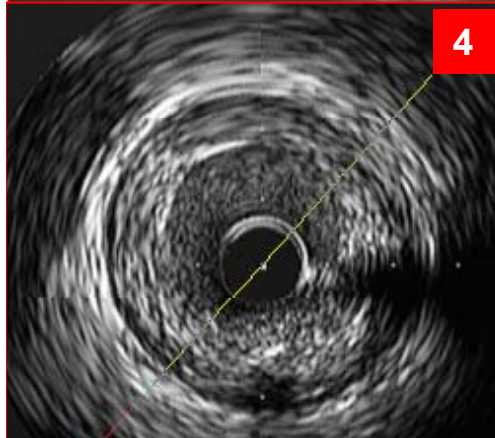
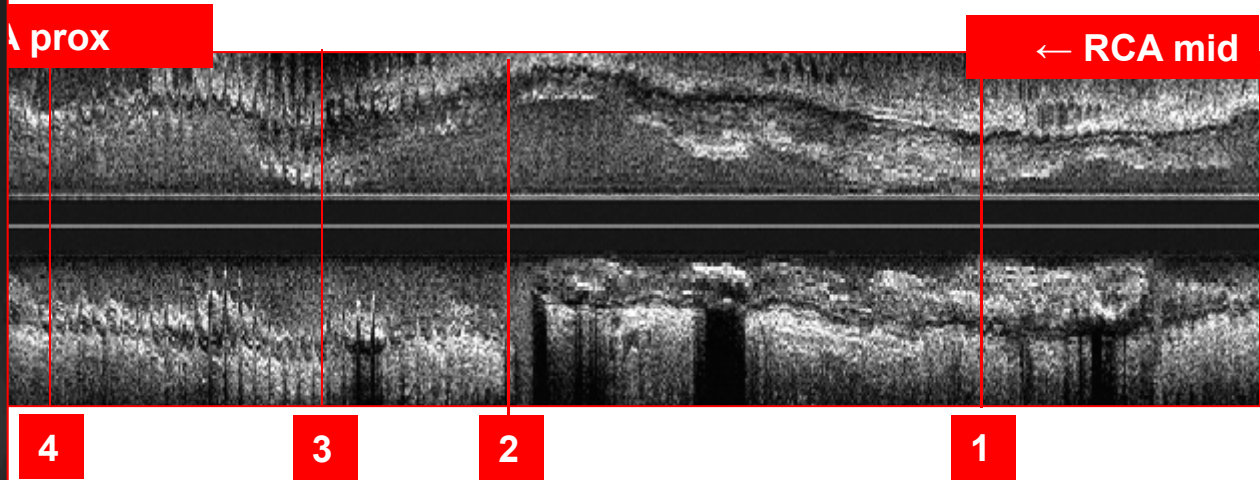
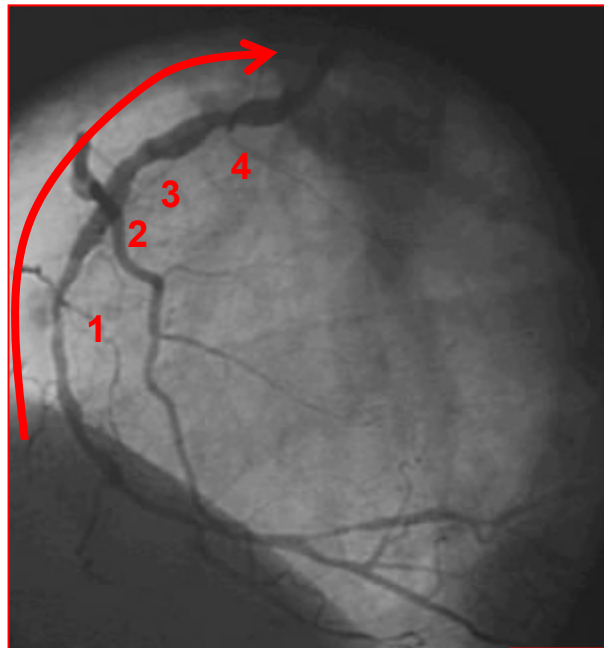
	Area (mm ²)		Diameter (mm)		
	Mean	Min	Max	Min/Max	
Lumen	2.71	1.88	1.82	1.98	0.92
Vessel	11.67	3.87	3.65	4.20	0.87
Stent					
Plaque	8.95 (76.8% of Vessel)				
NIH					
Malapp					

Measurements On Current Frame

	Area (mm ²)		Diameter (mm)		
	Mean	Min	Max	Min/Max	
Lumen	4.30	2.36	2.20	2.59	0.85
Vessel	11.80	3.90	3.76	4.00	0.94
Stent					
Plaque	7.50 (63.5% of Vessel)				
NIH					
Malapp					



IVUS mid to prox part of RCA



Measurements On Current Frame

	Area (mm ²)	Diameter (mm)			
		Mean	Min	Max	Min/Max
Lumen	5.00	2.55	2.40	2.82	0.85
Vessel	15.53	4.47	4.26	4.68	0.91
Stent					
Plaque	10.54 (67.8% of Vessel)				
NIH					
Malapp					

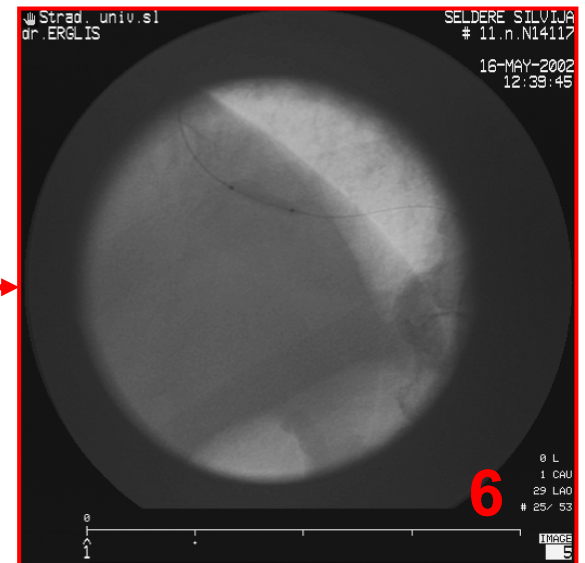
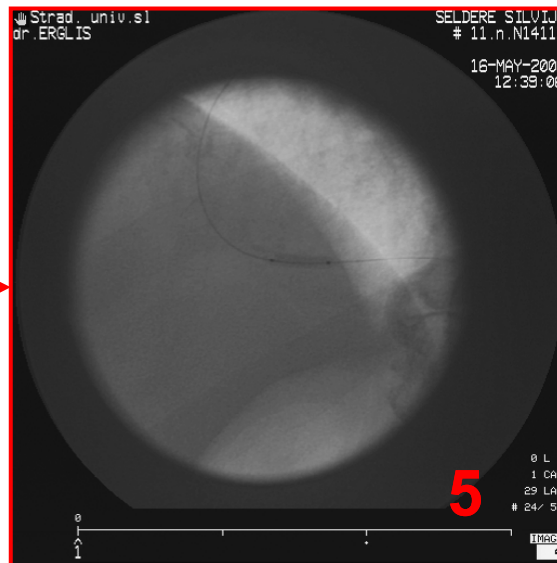
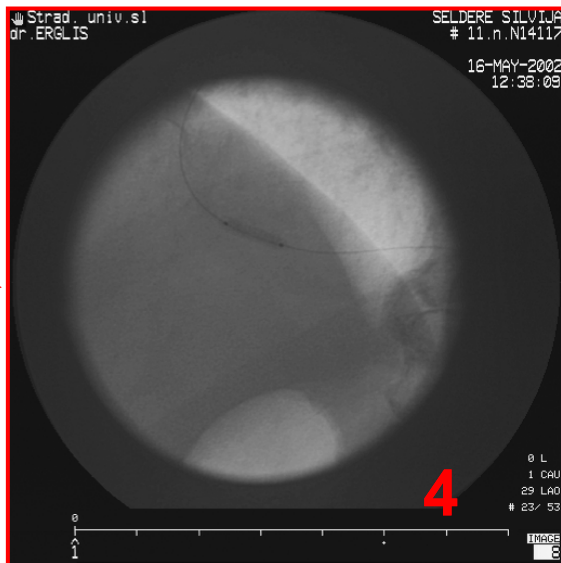
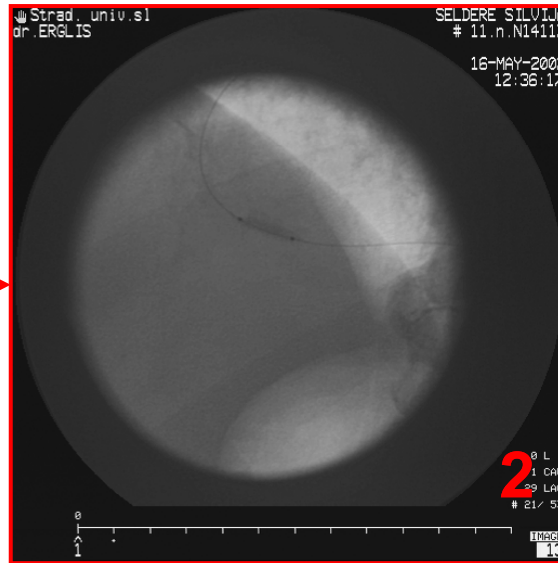
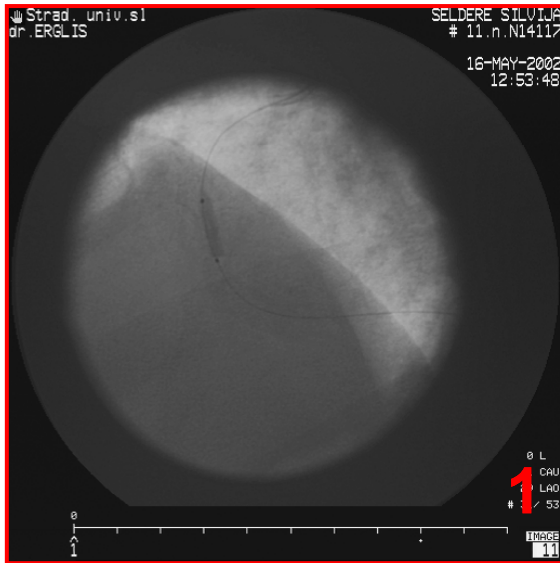
Measurements On Current Frame

	Area (mm ²)	Diameter (mm)			
		Mean	Min	Max	Min/Max
Lumen	3.70	2.19	1.98	2.41	0.82
Vessel	16.66	4.62	4.32	4.99	0.87
Stent					
Plaque	12.96 (77.8% of Vessel)				
NIH					
Malapp					

Measurements On Current Frame

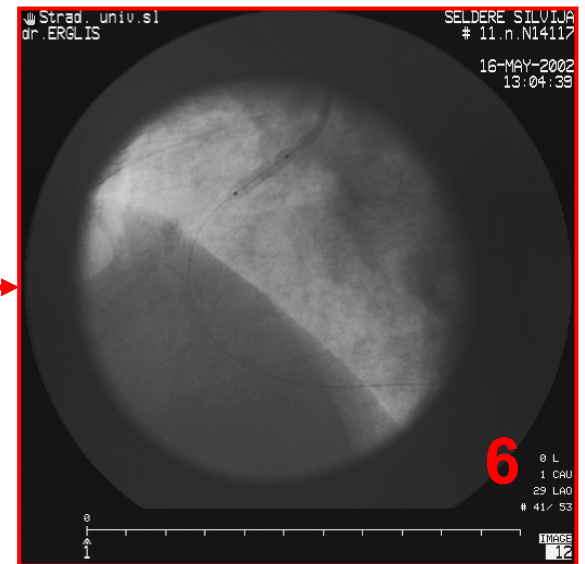
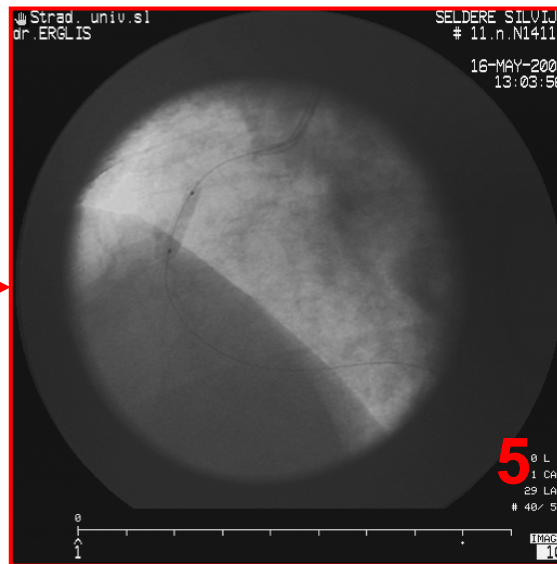
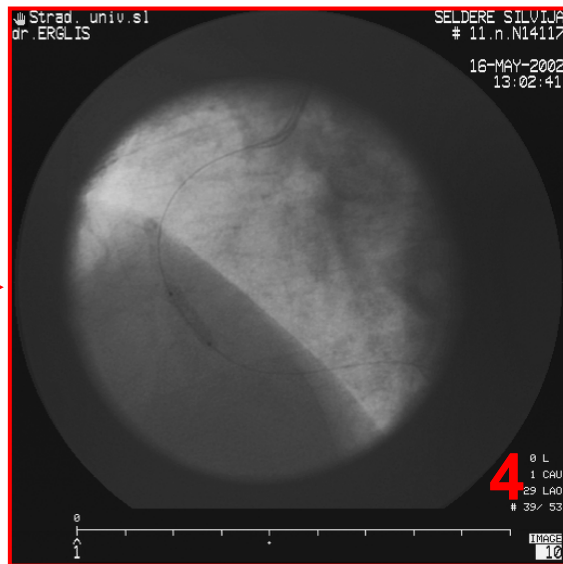
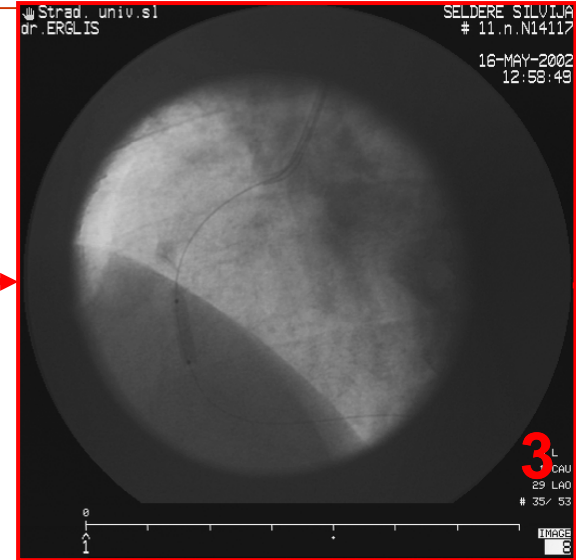
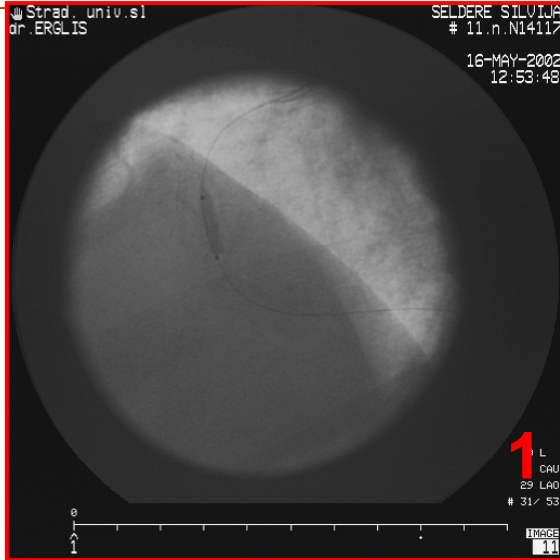
	Area (mm ²)	Diameter (mm)			
		Mean	Min	Max	Min/Max
Lumen	2.43	1.79	1.70	1.87	0.91
Vessel	14.61	4.33	4.09	4.58	0.89
Stent					
Plaque	12.17 (83.3% of Vessel)				
NIH					
Malapp					

Cutting balloon Ultra 3.5-10 mm (distal RCA) 3 times 6→9 atm in each segment



Cutting balloon Ultra 4.0-15 mm (prox)

3 times 7→10 atm in each segment



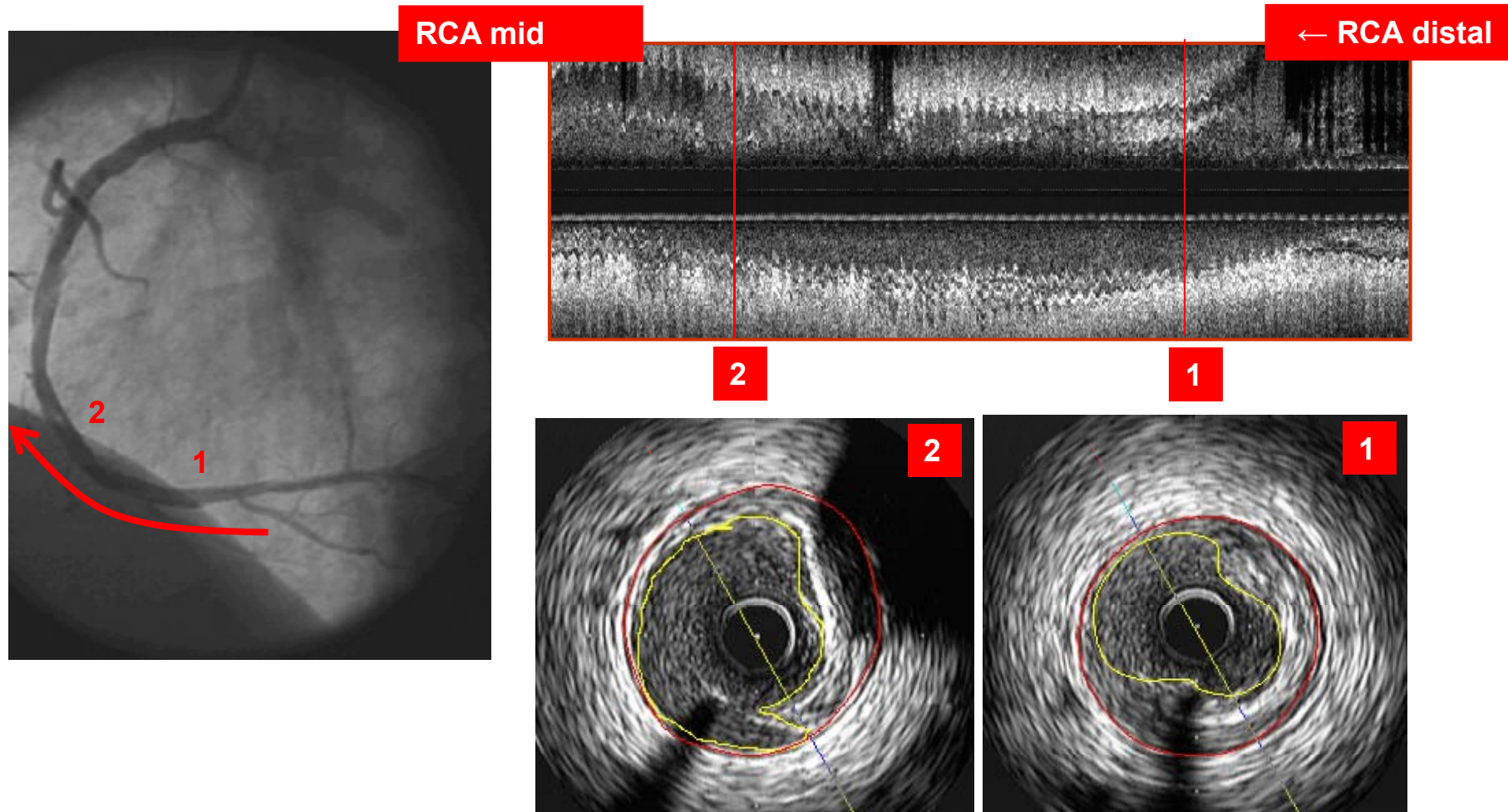
Post cutting balloon intervention

**Totally opened
artery**

**Significant
luminal gain**



IVUS distal to mid part of RCA



Measurements On Current Frame

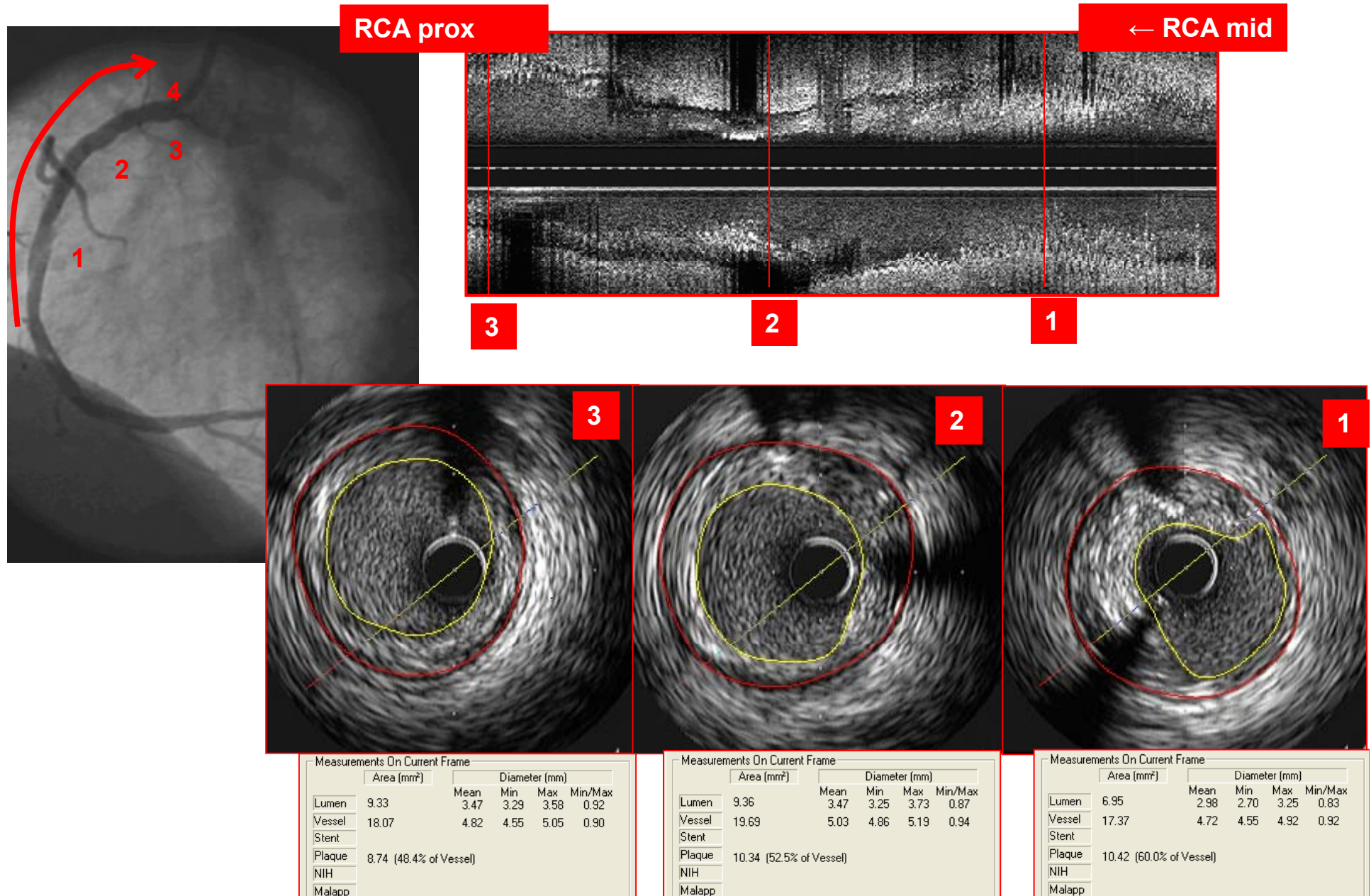
	Area (mm ²)		Diameter (mm)		
		Mean	Min	Max	Min/Max
Lumen	6.72	2.92	2.36	3.43	0.69
Vessel	13.87	4.23	4.11	4.33	0.95
Stent					
Plaque	7.16 (51.6% of Vessel)				
NIH					
Malapp					

Measurements On Current Frame

	Area (mm ²)		Diameter (mm)		
		Mean	Min	Max	Min/Max
Lumen	9.26	3.39	3.03	3.98	0.76
Vessel	15.43	4.45	4.26	4.76	0.89
Stent					
Plaque	6.18 (40.0% of Vessel)				
NIH					
Malapp					



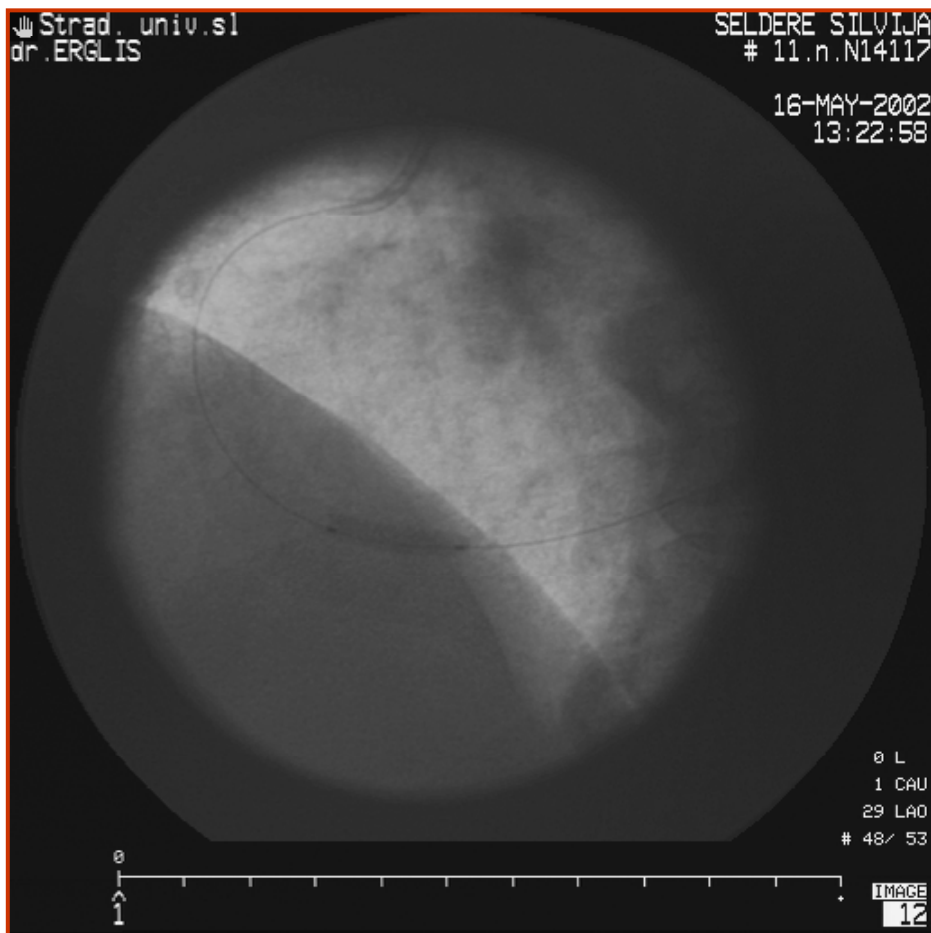
IVUS mid to prox part of RCA



Stent implantation

distal 1/3 of RCA

proximal 1/3 of RCA



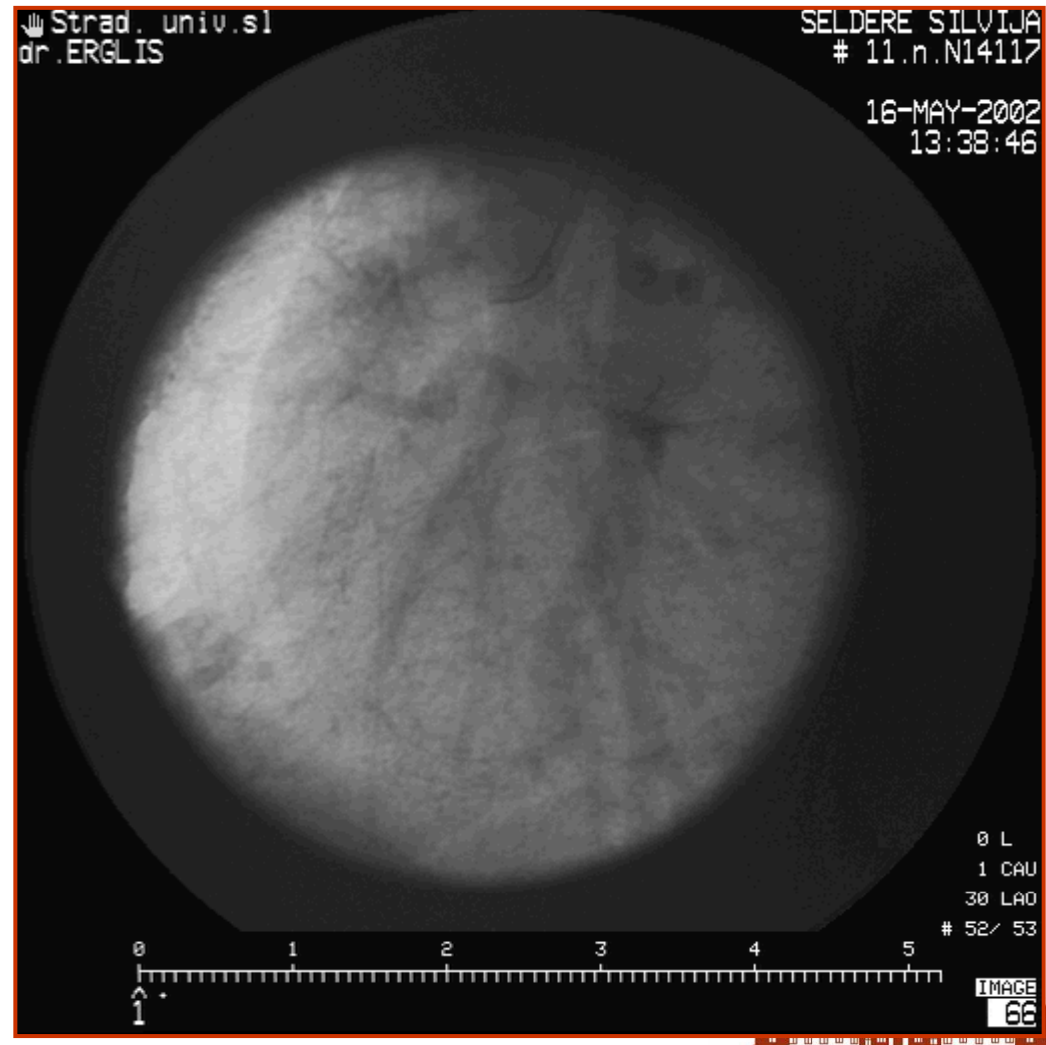
**Express 3.5-16 mm,
13 atm, 21 secs**

**Express 4.0-20 mm,
13 atm, 21 secs**



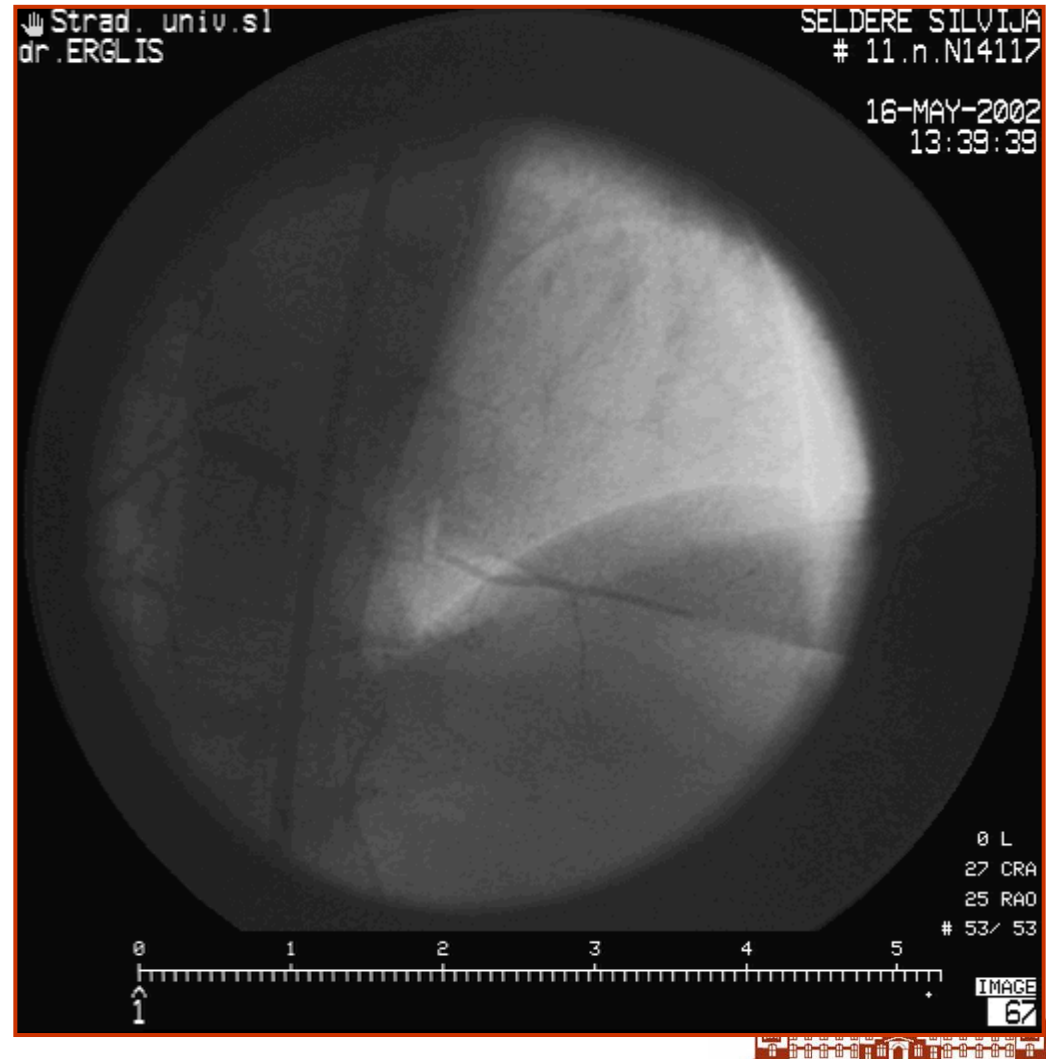
Final result after stent implantation

**Stents are
successfully
implanted avoiding
high pressure**



Final result after stent implantation

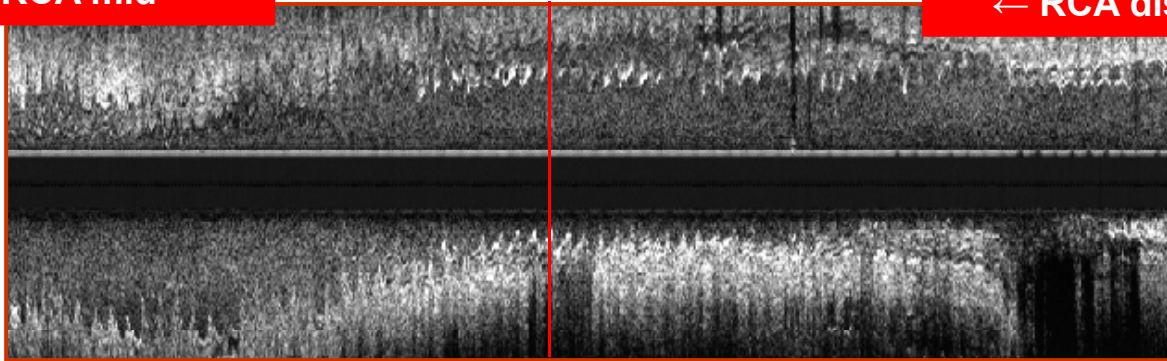
**Post implantation
angiogramm shows
good result**



IVUS after stent implantation

RCA mid

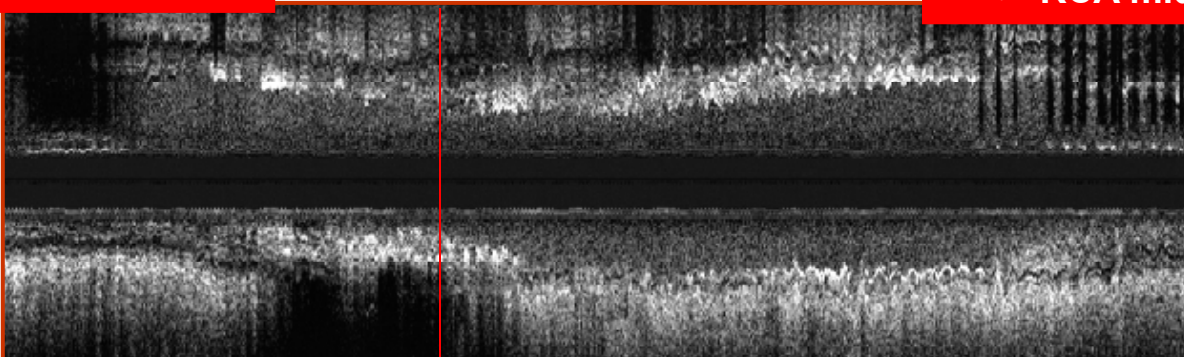
← RCA dist



1

RCA prox

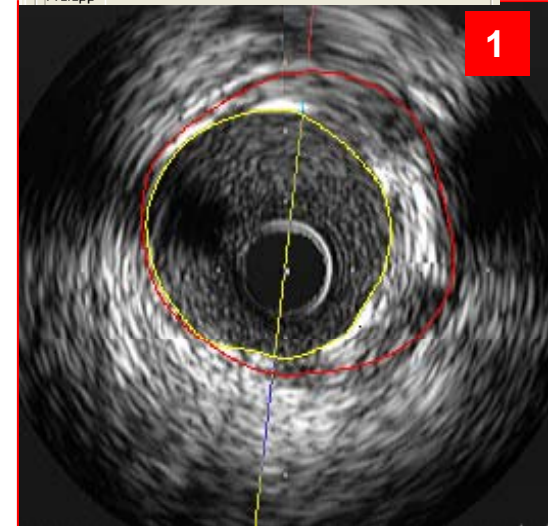
← RCA mid



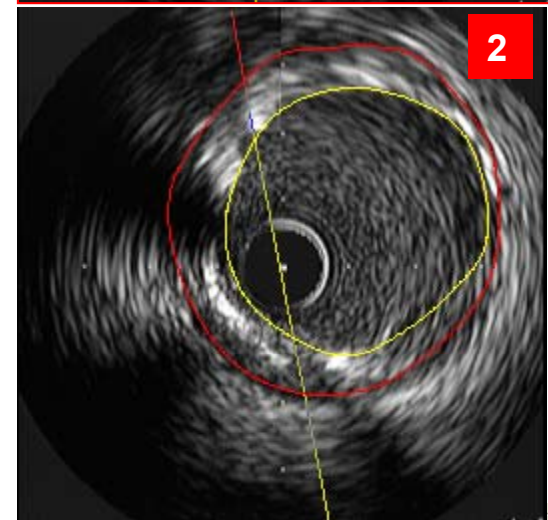
2

Measurements On Current Frame

	Area (mm ²)		Diameter (mm)		
	Mean	Min	Max	Min/Max	
Lumen	9.06	3.42	3.29	3.54	0.93
Vessel	14.49	4.32	4.18	4.51	0.93
Stent	9.06	3.42	3.29	3.54	0.93
Plaque	5.43 (37.5% of Vessel)				
NIH					
Malapp					



1



2

	Area (mm ²)		Diameter (mm)		
	Mean	Min	Max	Min/Max	
Lumen	10.88	3.74	3.54	3.91	0.90
Vessel	18.33	4.85	4.61	5.16	0.89
Stent	10.88	3.74	3.54	3.91	0.90
Plaque	7.45 (40.7% of Vessel)				
NIH					
Malapp					

6-month follow-up

The patient is free of symptoms

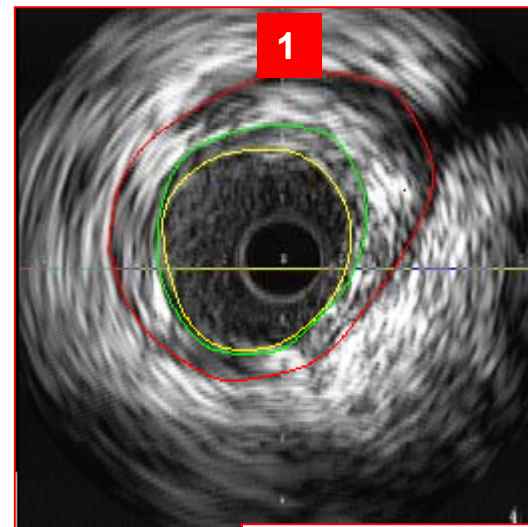
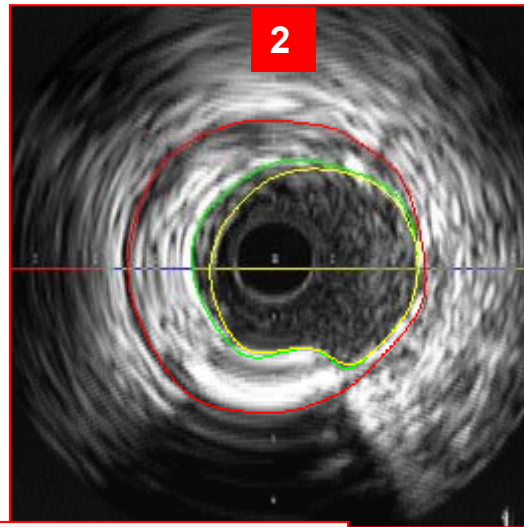
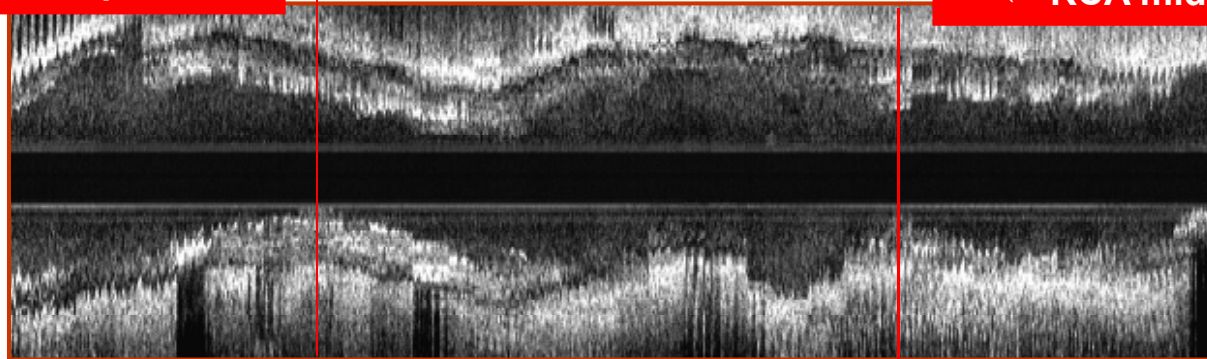
Minimal neointimal proliferation within both stents



6-month follow-up

RCA prox

← RCA mid



Measurements On Current Frame

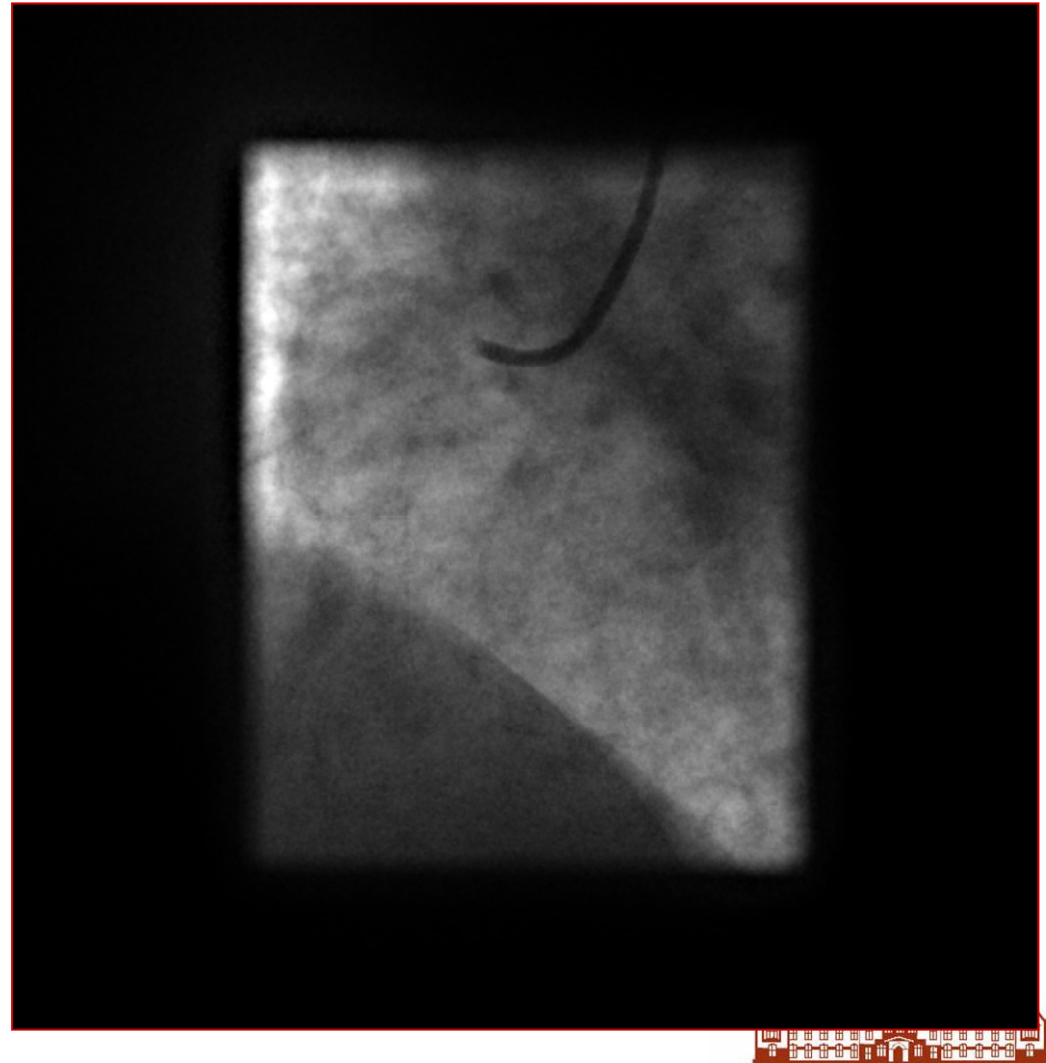
	Area (mm ²)	Diameter (mm)			
		Mean	Min	Max	Min/Max
Lumen	9.32	3.47	3.09	3.69	0.84
Vessel	20.38	5.12	5.02	5.29	0.95
Stent	10.70	3.71	3.24	3.94	0.82
Plaque	11.06 (54.3% of Vessel)				
NIH	1.39 (13.0% of Stent)				
Malapp	0.01				

Measurements On Current Frame

	Area (mm ²)	Diameter (mm)			
		Mean	Min	Max	Min/Max
Lumen	8.78	3.37	3.20	3.62	0.89
Vessel	22.03	5.30	4.61	6.01	0.77
Stent	11.19	3.80	3.51	4.21	0.83
Plaque	13.25 (60.1% of Vessel)				
NIH	2.41 (21.6% of Stent)				
Malapp					

6 - year follow-up

**The patient is still
free of symptoms**

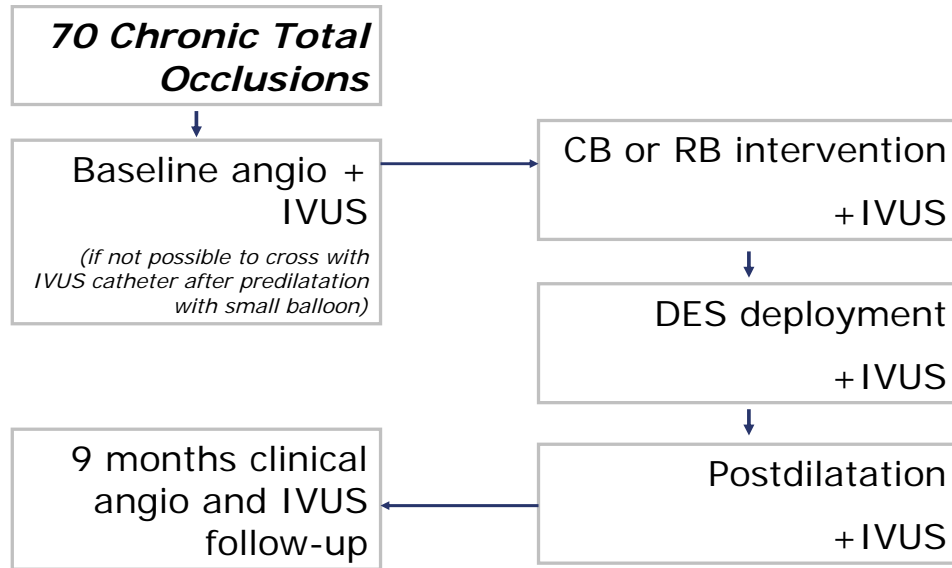


CARVING study: IVUS guided cutting balloon coronary intervention followed by stenting for long calcified lesions

- **64 consecutive patients (or 65 B2 and C type lesions, length ≥ 20 mm) were enrolled**
- **After CB intervention spot stenting (max 13 atm) for the most dissected areas was performed**
- **The CB and stent size was selected by IVUS measurements following the “media to media” treatment principle**
- **Clinical review after 30 days and 6 months angiographic and IVUS follow-up was performed**

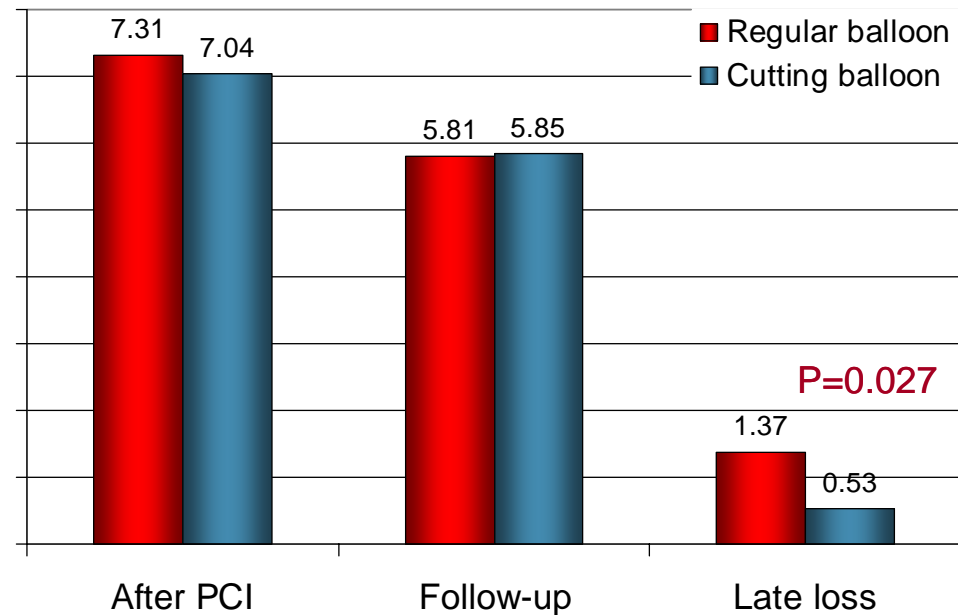


eICARVING study



- Angiographic restenosis – 13% in RB vs 8% in CB group
- TLR – 8% in RB vs 6% in CB group
- Re-occlusions 4 in each group
- No death during 9 mo f-up

Serial IVUS Minimum Lumen Area



Our Hypothesis

- **IVUS guided plaque modification** before stent deployment may minimize arterial injury and subsequent neointimal proliferation and may prevent restenosis formation:
 - it minimizes plaque shifting between main branch and side branch and thus helps avoiding side branch stenting
 - it gives perfect stent apposition with reduced inflation pressure even if very long stents are deployed
 - *in the future when bioabsorbable stents will be available it can be an essential tool to perform complete “vessel repair procedures”*

