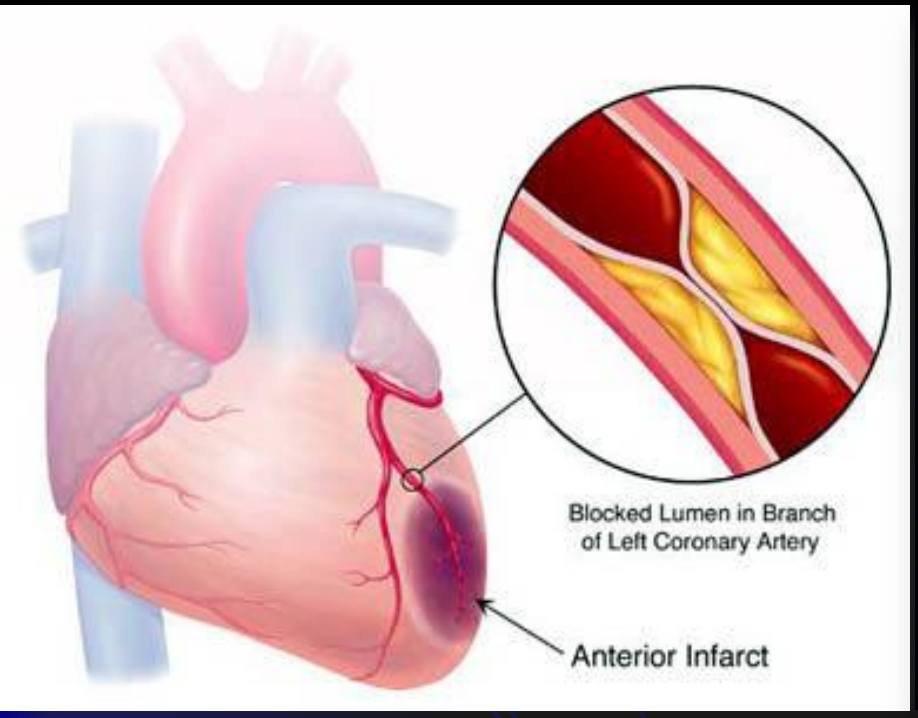
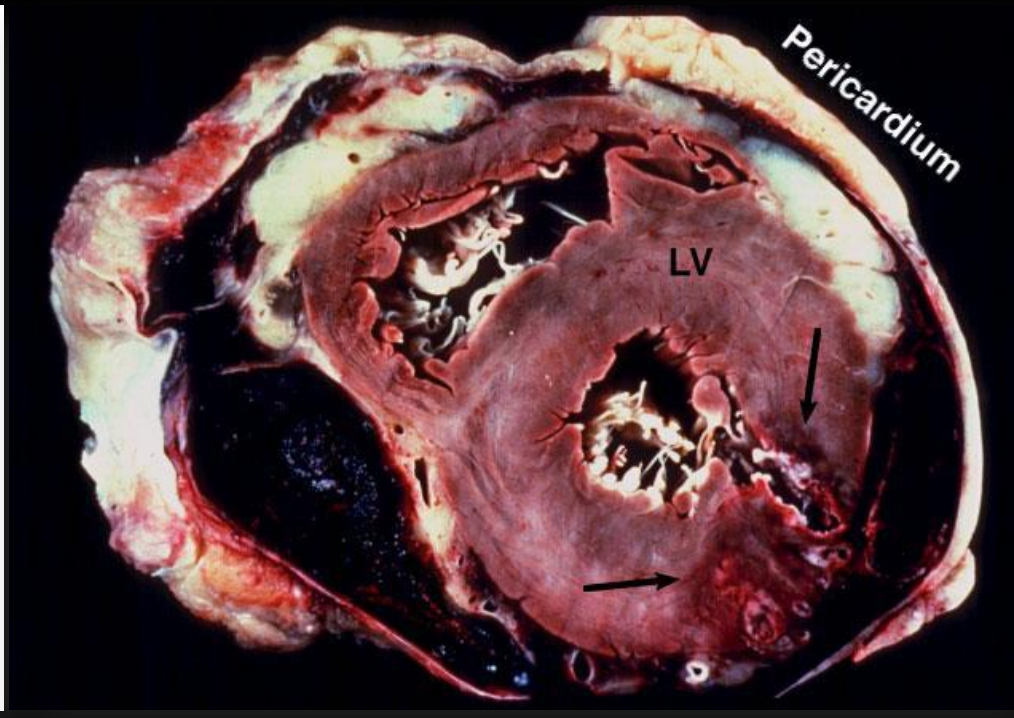
Is IVUS-Guided PCI Effective in AMI Patients?



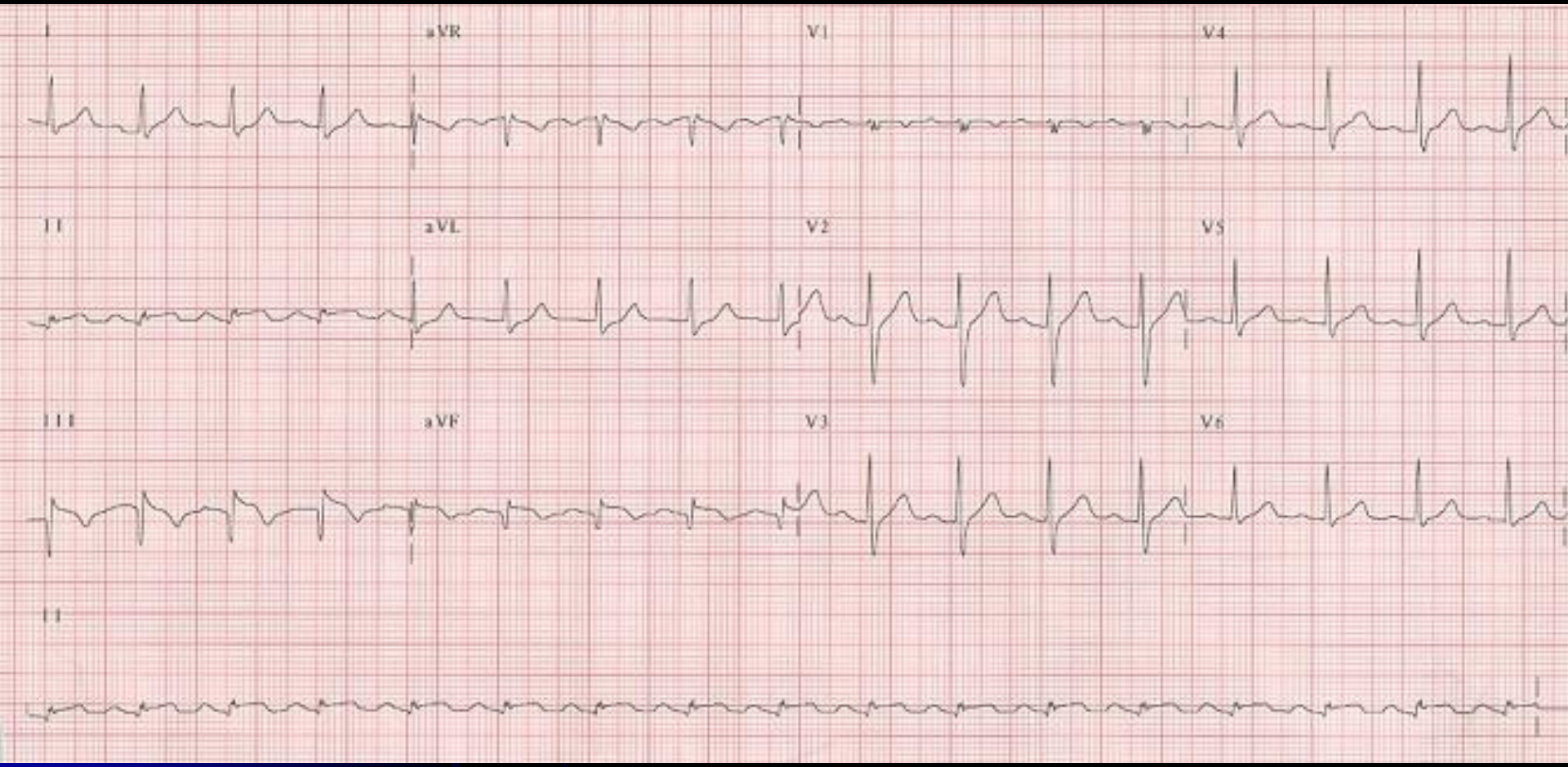


Young Joon Hong, M.D., Ph.D.
Department of Cardiology, Chonnam National University Hospital

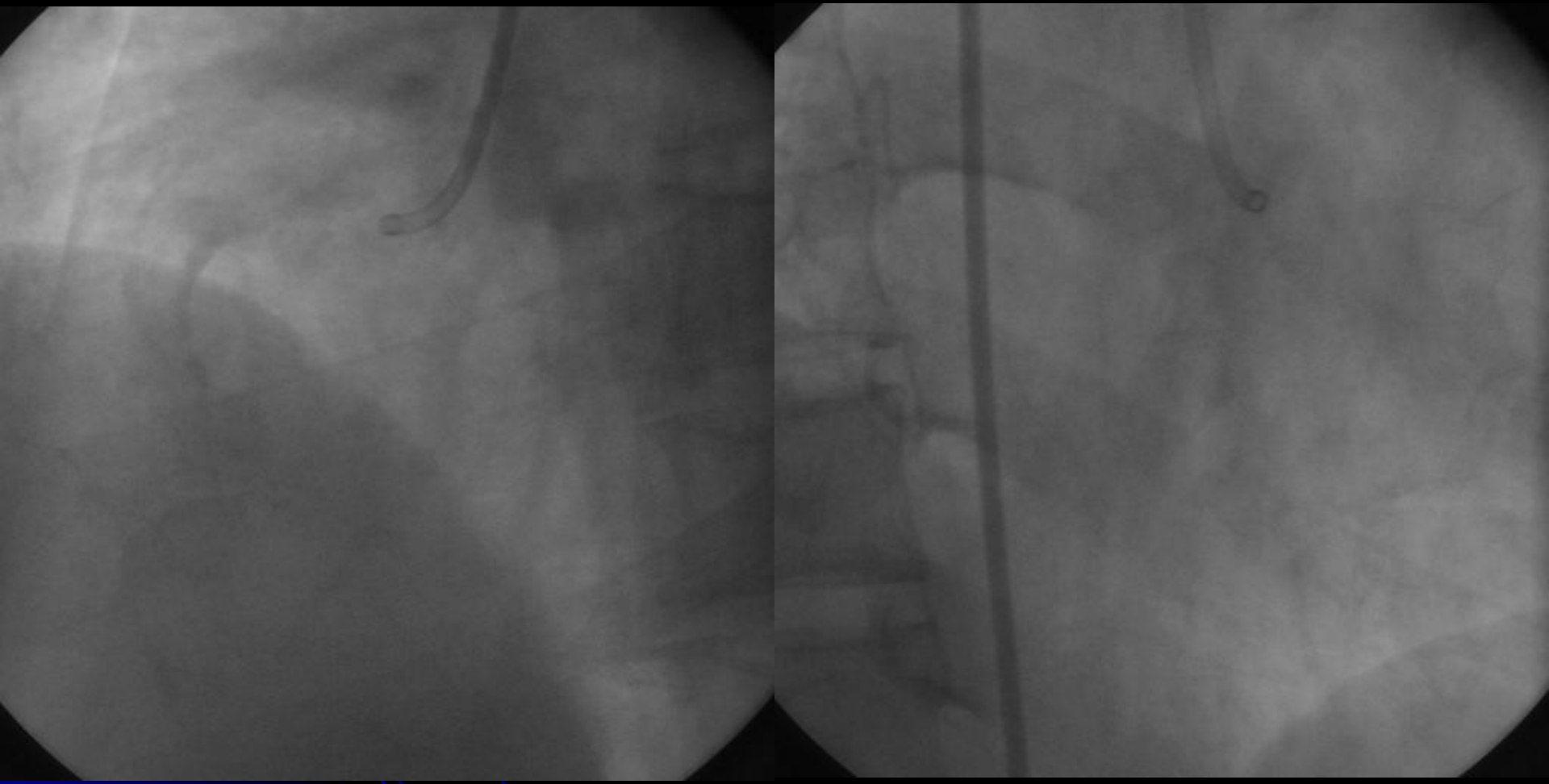
49-Year-Old Male

Chest pain for 7 hrs, Current smoker

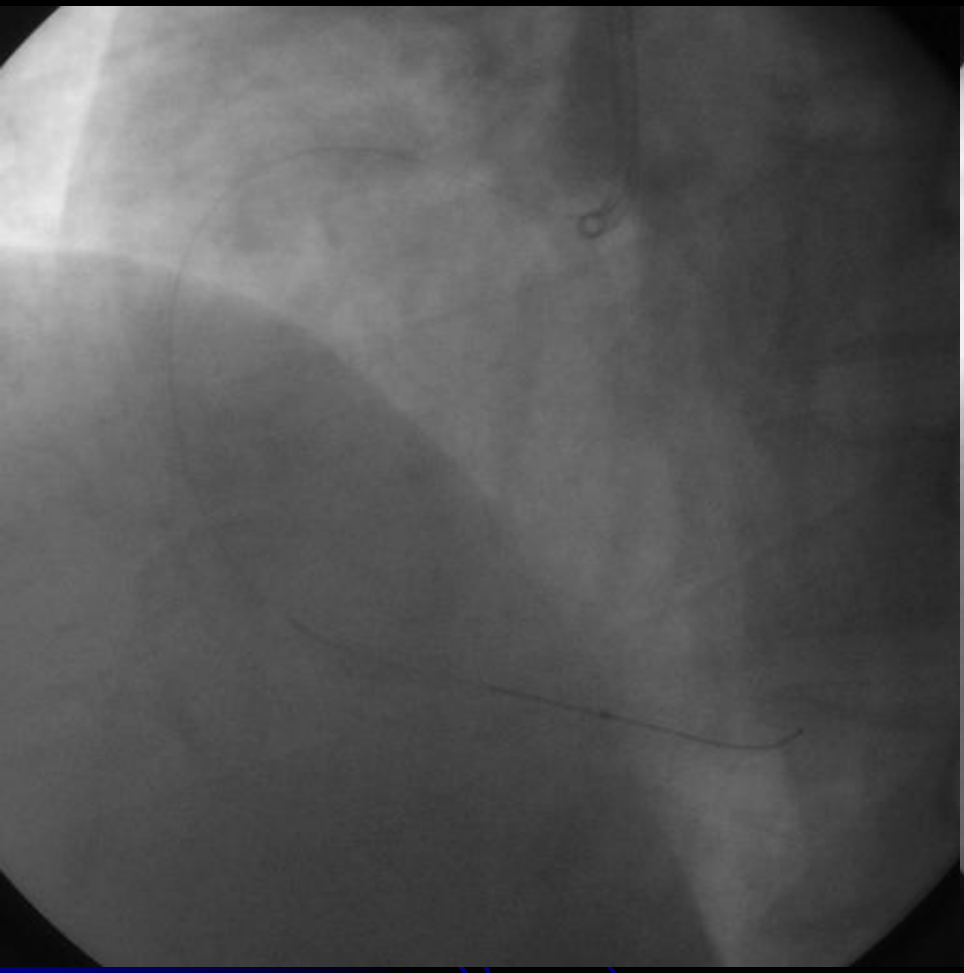
cTnI 9.21 ng/mL, LVEF 58%



Coronary Angiogram (Dec. 13, 2007)

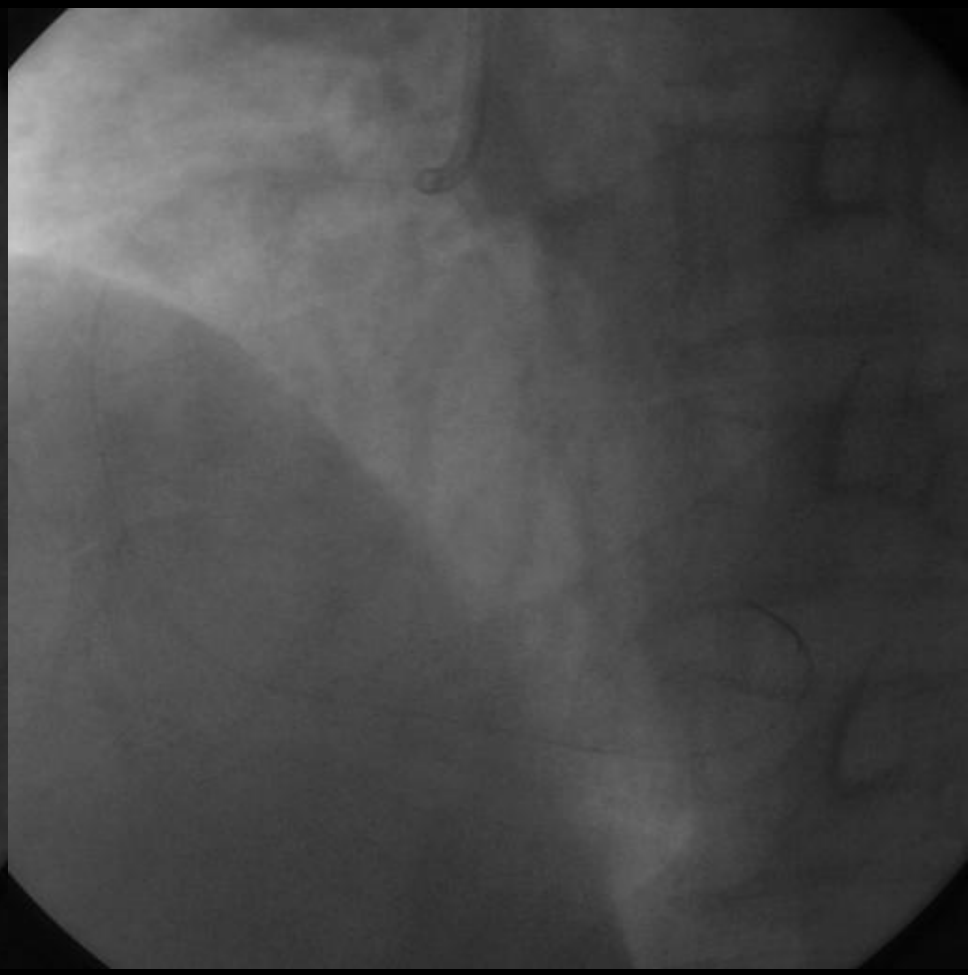


Thrombus aspiration

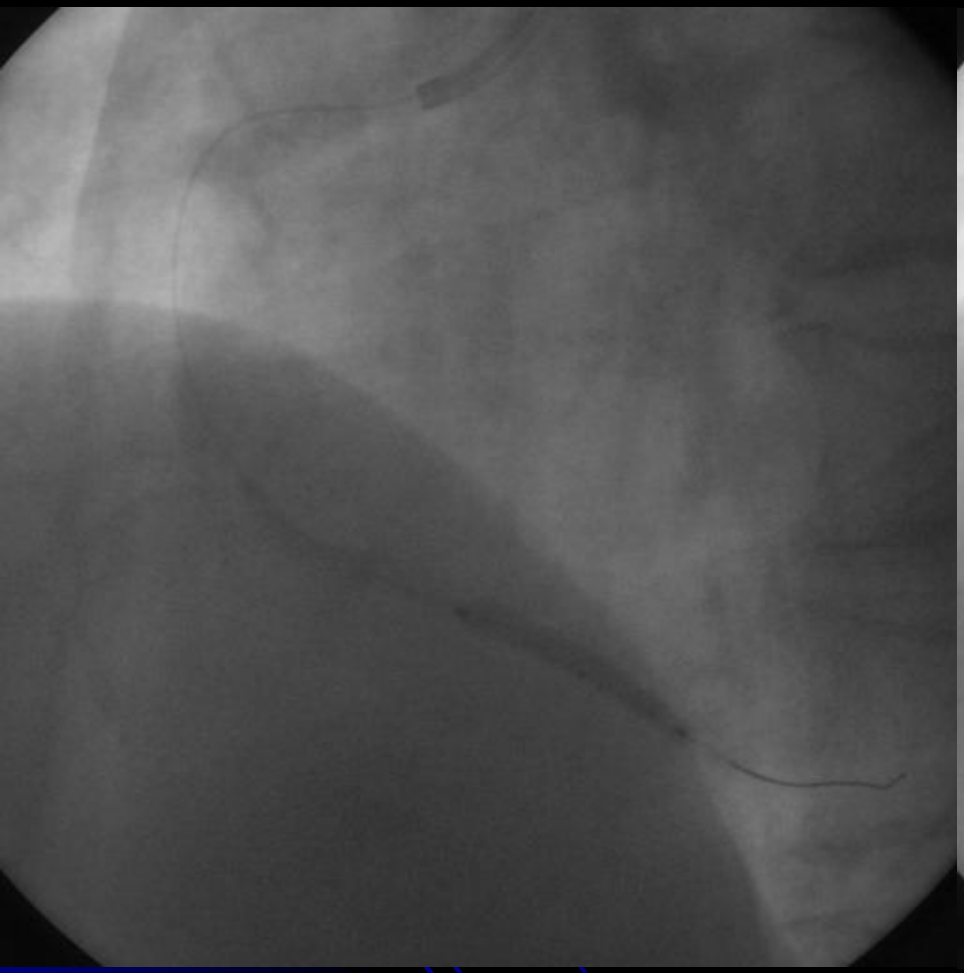


After thrombus aspiration

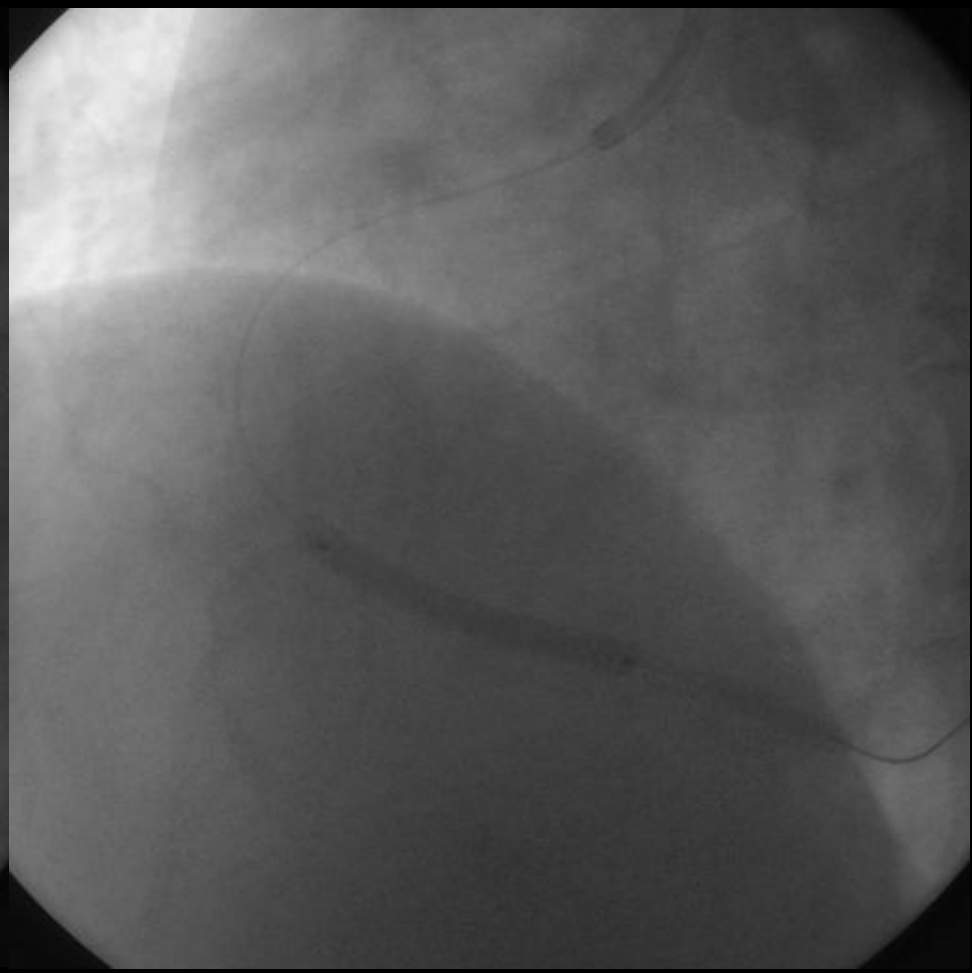
The final CAG after ballooning



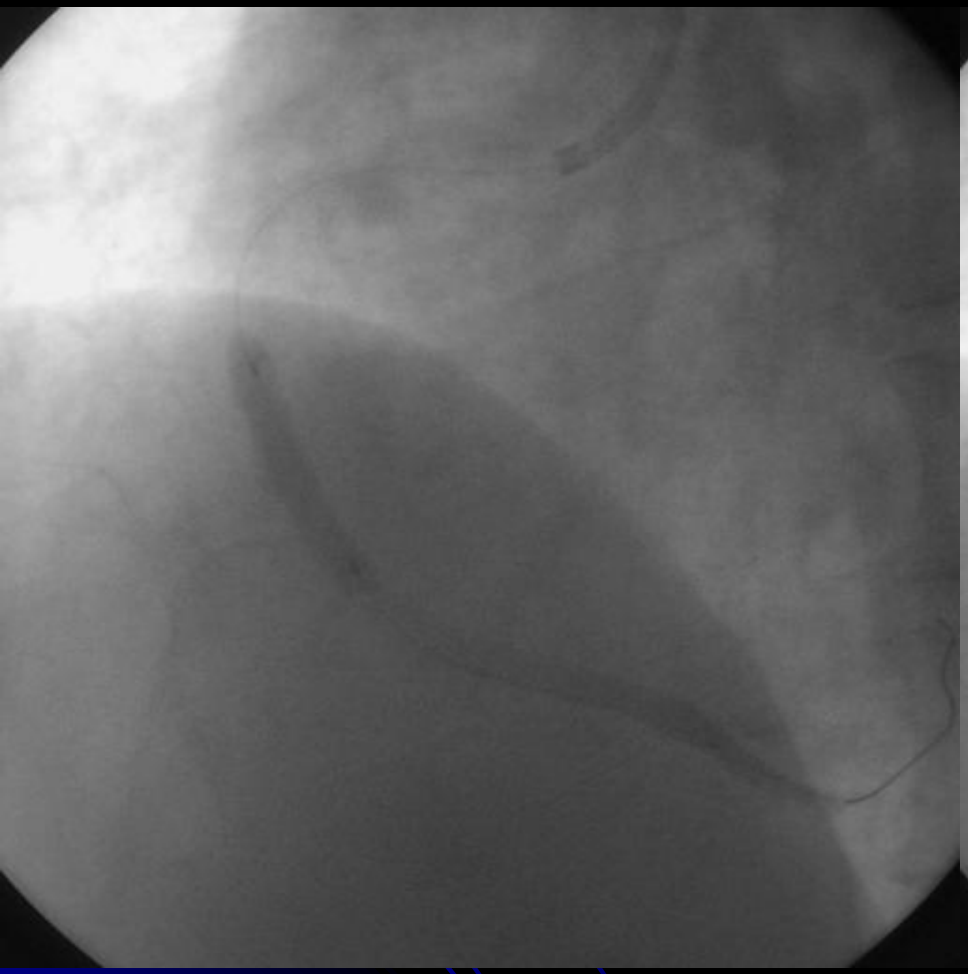
CAG and IVUS (Dec. 18, 2007)



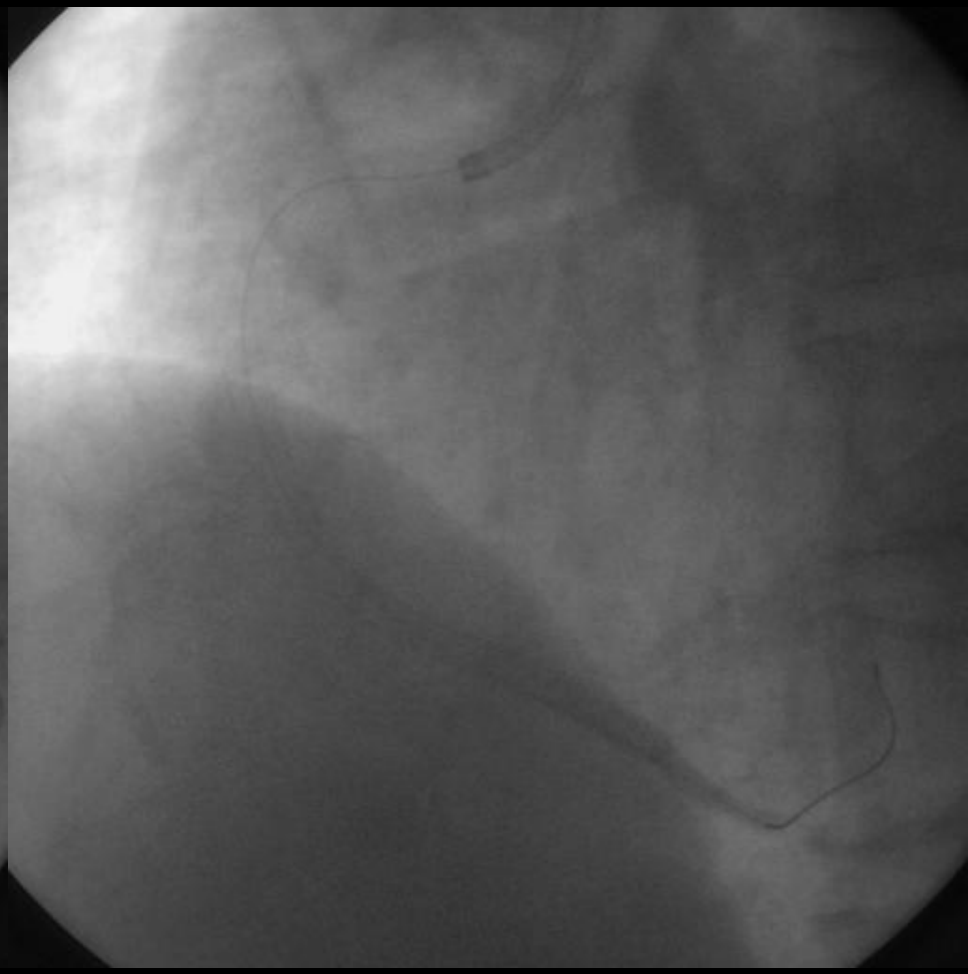
d-RCA to PL: 3.0x25 mm BMS
(Coroflex Blue, 12 atm)



d-RCA: 3.5x28 mm BMS
(Arthos Pico, 14 atm)

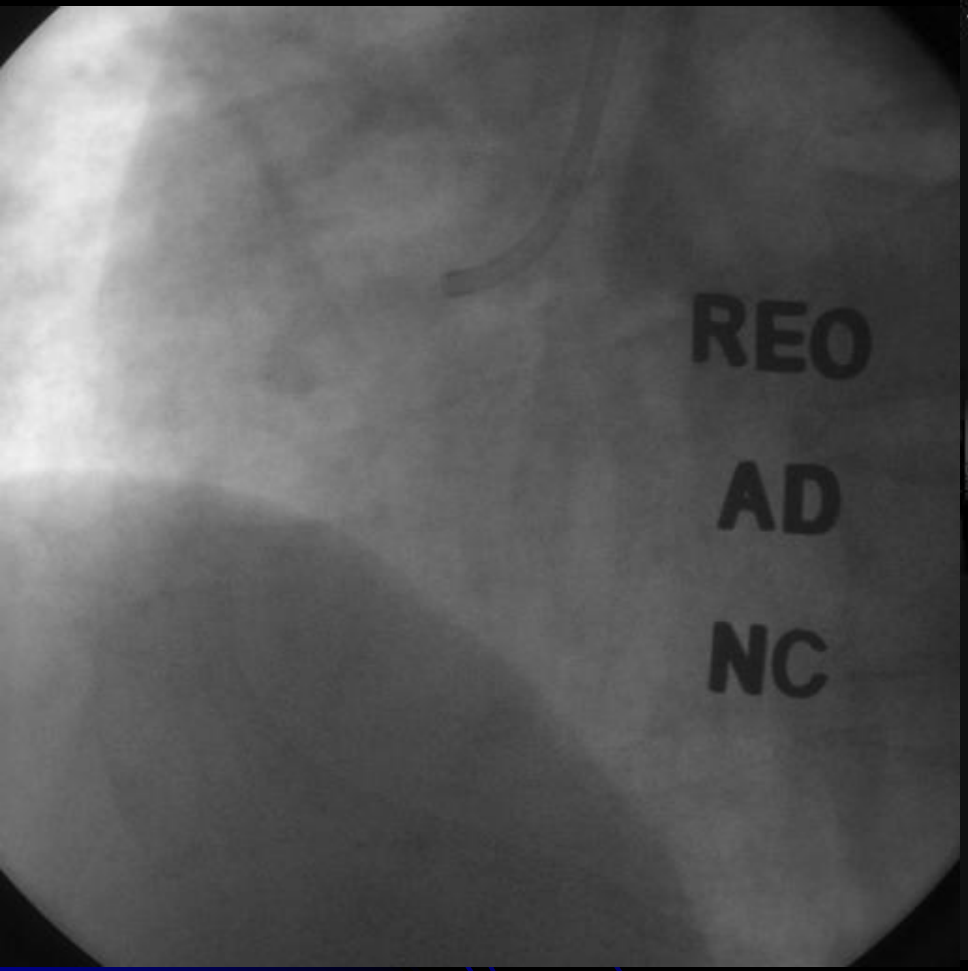


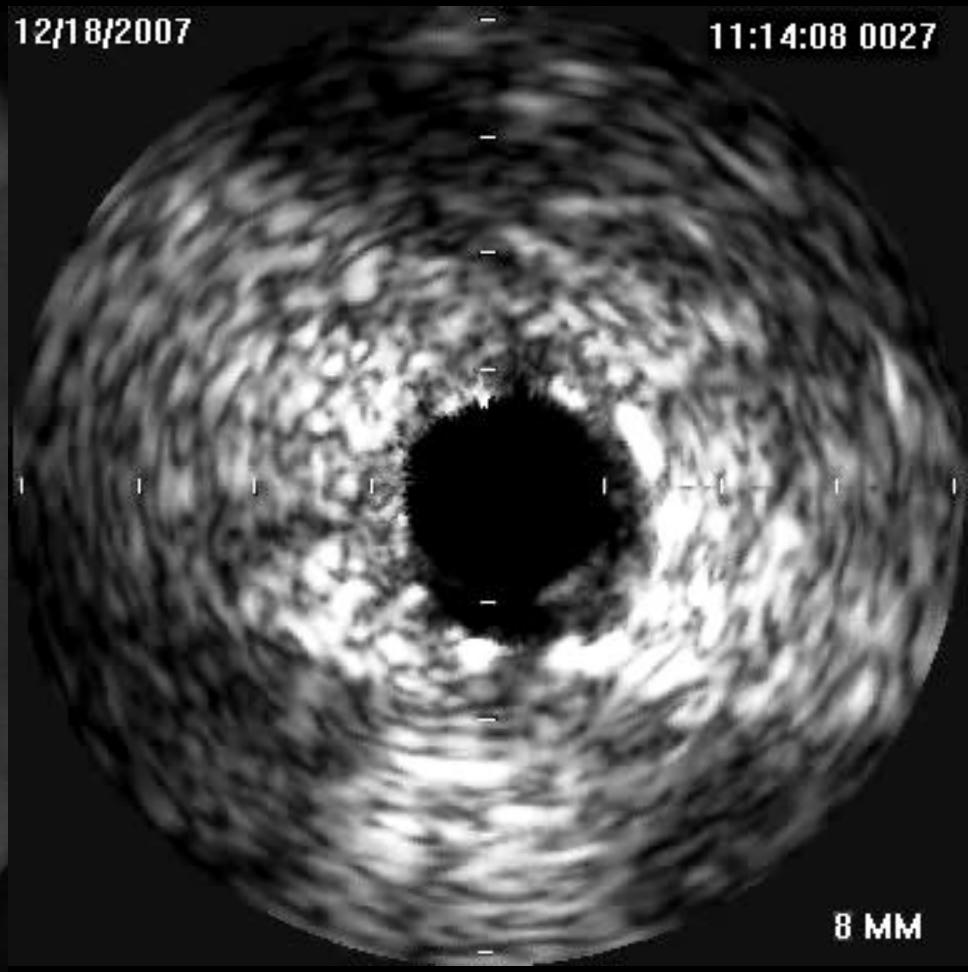
m-RCA: 4.0x19 mm BMS
(Coroflex Blue)



Adenosine, Nicorandil IC

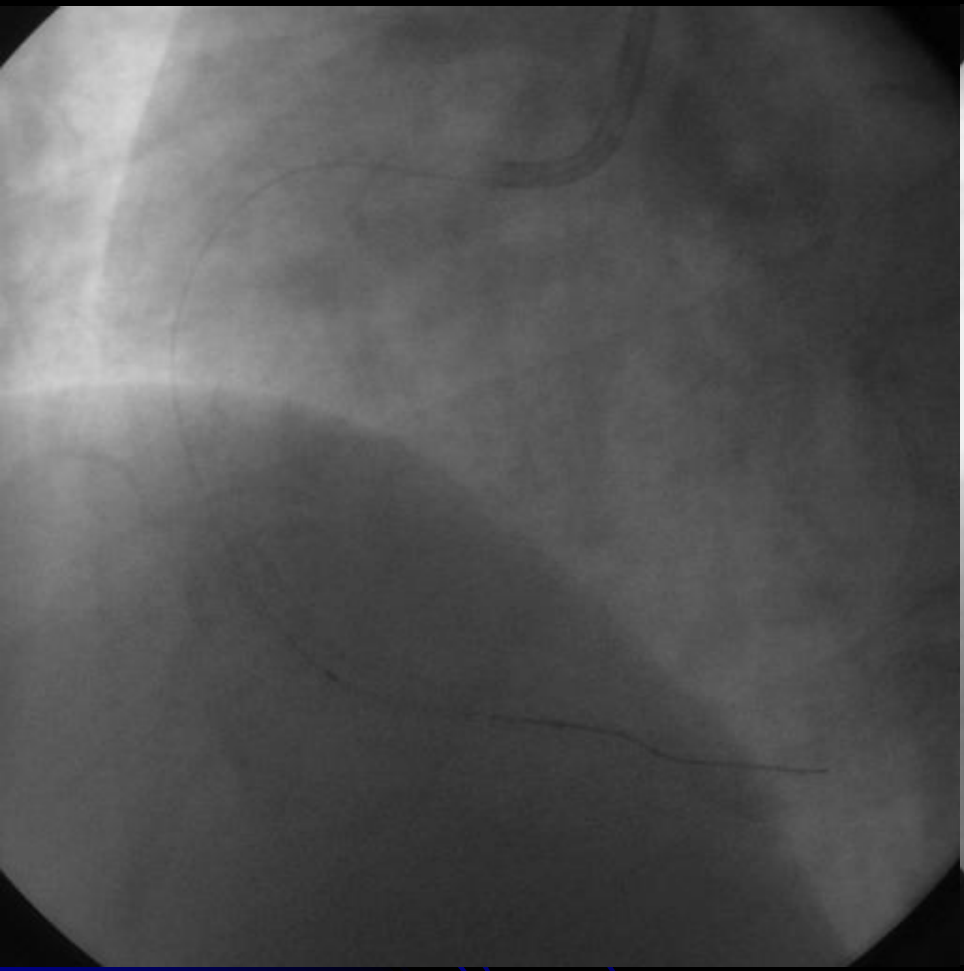
Post-stent CAG and IVUS





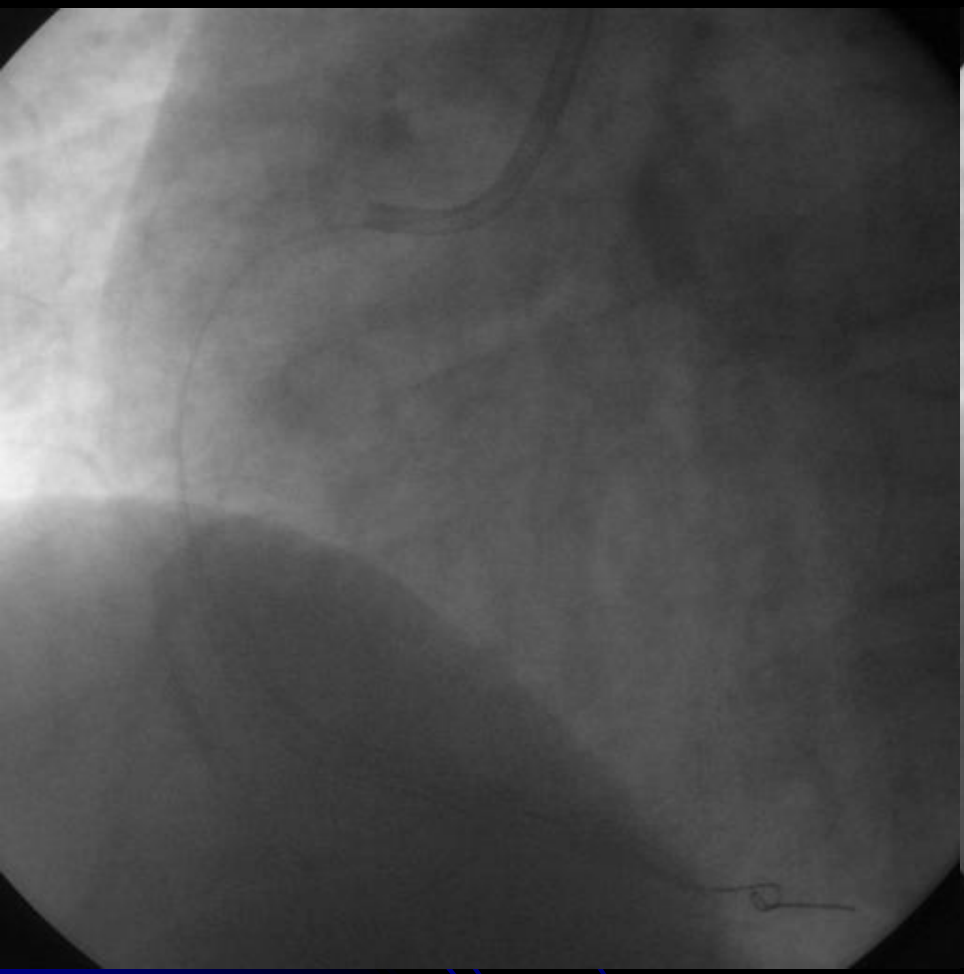
IV heparin
ASA, Clopidogrel, Cilostazol

Thrombus aspiration

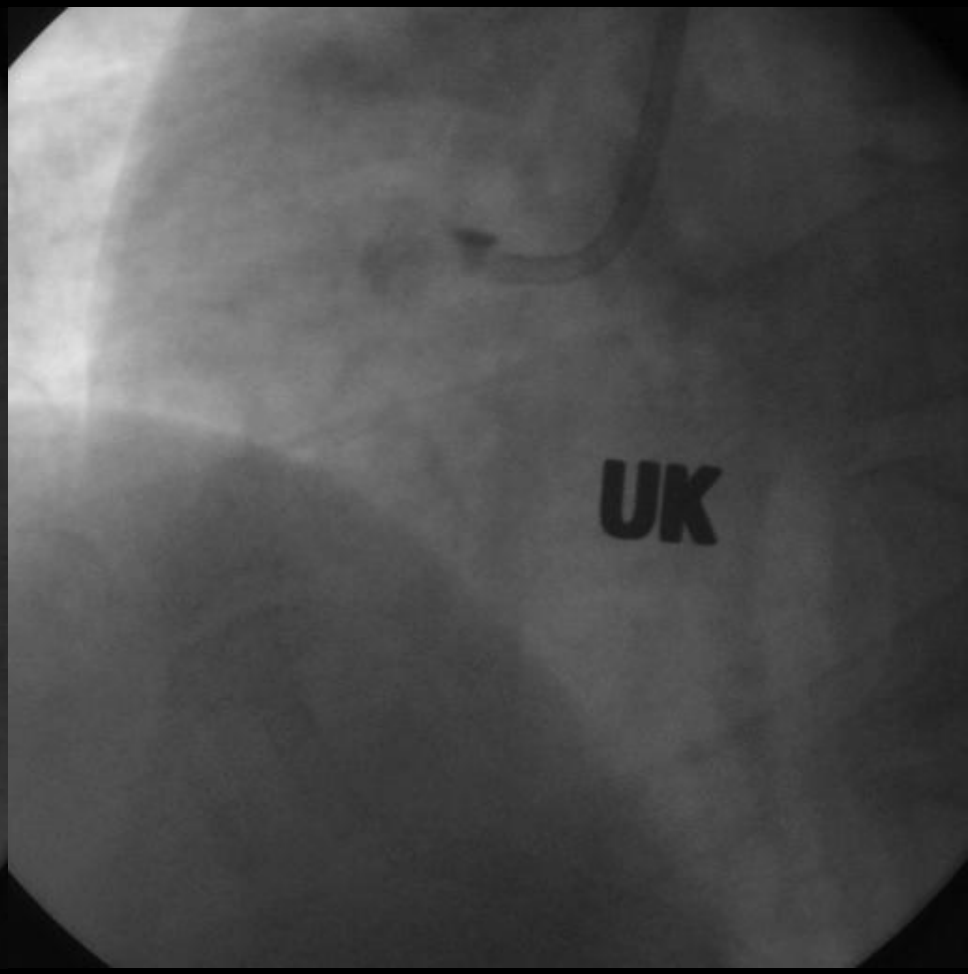


Additional BA (3.0x20 mm, 6-14 atm)

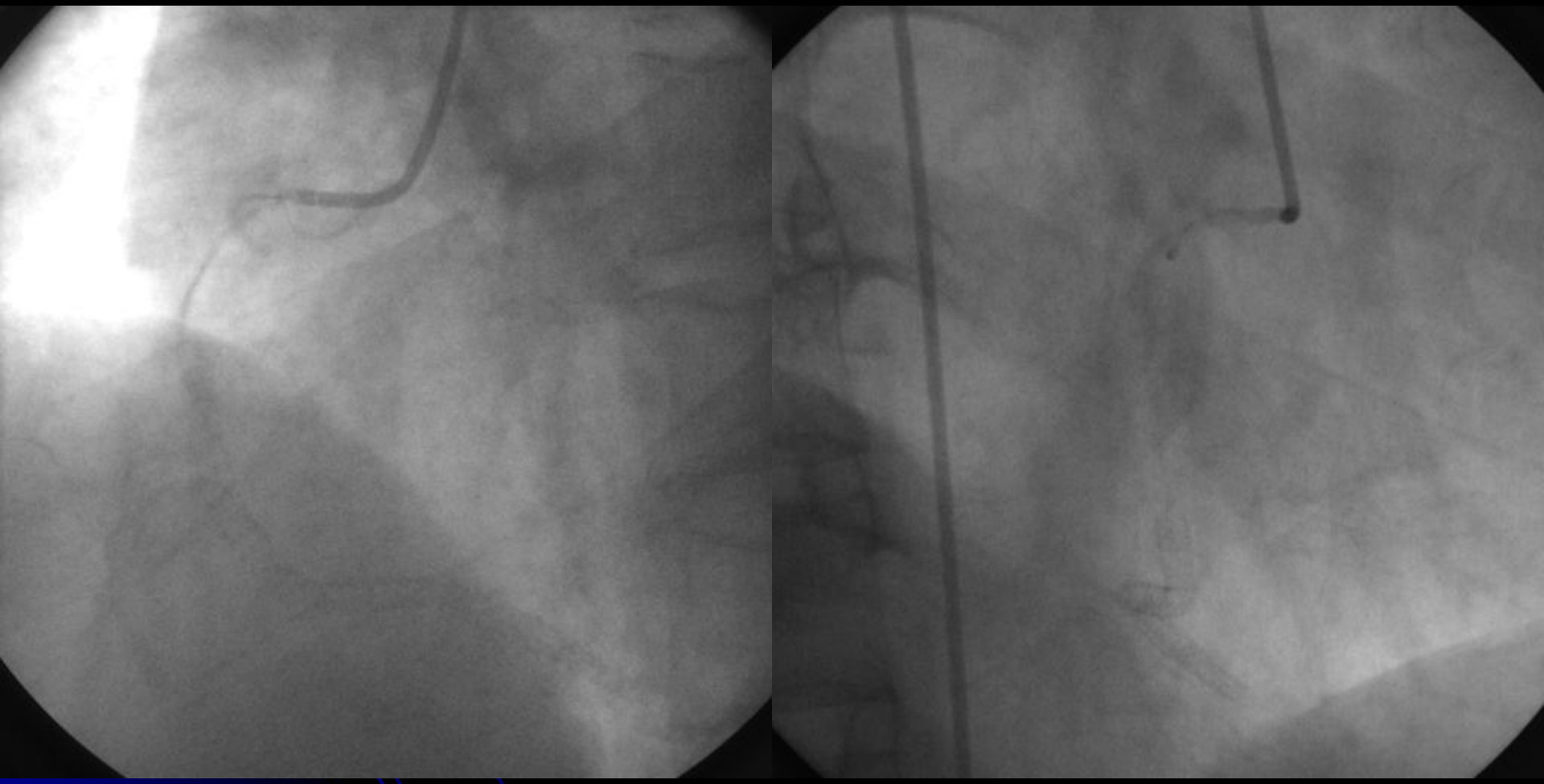
UK infusion (500,000U IC for 1 hr)



Mild dissection in RCA os

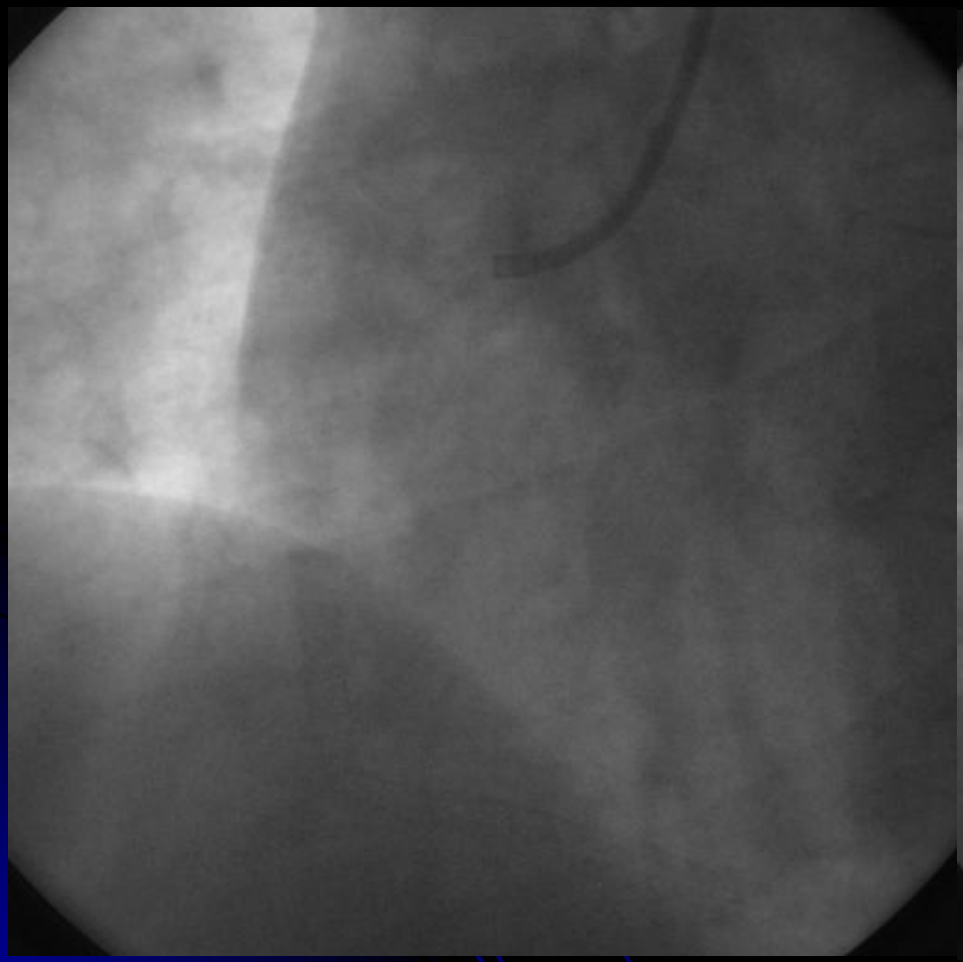


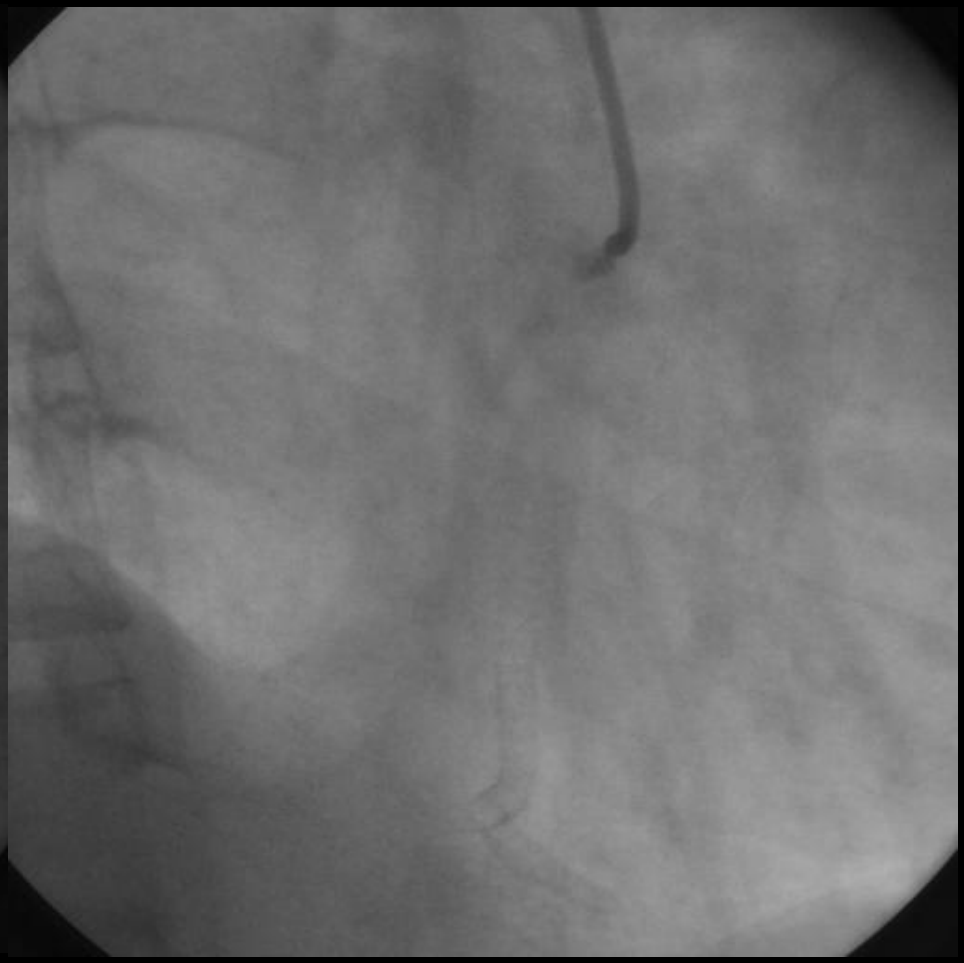
Coronary Angiogram (Jan. 3, 2008)



ASA, Clopidogrel, Cilostazol

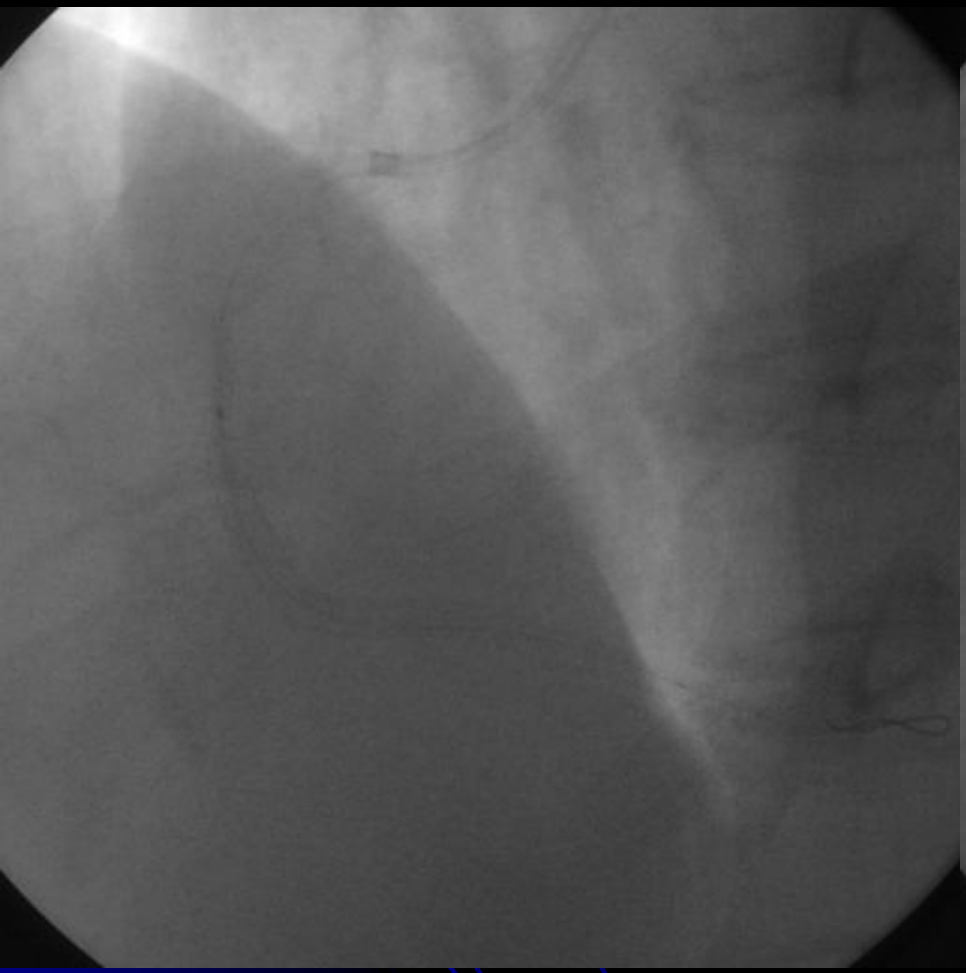
FU Coronary angiogram (Sept. 18, 2008)



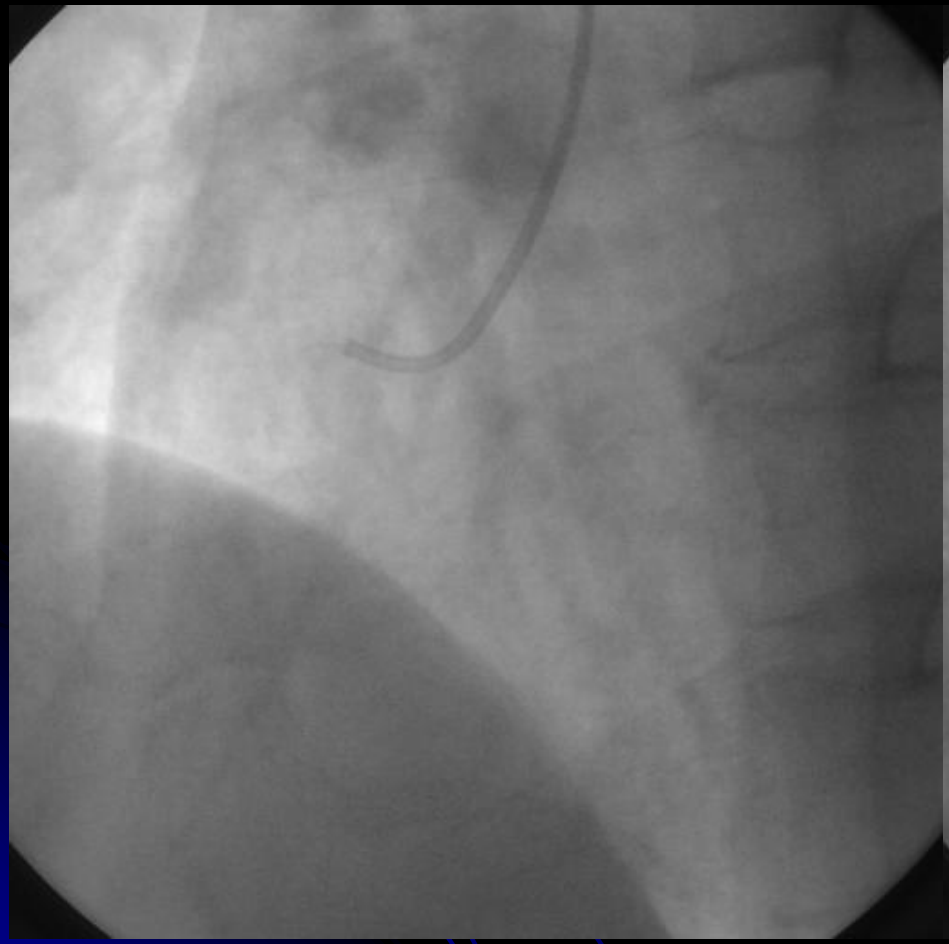


PTCA
(2.0 mm, 8 atm; 3.0 mm, 10-20 atm)

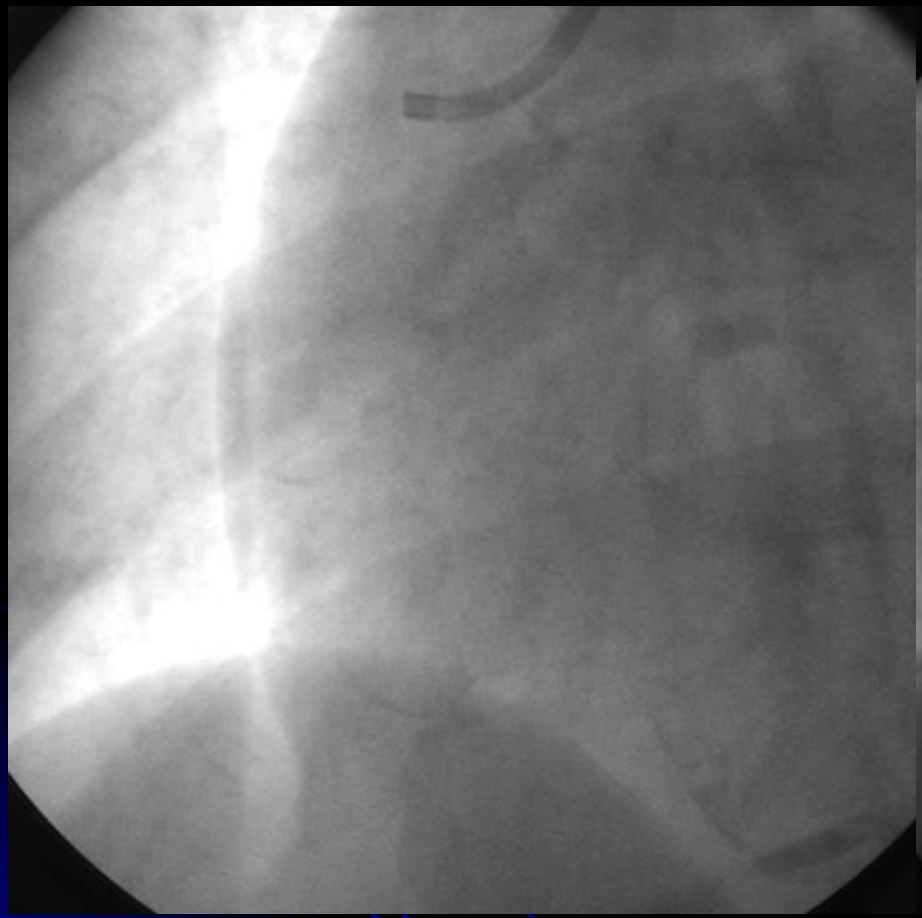
After PTCA

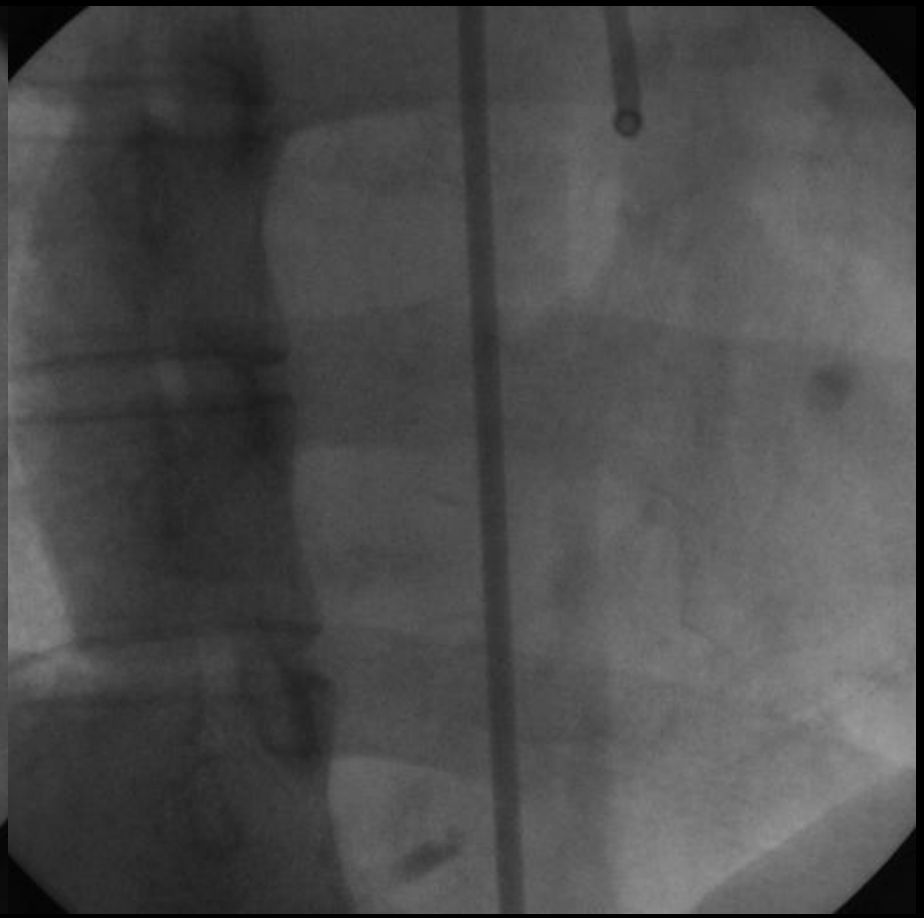


Coronary angiogram (Sept. 23, 2008)

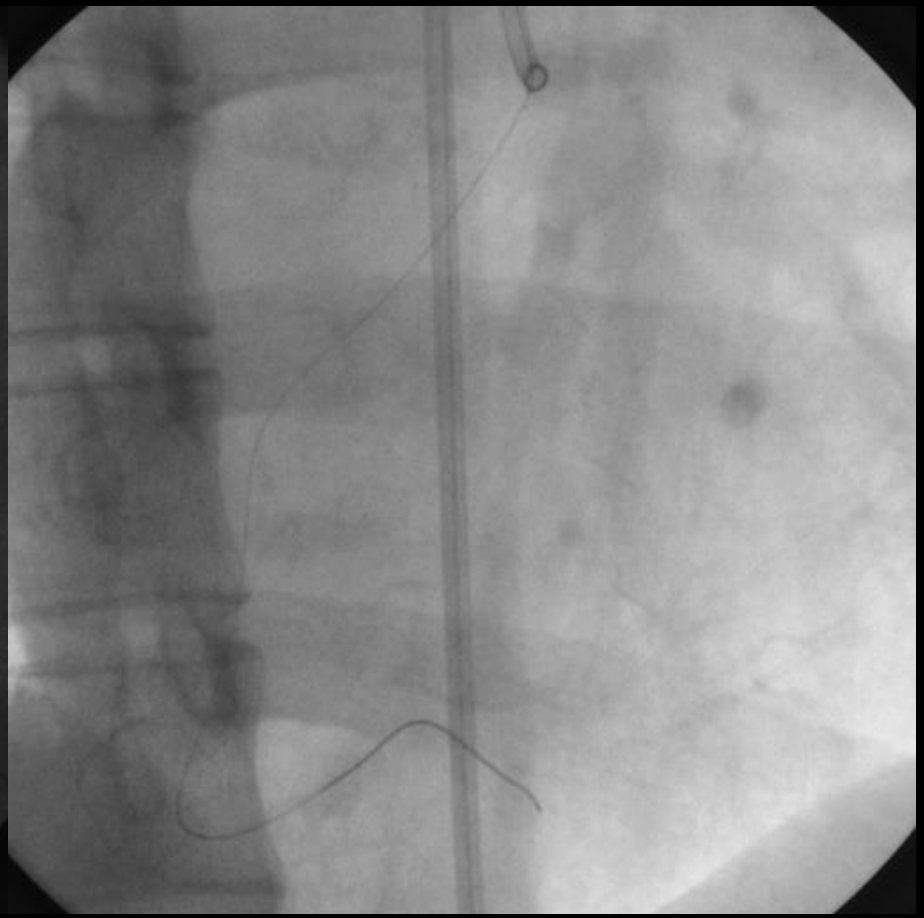


30/F No Risk Factors, Inf. STEMI



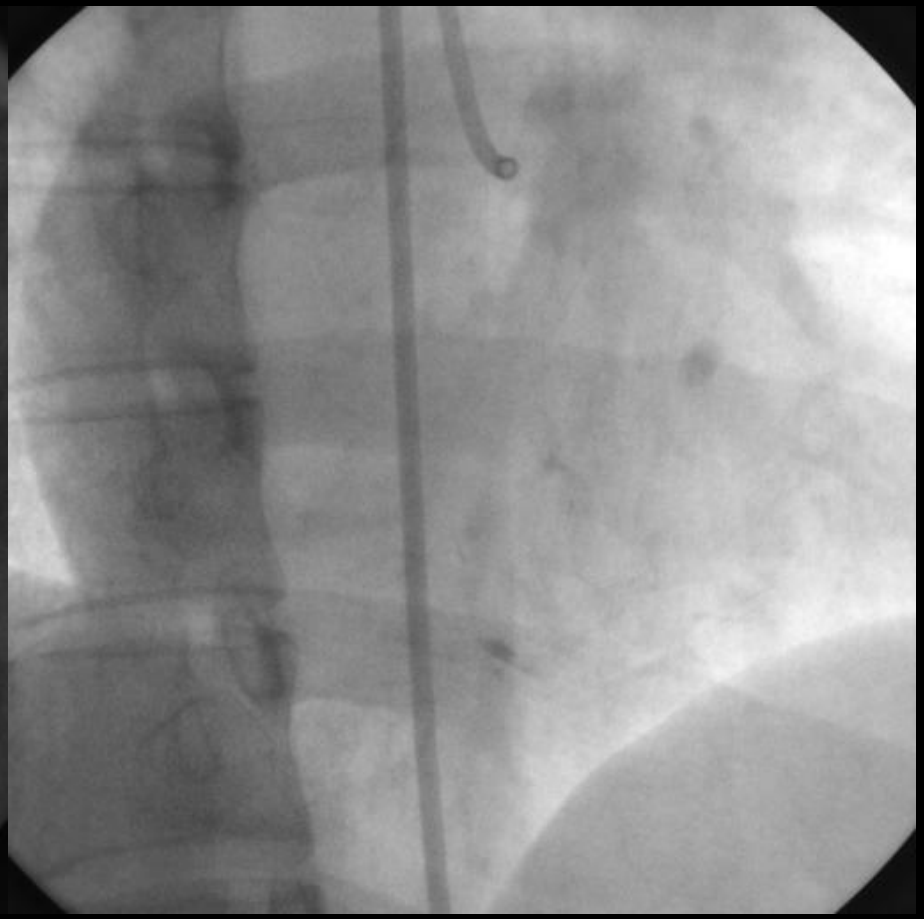


Thrombus Aspiration



Aspirated Thrombi

CAG



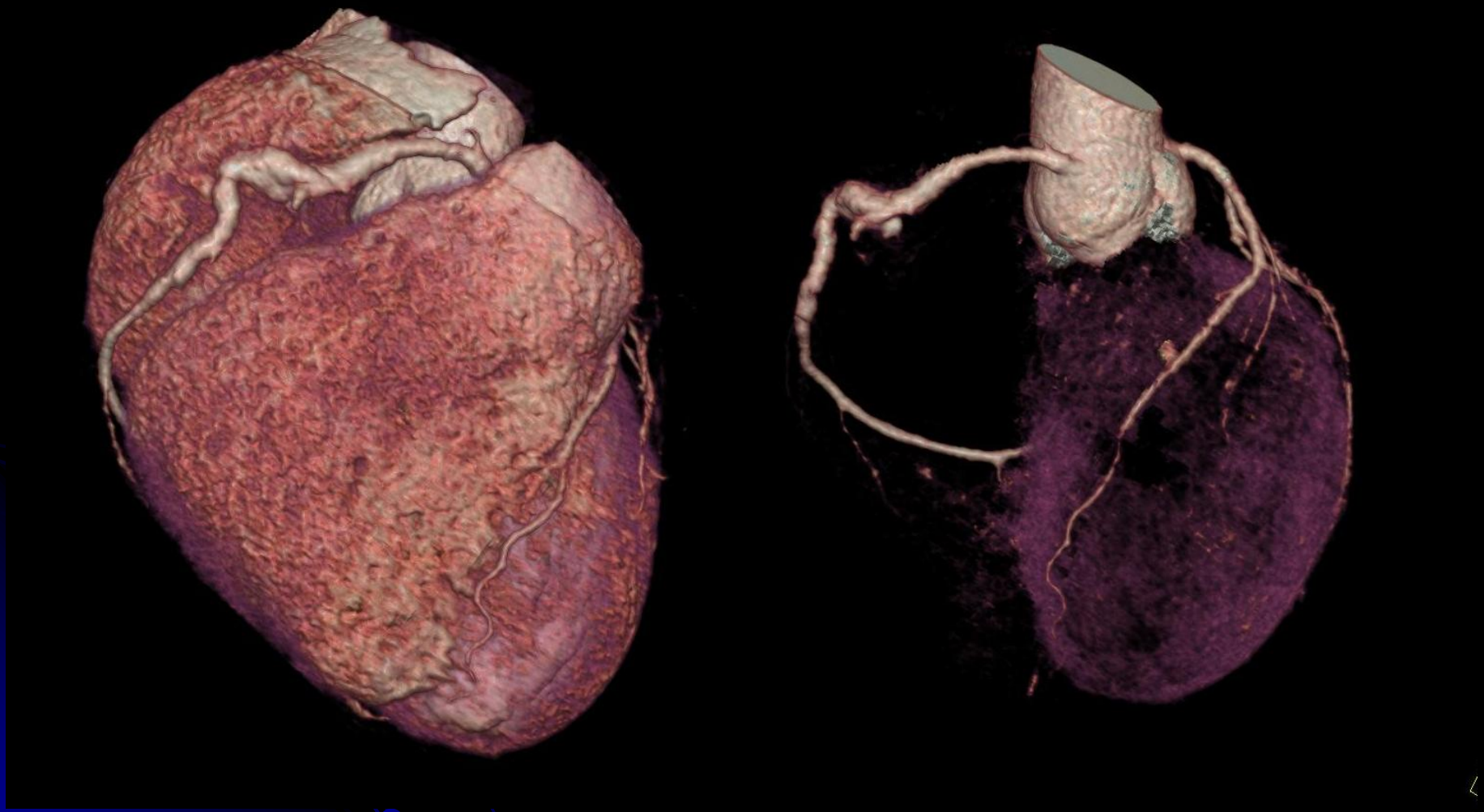
IVUS

IVUS

Distal reference EEM CSA	Lesion site EEM CSA	Proximal reference EEM CSA
23.6mm^2	97.3mm^2	27.5mm^2

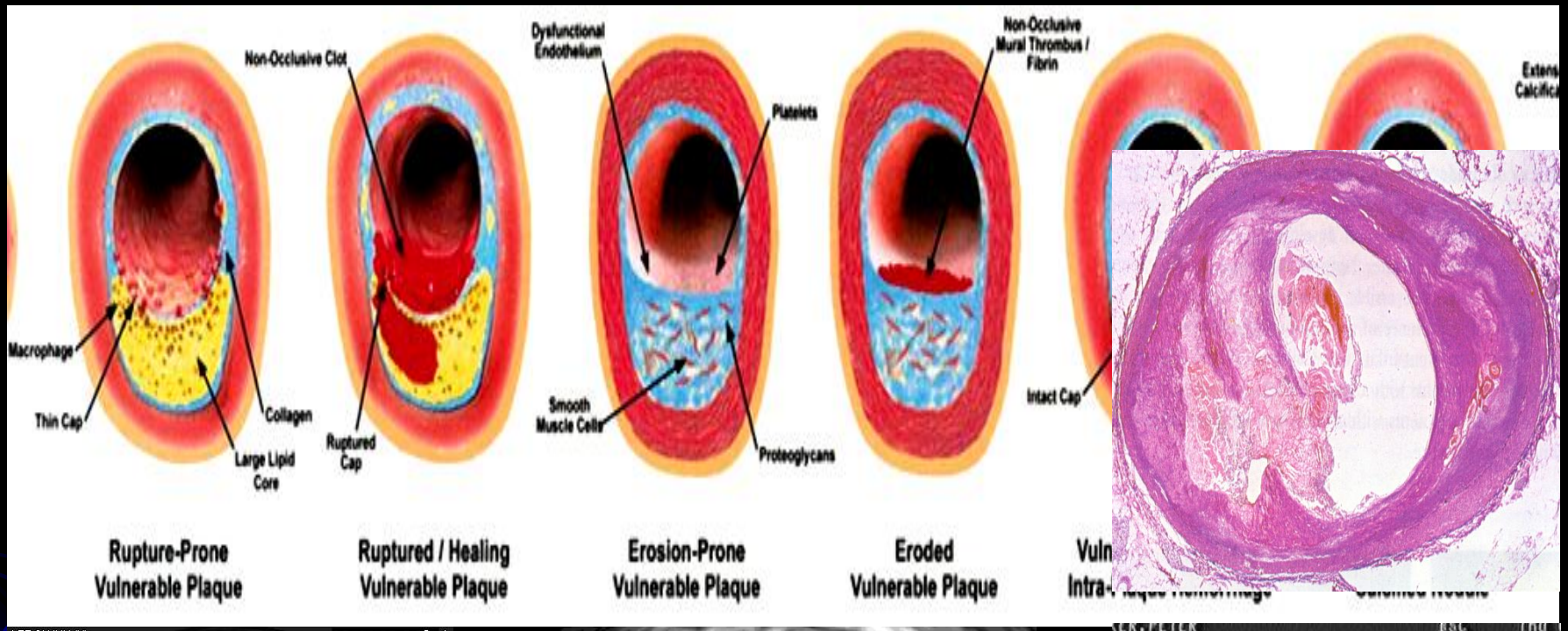
Kawasaki disease-related complication

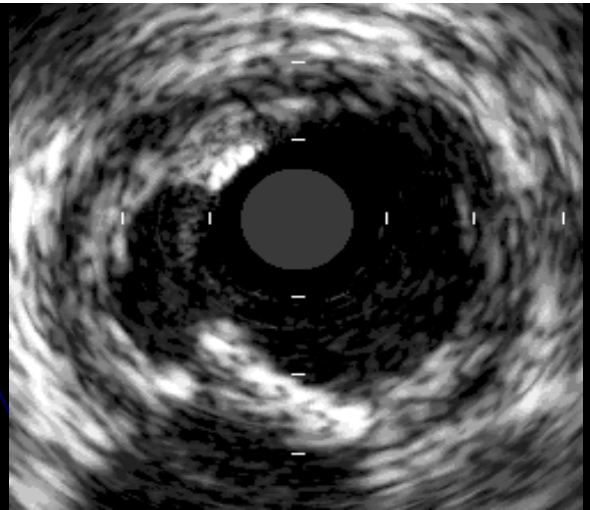
Cardiac CT



IVUS Findings in AMI

Plaque in AMI





Journal of Cardiology (2010) 56, 15–22

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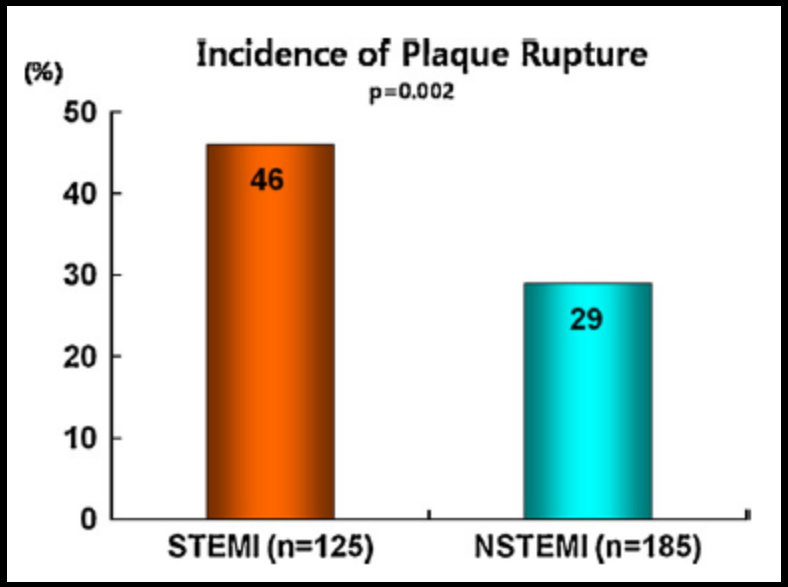
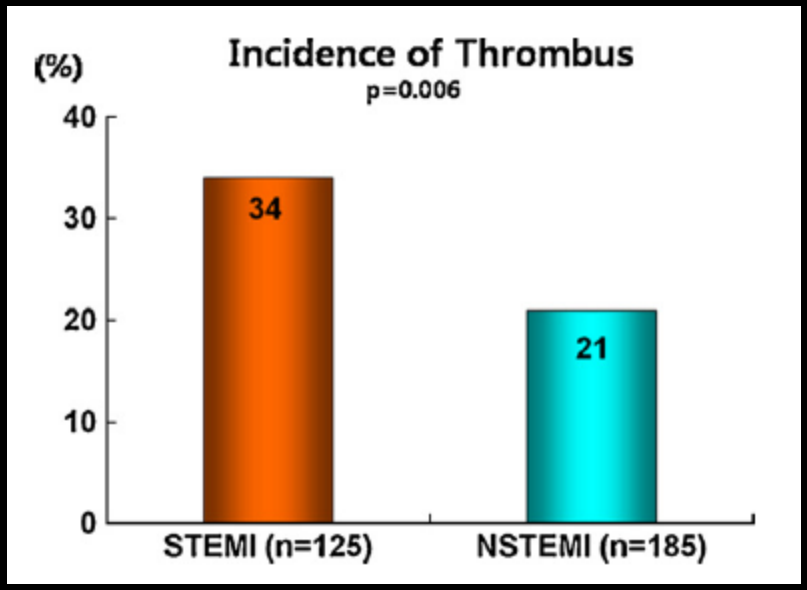
journal homepage: www.elsevier.com/locate/jjcc

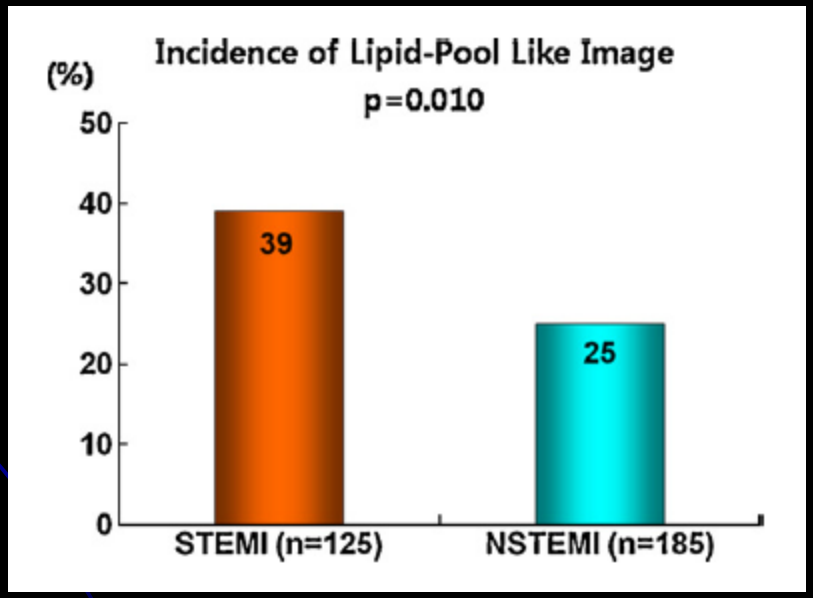
Original article

Differences in intravascular ultrasound findings in culprit lesions in infarct-related arteries between ST segment elevation myocardial infarction and non-ST segment elevation myocardial infarction

Young Joon Hong (MD), Myung Ho Jeong (MD, PhD, FESC, FACC, FAHA, FSCAI)*, Yun Ha Choi (RN), Eun Hae Ma (RN), Jum Suk Ko (MD), Min Goo Lee (MD), Keun Ho Park (MD), Doo Sun Sim (MD), Nam Sik Yoon (MD), Hyun Ju Youn (MD), Kye Hun Kim (MD), Hyung Wook Park (MD), Ju Han Kim (MD), Youngkeun Ahn (MD), Jeong Gwan Cho (MD), Jong Chun Park (MD), Jung Chaee Kang (MD)







Hong YJ et al. J Cardiol 2010;56:15-22

Journal of Cardiology (2009) 53, 278–287

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Official Journal of the Japanese College of Cardiology

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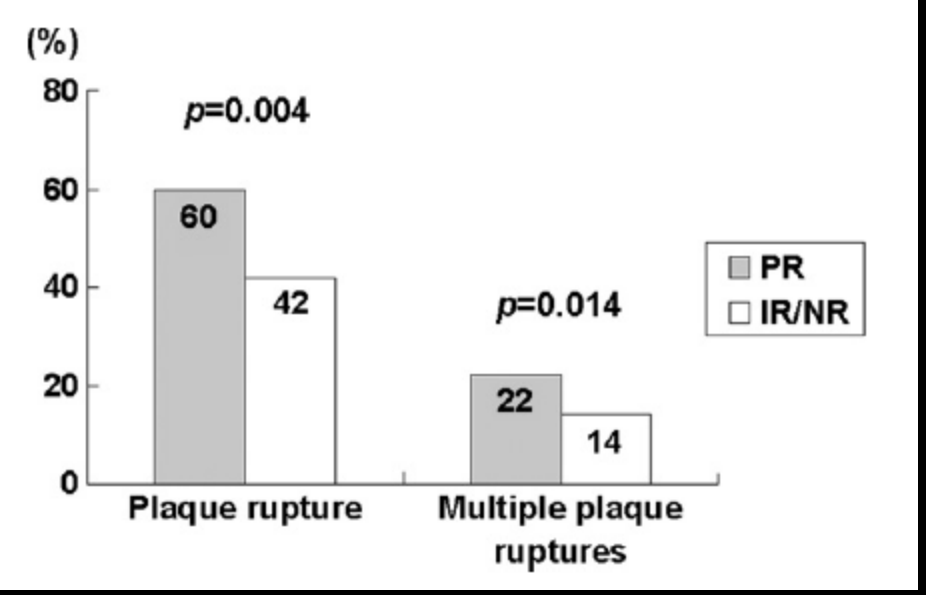
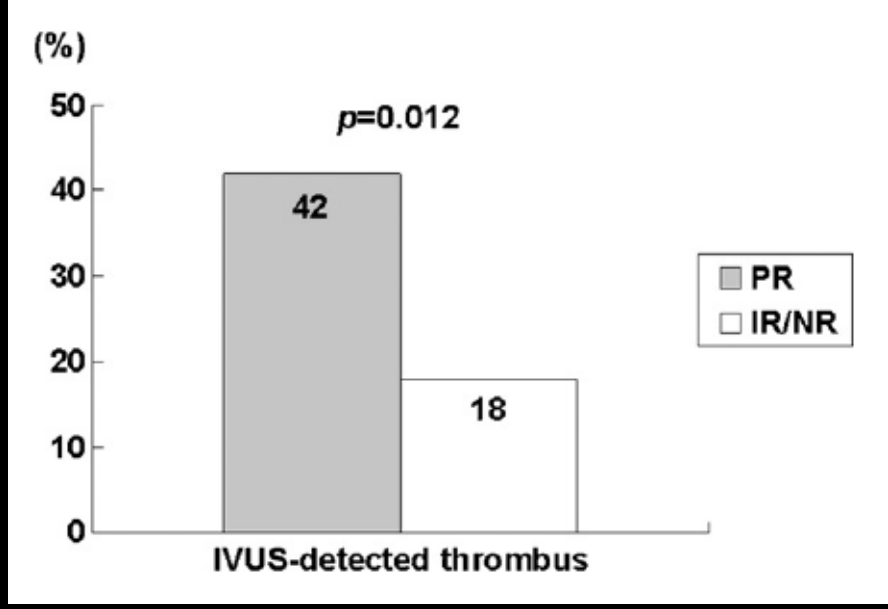
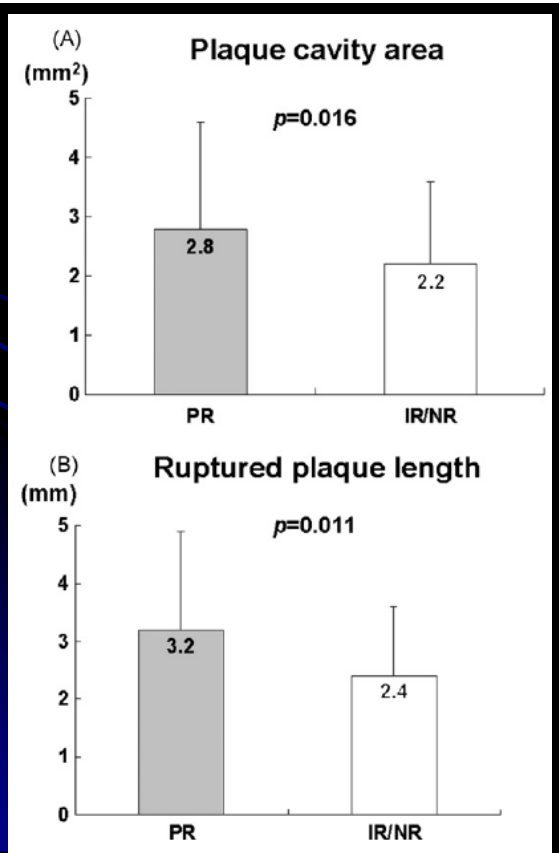
ORIGINAL ARTICLE

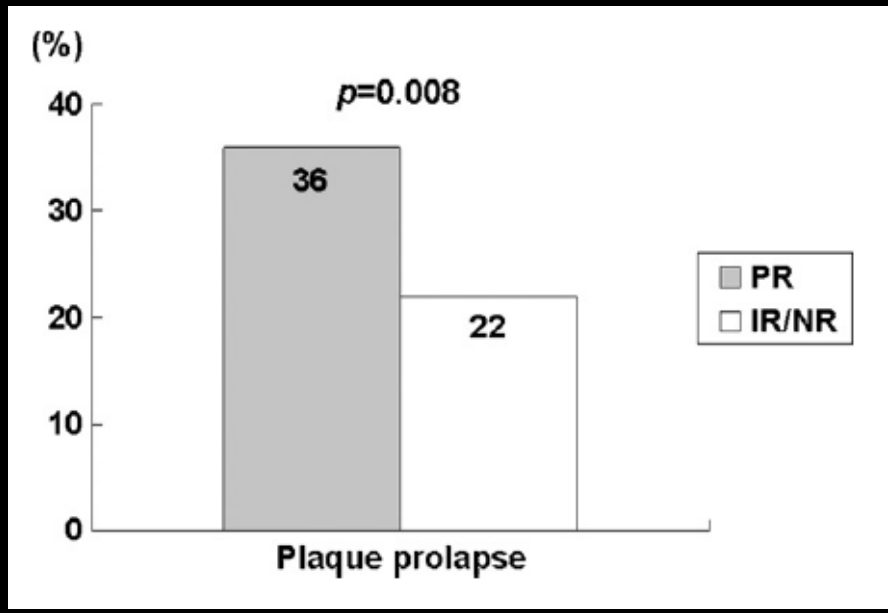
Positive remodeling is associated with more plaque vulnerability and higher frequency of plaque prolapse accompanied with post-procedural cardiac enzyme elevation compared with intermediate/negative remodeling in patients with acute myocardial infarction

Young Joon Hong (MD), Myung Ho Jeong (MD)*, Yun Ha Choi (RN), Jum Suk Ko (MD), Min Goo Lee (MD), Won Yu Kang (MD), Shin Eun Lee (MD), Soo Hyun Kim (MD), Keun Ho Park (MD), Doo Sun Sim (MD), Nam Sik Yoon (MD), Hyun Ju Youn (MD), Kye Hun Kim (MD), Hyung Wook Park (MD), Ju Han Kim (MD), Youngkeun Ahn (MD), Jeong Gwan Cho (MD), Jong Chun Park (MD), Jung Chaee Kang (MD)





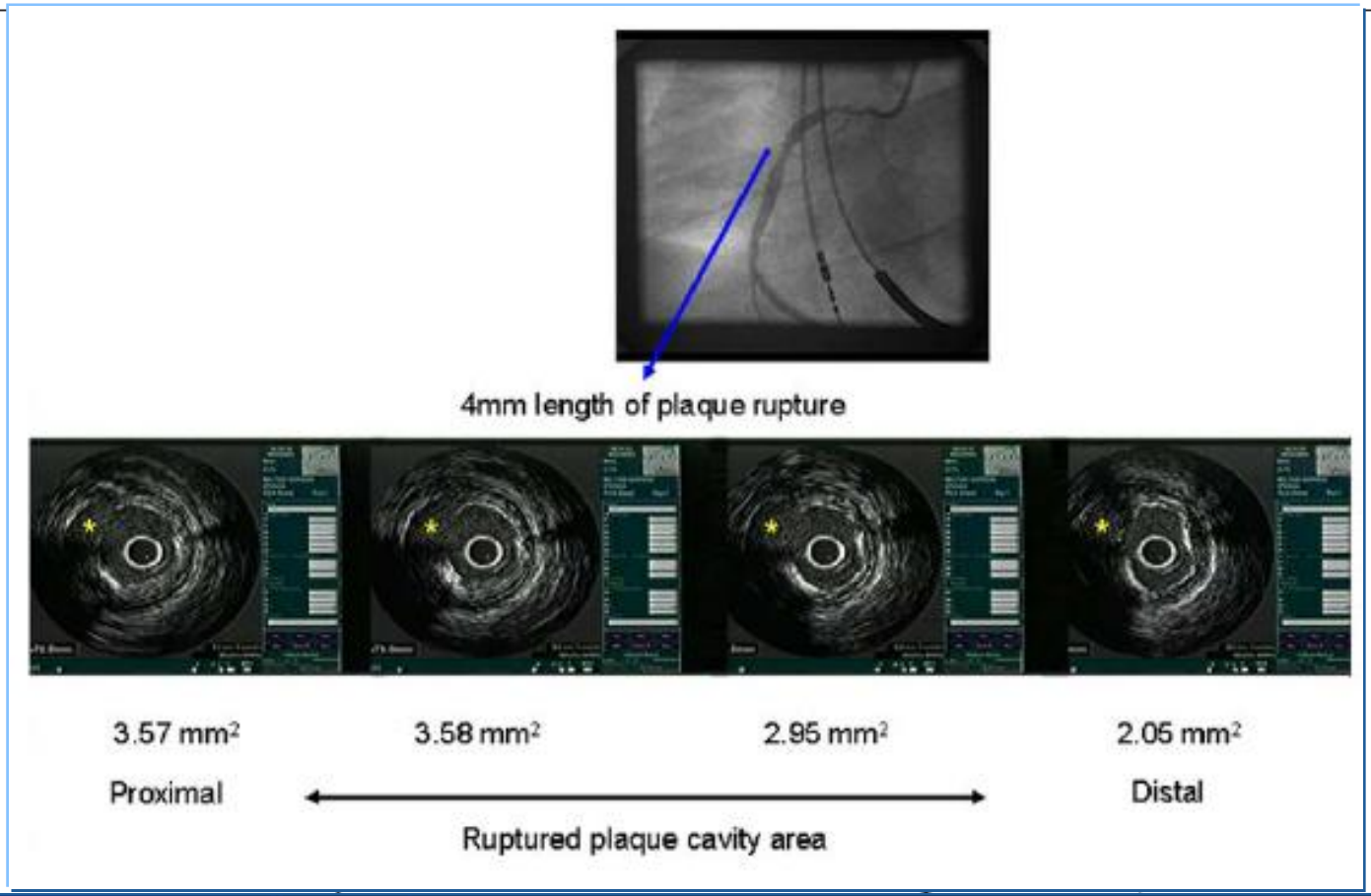




Hong YJ et al. J Cardiol 2009;53:278-87

Effect of Renal Function on Ultrasonic Coronary Plaque Characteristics in Patients With Acute Myocardial Infarction

Young Joon Hong, MD[a], Myung Ho Jeong, MD[a,*], Yun Ha Choi, RN[a], Eun Hye Ma, RN[a], Jum Suk Ko, MD[a], Min Goo Lee, MD[a], Keun Ho Park, MD[a], Doo Sun Sim, MD[a], Nam Sik Yoon, MD[a], Hyun Ju Youn, MD[a], Kye Hun Kim, MD[a], Hyung Wook Park, MD[a], Ju Han Kim, MD[a], Youngkeun Ahn, MD[a], Jeong Gwan Cho, MD[a], Jong Chun Park, MD[a], Gary S. Mintz, MD[b], Neil J. Weissman, MD[c], and Jung Chaee Kang, MD[a]



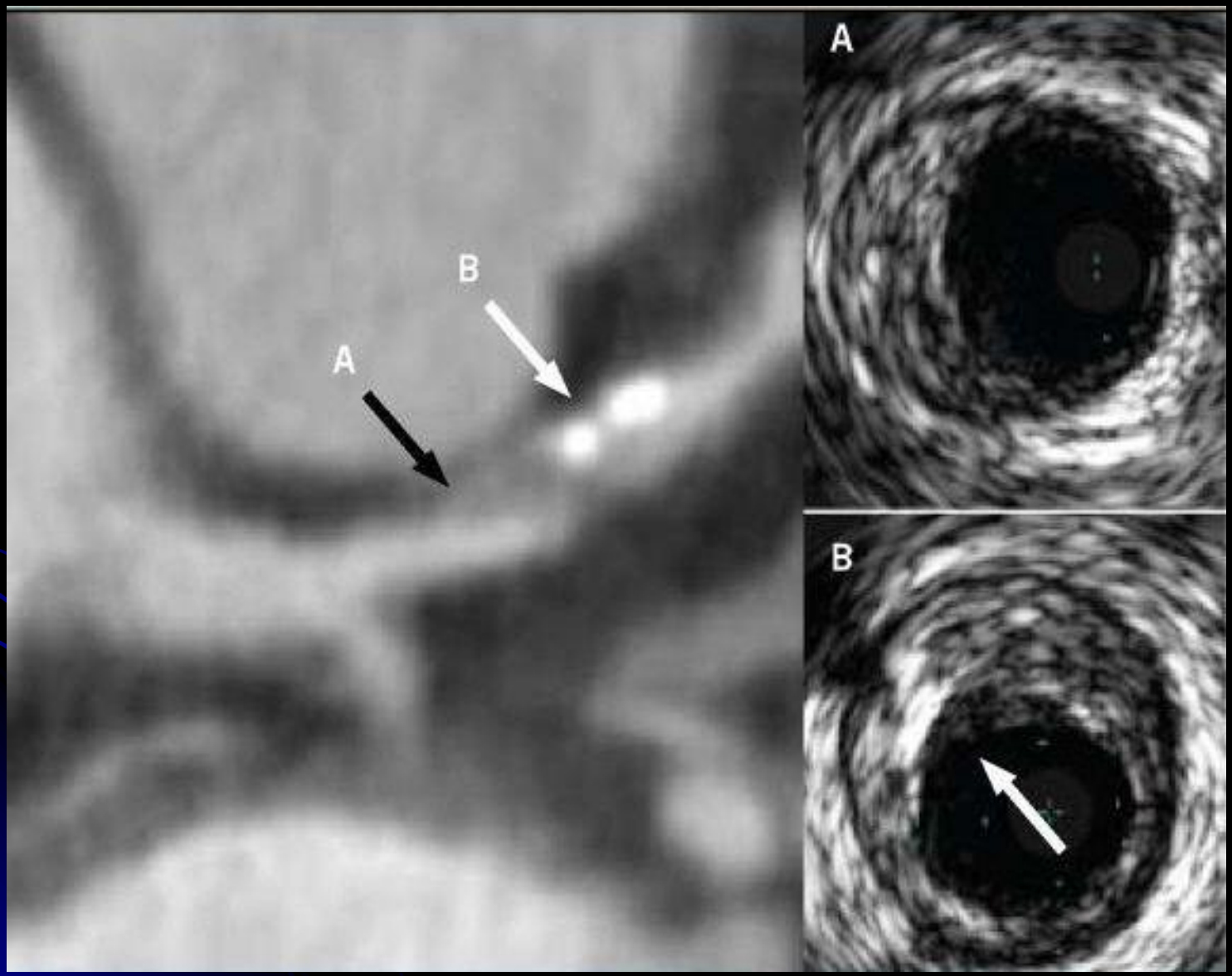
Hong YJ et al., Am J Cardiol 2010;105:936-942

Table 3
Intravascular ultrasound (IVUS) findings

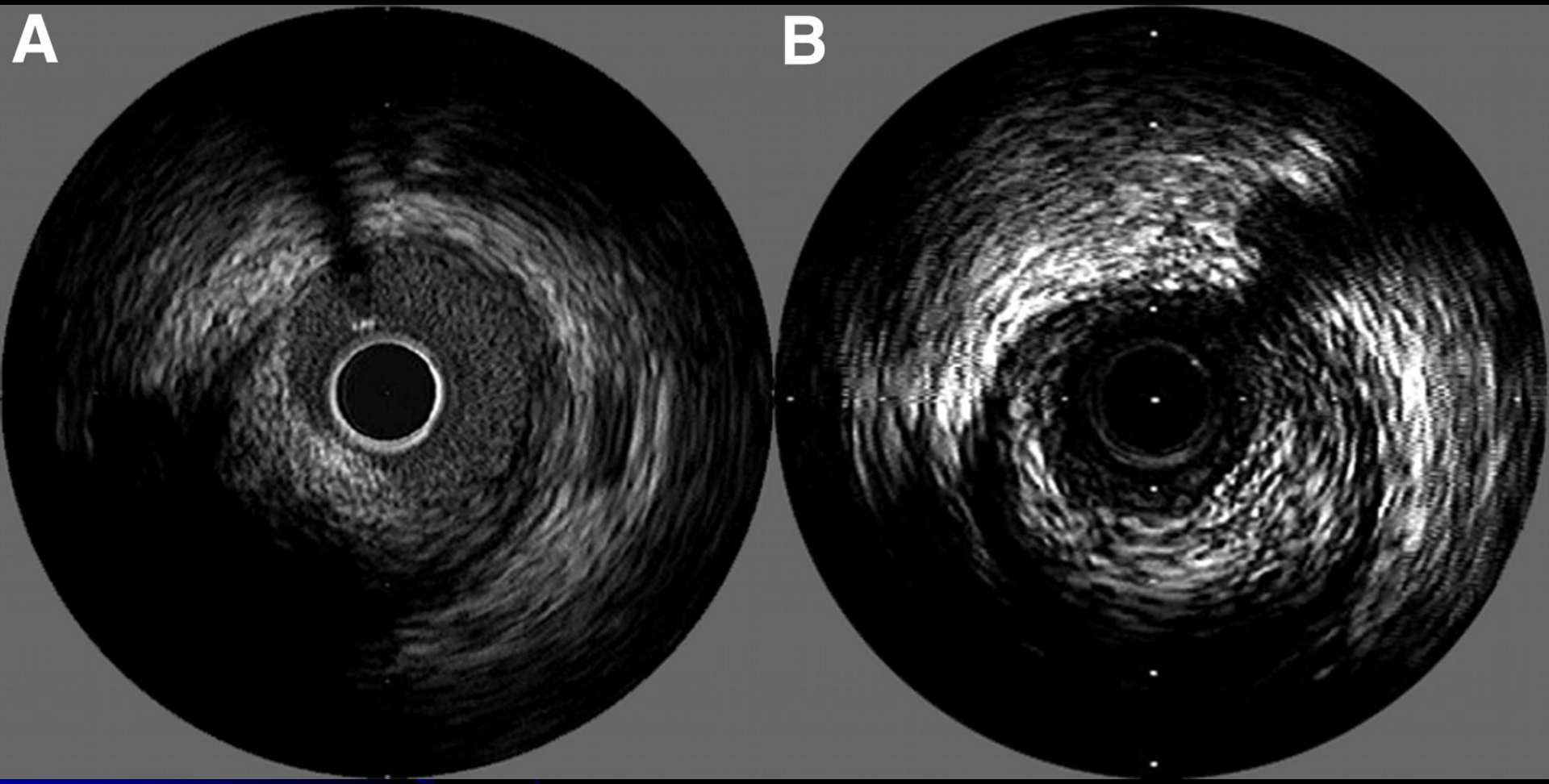
Variable	CrCl (ml/min) Group			p Value
	≥70 (n = 153)	30–69 (n = 103)	<30 (n = 54)	
Referent				
External elastic membrane cross-sectional area (mm^2)	12.8 ± 4.5	12.2 ± 4.8	11.9 ± 4.5	0.034
Lumen cross-sectional area (mm^2)	8.5 ± 3.0	7.7 ± 3.0	7.0 ± 3.1	0.008
Plaque plus media cross-sectional area (mm^2)	4.3 ± 2.5	4.5 ± 2.8	4.9 ± 2.2	0.041
Plaque burden (%)	30.1 ± 12.3	36.9 ± 11.4	41.2 ± 10.8	0.003
Lesion site				
External elastic membrane cross-sectional area (mm^2)	12.7 ± 4.3	12.4 ± 5.1	11.1 ± 4.4	0.047
Lumen cross-sectional area (mm^2)	2.6 ± 1.2	2.5 ± 1.5	2.0 ± 1.1	0.017
Plaque plus media cross-sectional area (mm^2)	10.0 ± 4.0	9.9 ± 4.7	9.1 ± 4.1	0.024
Plaque burden (%)	77.4 ± 11.0	79.8 ± 12.5	82.0 ± 10.3	0.031
Lesion length (mm)	20.9 ± 9.1	23.1 ± 9.5	26.3 ± 9.6	0.038
Plaque morphology				0.065
Soft	82 (53.6%)	44 (42.7%)	20 (37.0%)	
Fibrotic	26 (17.0%)	16 (15.5%)	10 (18.5%)	
Calcific	31 (20.3%)	34 (33.0%)	19 (35.2%)	
Mixed	14 (9.2%)	9 (8.7%)	5 (9.3%)	
Arc of calcium (°)	103 ± 96	142 ± 110	180 ± 114	<0.001
Remodeling index	0.99 ± 0.23	1.02 ± 0.22	0.93 ± 0.19	0.031
Plaque rupture	48 (31.4%)	35 (34.0%)	29 (53.7%)	0.011
Multiple plaque rupture	17 (11.1%)	13 (12.6%)	18 (33.3%)	<0.001
Plaque cavity area (mm^2)	1.98 ± 0.89	2.20 ± 1.45	3.06 ± 1.70	0.002
Ruptured plaque length (mm)	2.33 ± 0.93	2.59 ± 1.50	3.33 ± 1.76	0.008
Intravascular ultrasound-detected thrombus	35 (22.9%)	24 (23.3%)	22 (40.7%)	0.027

Hong YJ et al., Am J Cardiol 2010;105:936-942

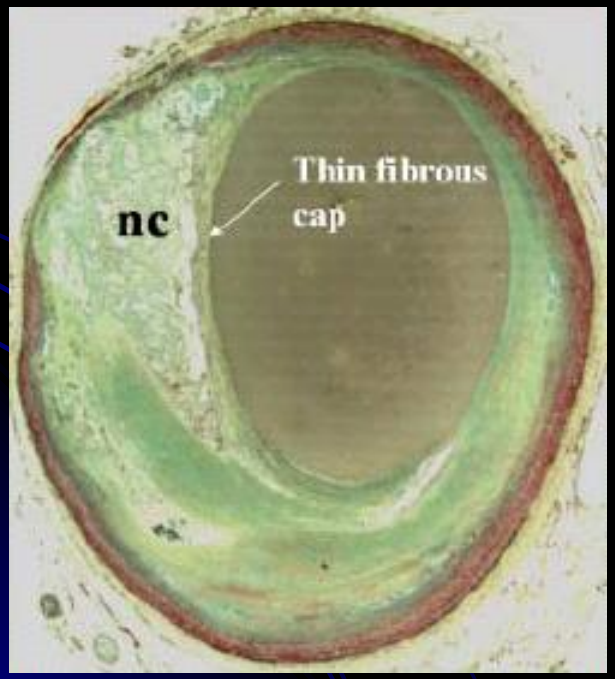
Spotty Calcification

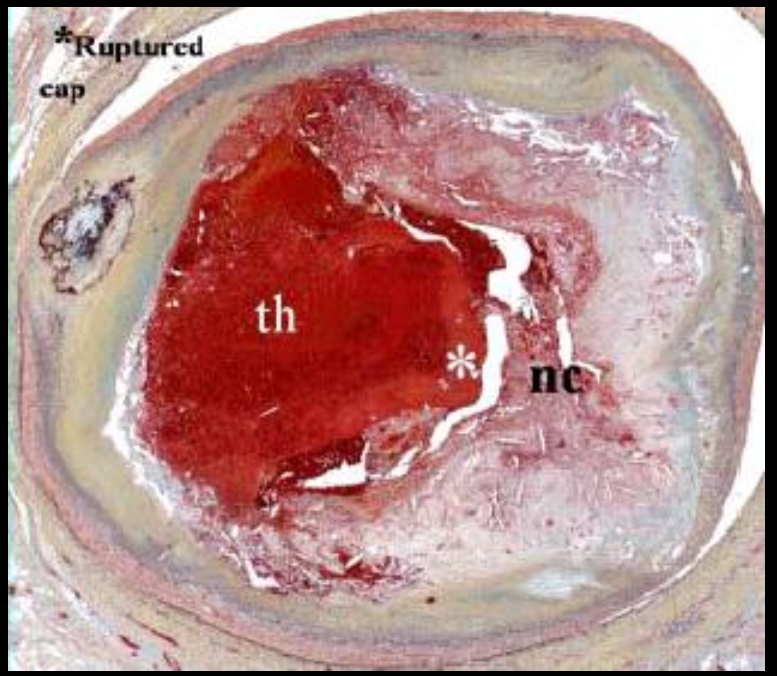


Attenuated Plaque



Thin-cap Fibroatheroma is a Precursor Lesions of Plaque Rupture





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DOI:10.1016/j.jcmg.2008.10.017

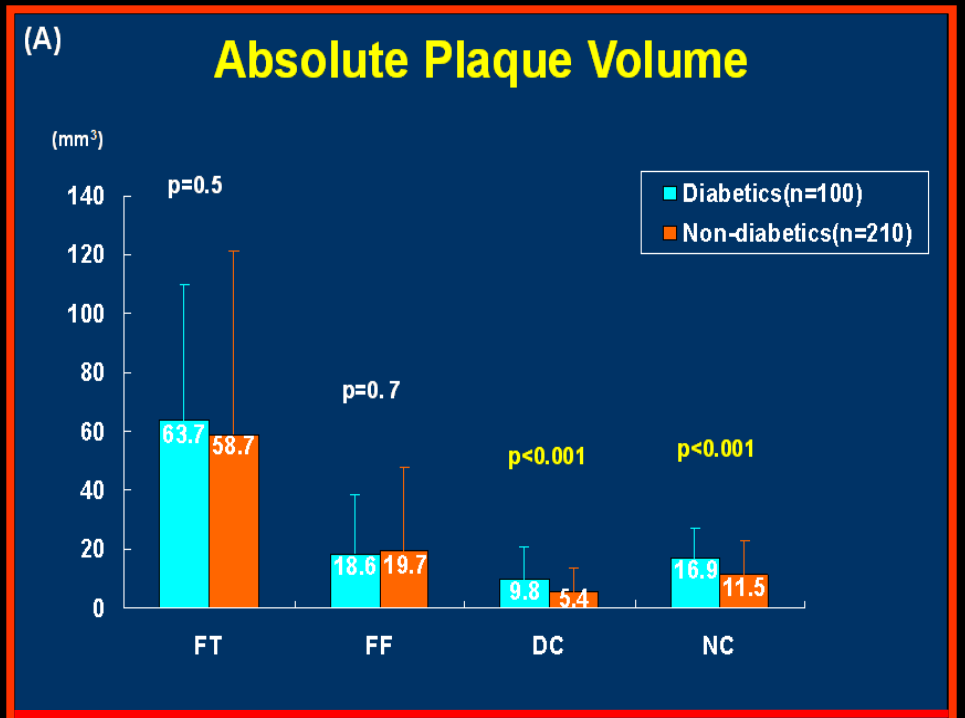
Plaque Characteristics in Culprit Lesions and Inflammatory Status in Diabetic Acute Coronary Syndrome Patients

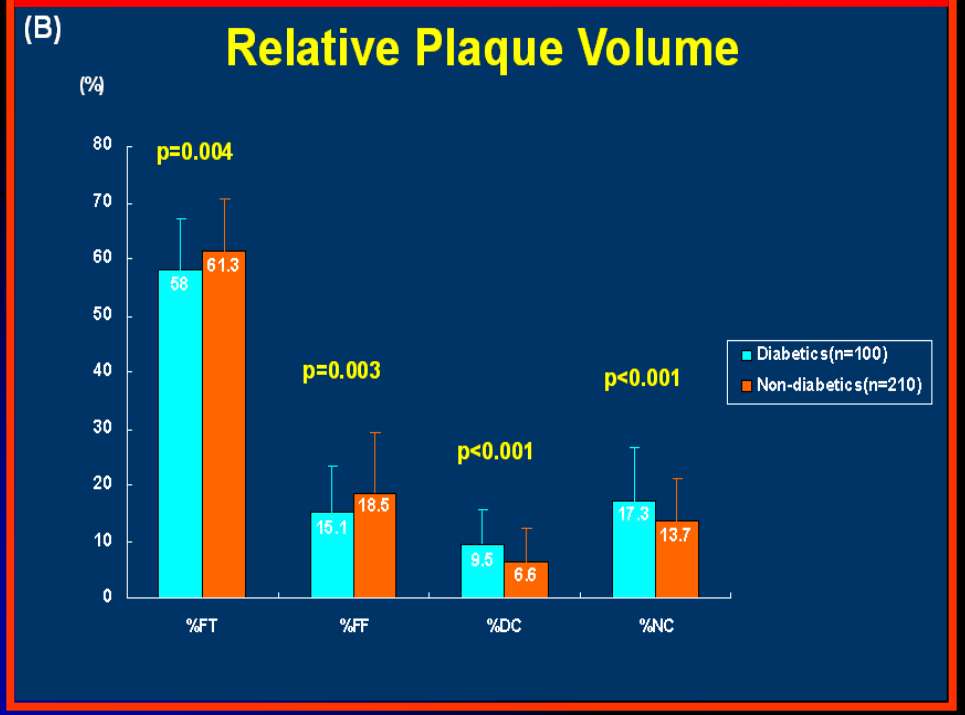
Intravascular Ultrasound and Virtual Histology-Intravascular Ultrasound Analysis

Young Joon Hong, MD, PHD, Myung Ho Jeong, MD, PHD, FACC, FAHA, FESC, FSCAI, Yun Ha Choi, RN, Jum Suk Ko, MD, Min Goo Lee, MD, Won Yu Kang, MD, Shin Eun Lee, MD, Soo Hyun Kim, MD, Keun Ho Park, MD, Doo Sun Sim, MD, Nam Sik Yoon, MD, Hyun Ju Yoon, MD, Kye Hun Kim, MD, PHD, Hyung Wook Park, MD, PHD, Ju Han Kim, MD, PHD, Youngkeun Ahn, MD, PHD, FACC, FSCAI, Jeong Gwan Cho, MD, PHD, FACC, Jong Chun Park, MD, PHD, Jung Chaee Kang, MD, PHD

Gwangju, Korea

Hong YJ et al., JACC Cardiovasc Imaging 2009;2:339-49.



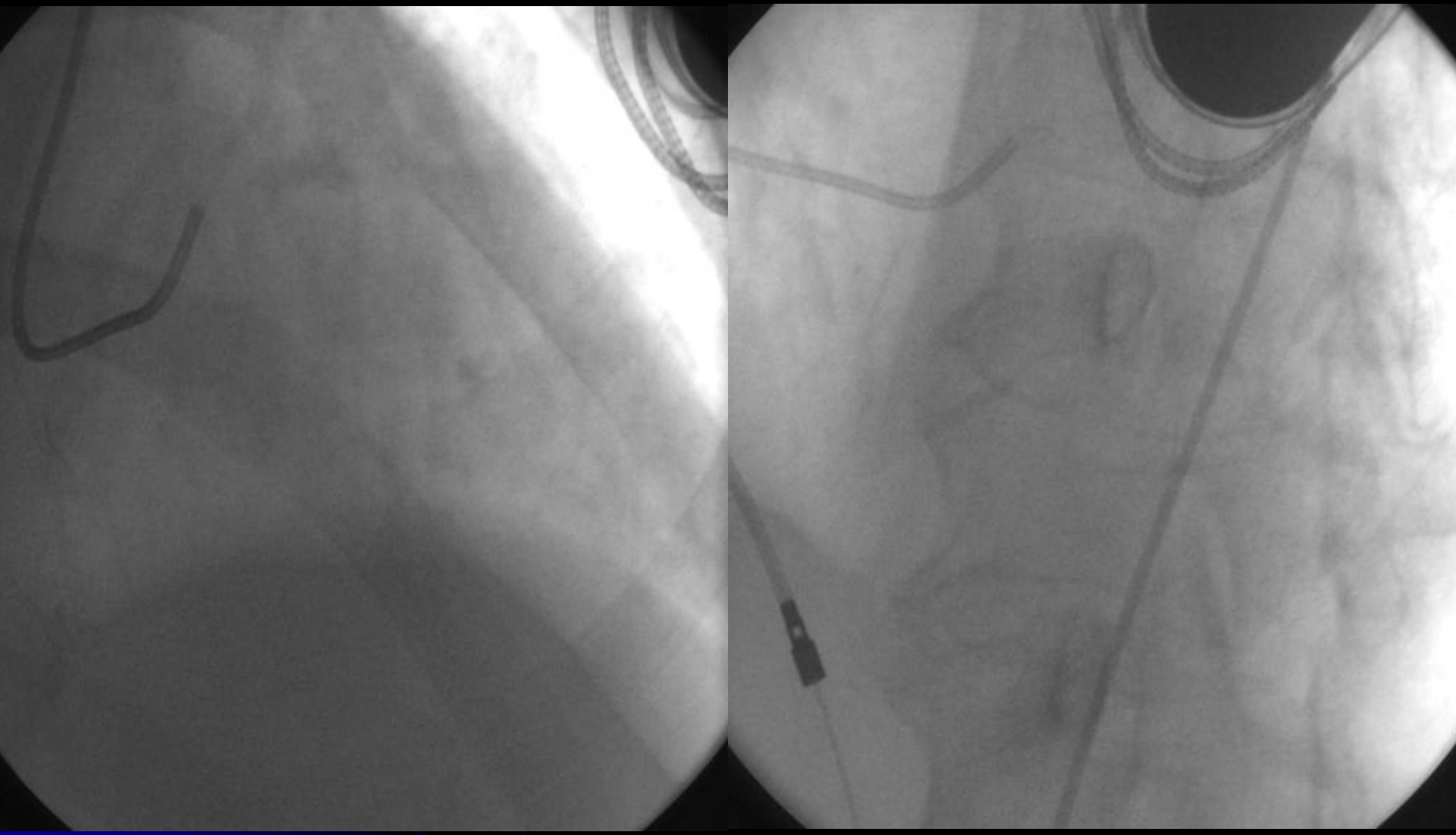


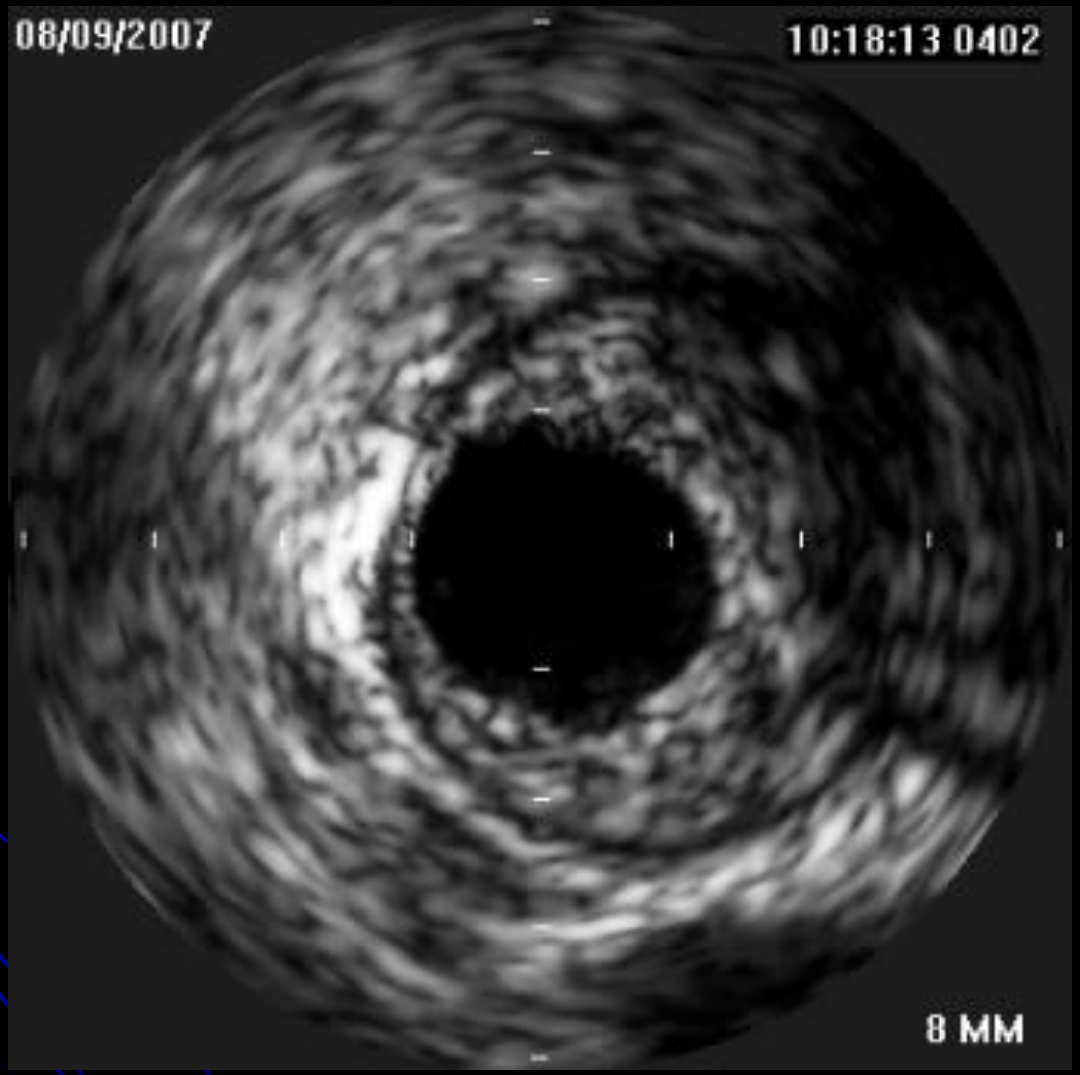
In 310 VH-IVUS subsets, the absolute and % **necrotic core volumes** were significantly greater (16.9±15.1 mm3 vs. 11.5±11.4 mm3, p<0.001, and 17.3±9.4% vs. 13.7±7.5%, p<0.001, respectively), and the presence of at least one TCFA (60% vs. 42%, p=0.003) and multiple TCFAs (28% vs. 11%, p<0.001) within culprit lesions were more common in diabetic group, and **diabetes mellitus** was the only independent predictor of TCFA by multivariate analysis (HR: 2.139, 95% CI: 1.266-3.613, p=0.004).

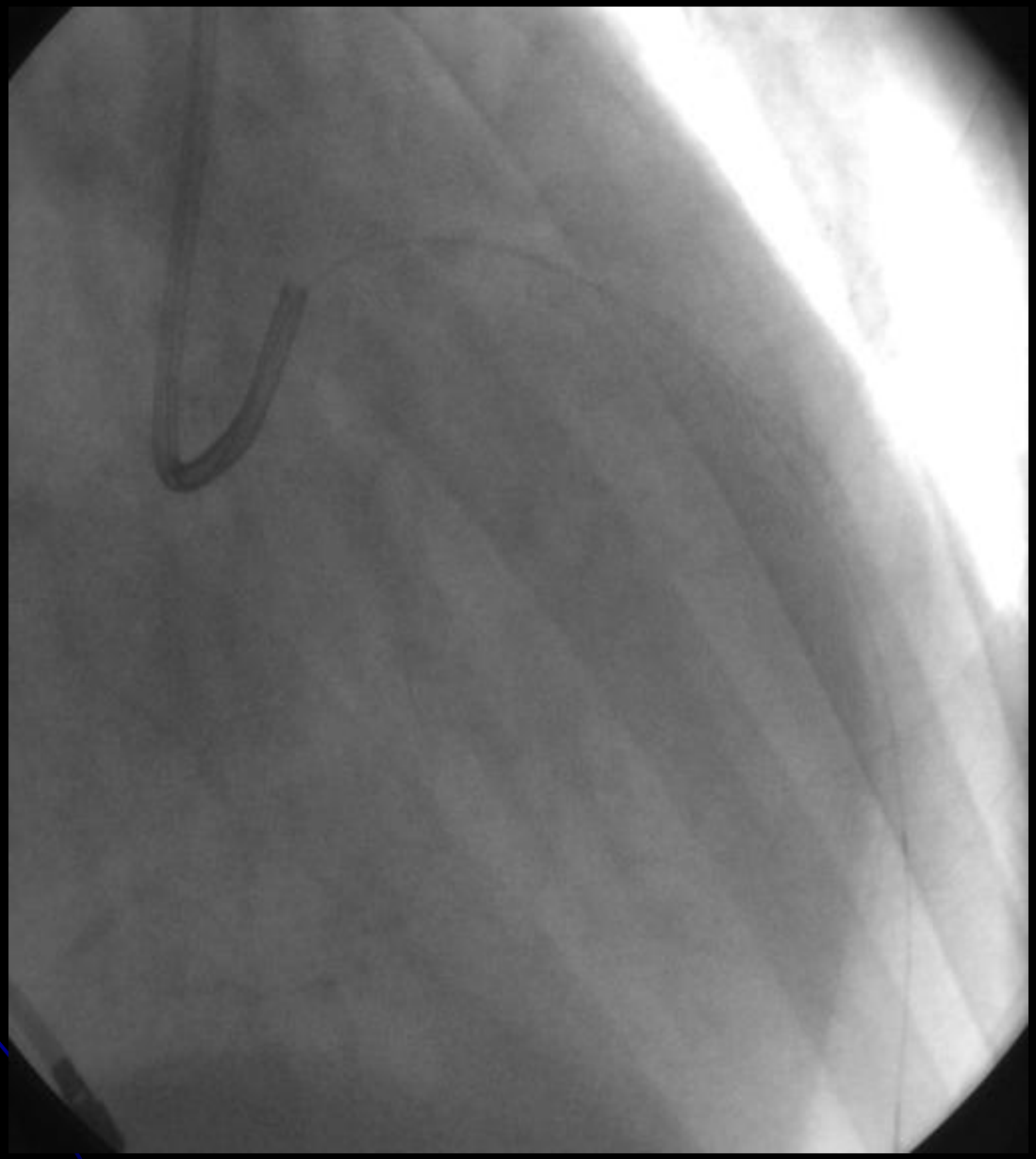
Hong YJ et al., JACC Cardiovasc Imaging 2009;2:339-49.

IVUS Findings in AMI vs. Post-PCI Outcome

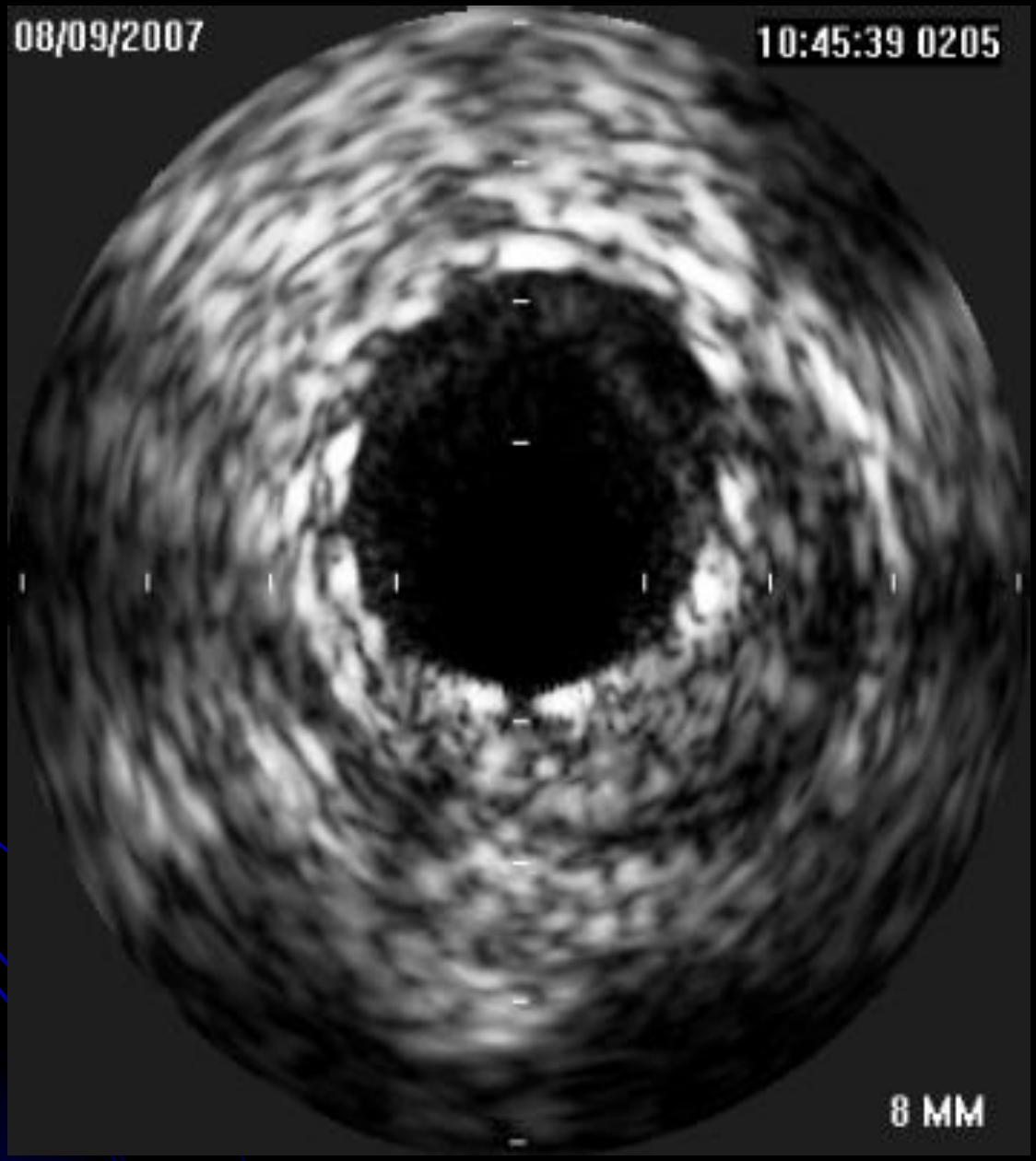
74/M NSTEMI, HT, DM, ESRD, s/p PPM (VDD)




08/09/2007
10:18:13 0402
8 MM



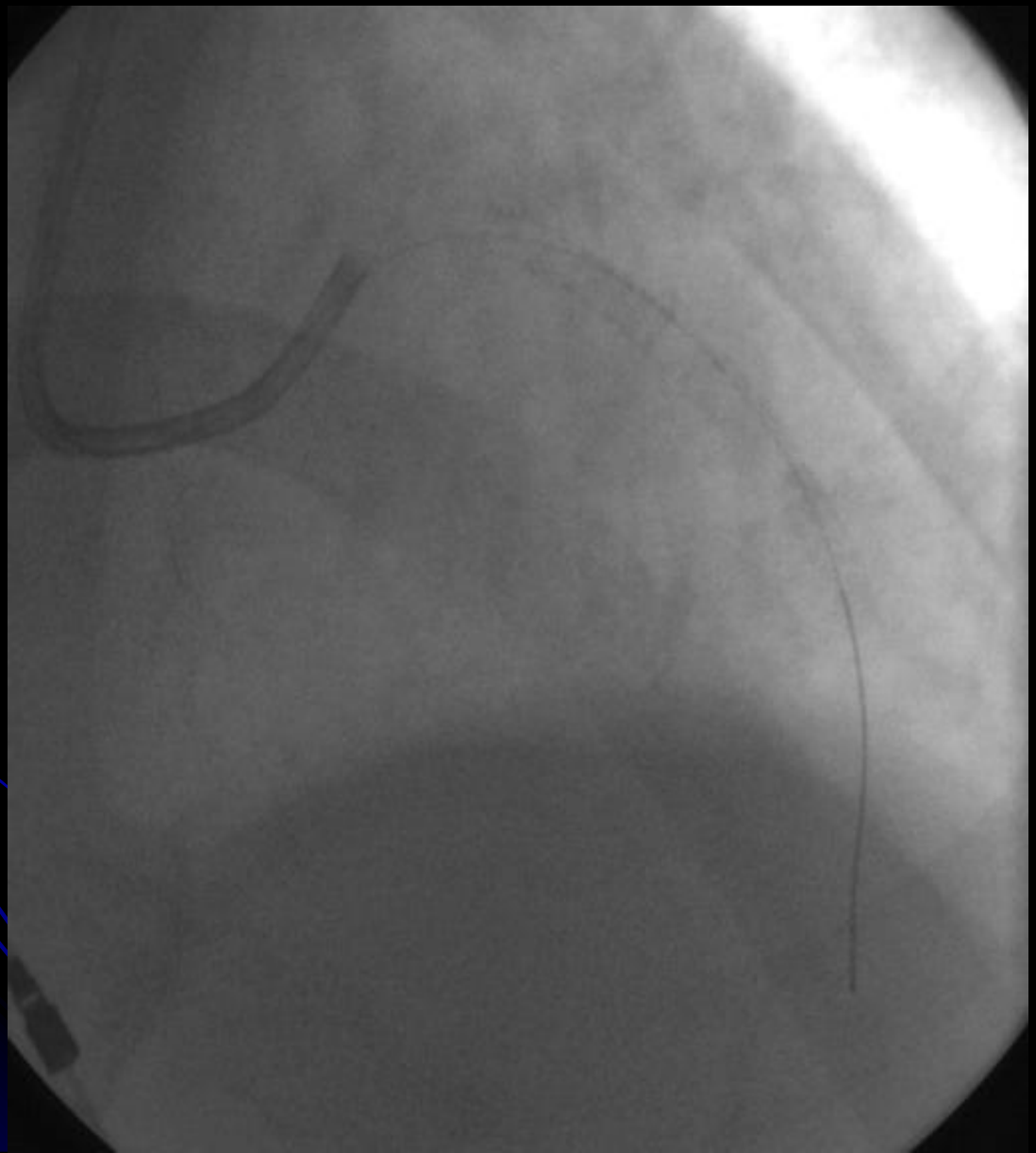
3.5*38mm stent for mLAD at 8atm


08/09/2007
10:45:39 0205
8 MM

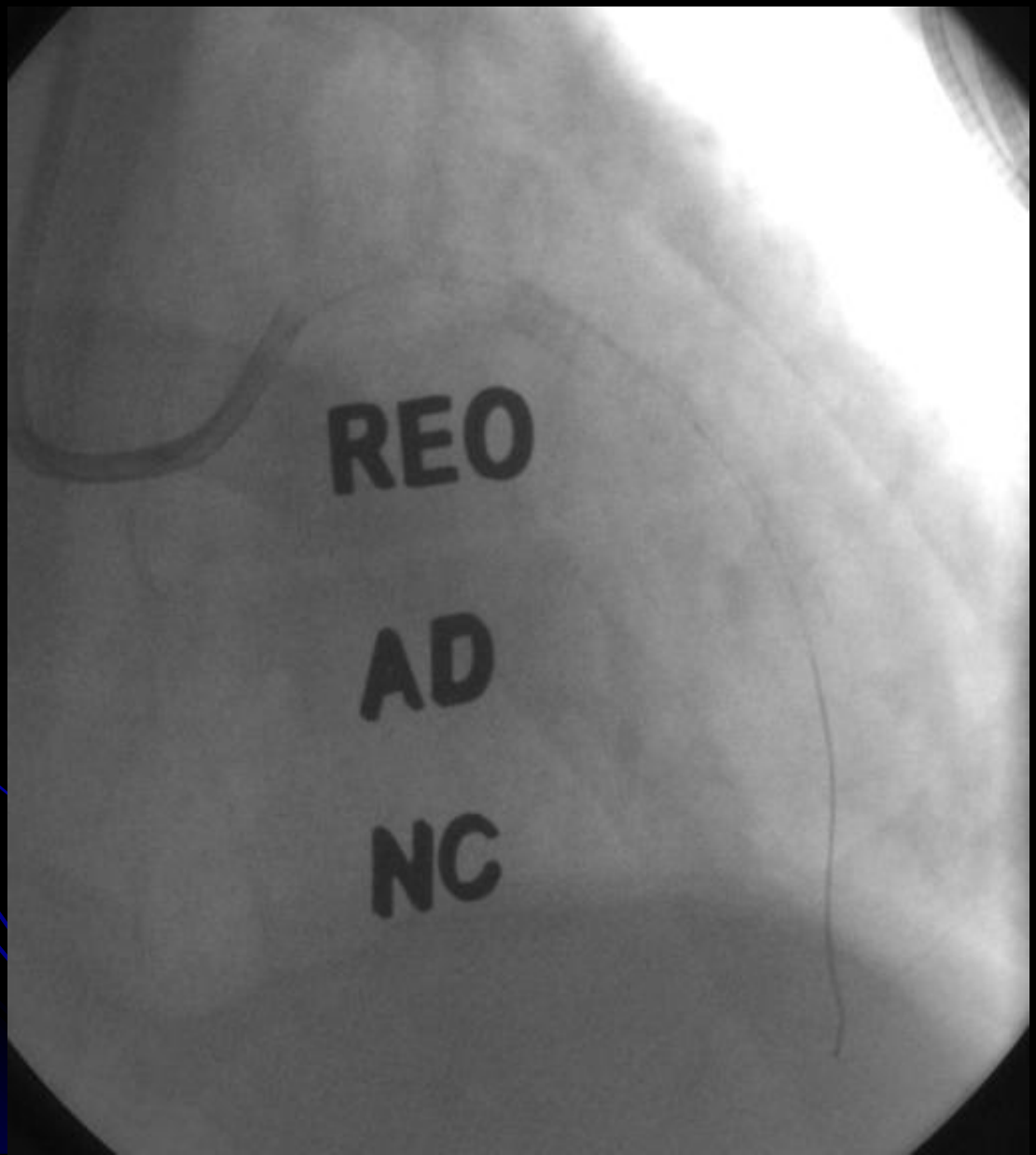
3.5*18mm stent for pLAD at 14atm

3.5*18, 3.5*38mm Stent Implantation

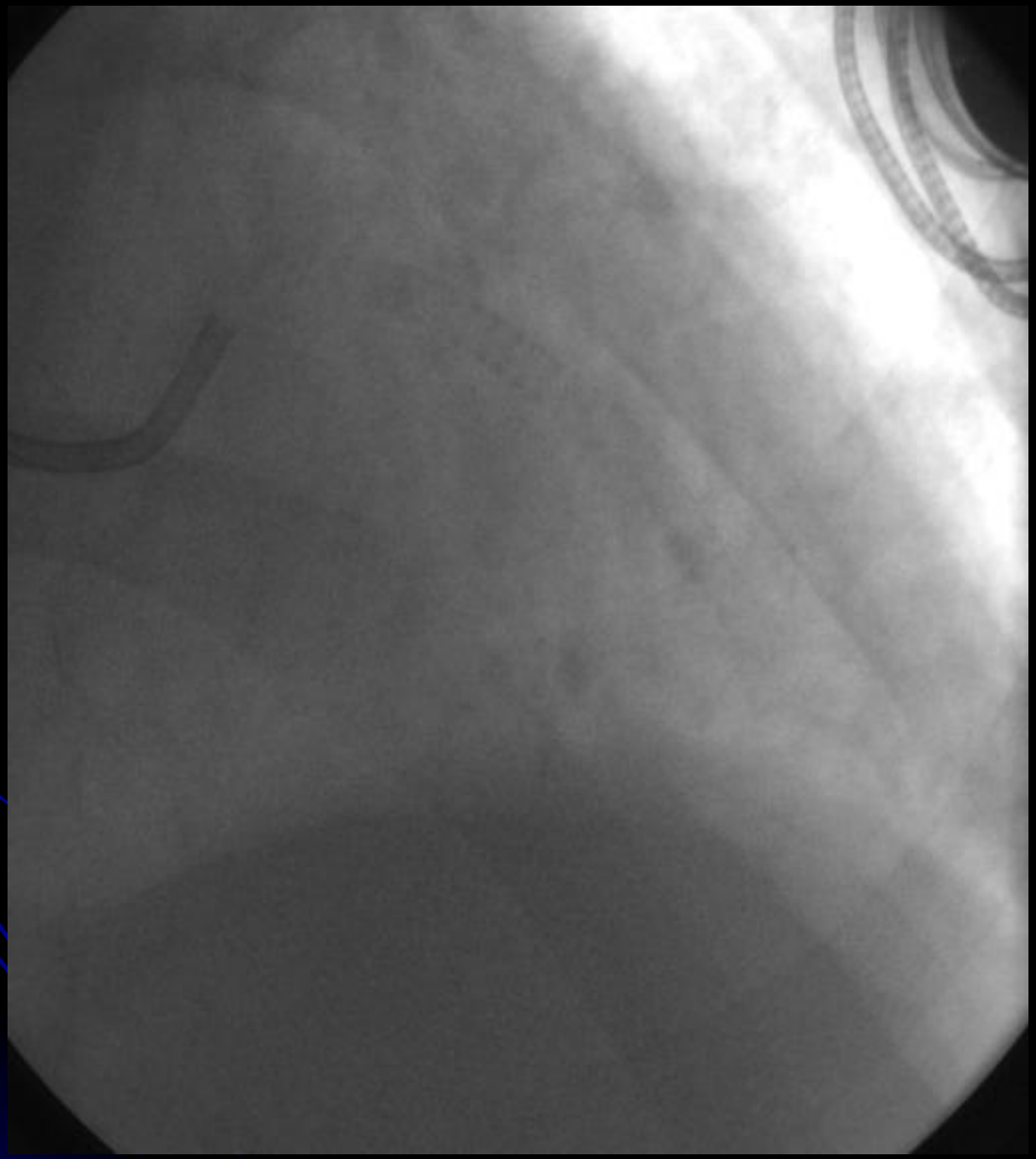
No-reflow



ReoPro, Adenosin, Nicorandil



Final CAG



No-Reflow Phenomenon and Lesion Morphology in Patients With Acute Myocardial Infarction

	No-Reflow Group (n=13)	Reflow Group (n=87)	*P*
IVUS images			
Eccentric	12 (92)	44 (51)	<0.01
Fissure/dissection	12 (92)	32 (37)	<0.01
Lipid pool–like image	12 (92)	22 (25)	<0.01
Superficial calcium	3 (23)	38 (44)	0.23
Deep wall calcium	3 (23)	33 (38)	0.37
Positive remodeling	4 (31)	17 (20)	0.46
Distal reference EEM-CSA, mm^2	17.1±6.4	12.7±4.3	<0.01
Distal reference plaque area, mm^2	9.3±4.5	6.2±2.5	<0.01
Lesion EEM-CSA, mm^2	18.4±4.3	13.3±4.1	<0.01
Lesion lumen CSA, mm^2	2.2±1.4	2.3±1.4	0.93
Proximal reference EEM-CSA, mm^2	20.8±4.1	15.2±4.4	<0.01
Proximal reference plaque area, mm^2	10.0±2.9	7.3±2.7	<0.01

Tanaka A et al. Circulation 2002;105:2148-2152

Journal of Cardiology (2009) 54, 36—44

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JOURNAL of CARDIOLOGY

Official Journal of the Japanese College of Cardiology

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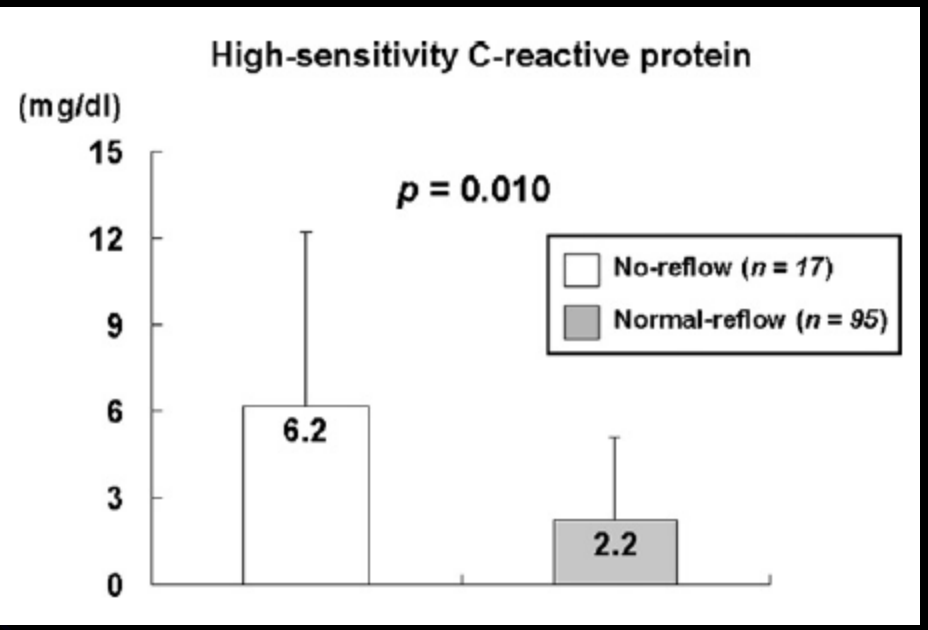
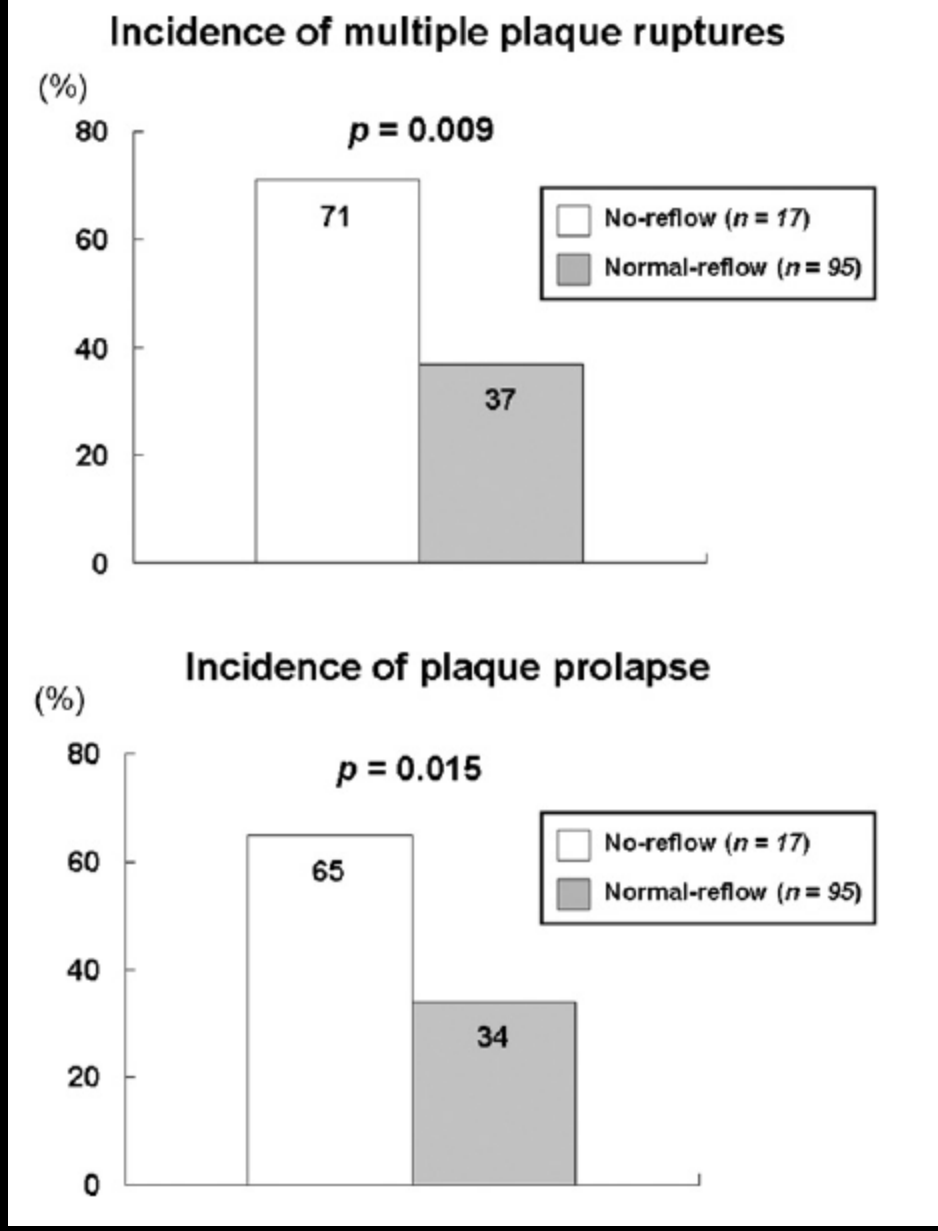
ORIGINAL ARTICLE

Predictors of no-reflow after percutaneous coronary intervention for culprit lesion with plaque rupture in infarct-related artery in patients with acute myocardial infarction

Young Joon Hong (MD), Myung Ho Jeong (MD)*, Yun Ha Choi (RN), Jum Suk Ko (MD), Min Goo Lee (MD), Won Yu Kang (MD), Shin Eun Lee (MD), Soo Hyun Kim (MD), Keun Ho Park (MD), Doo Sun Sim (MD), Nam Sik Yoon (MD), Hyun Ju Youn (MD), Kye Hun Kim (MD), Hyung Wook Park (MD), Ju Han Kim (MD), Youngkeun Ahn (MD), Jeong Gwan Cho (MD), Jong Chun Park (MD), Jung Chaee Kang (MD)

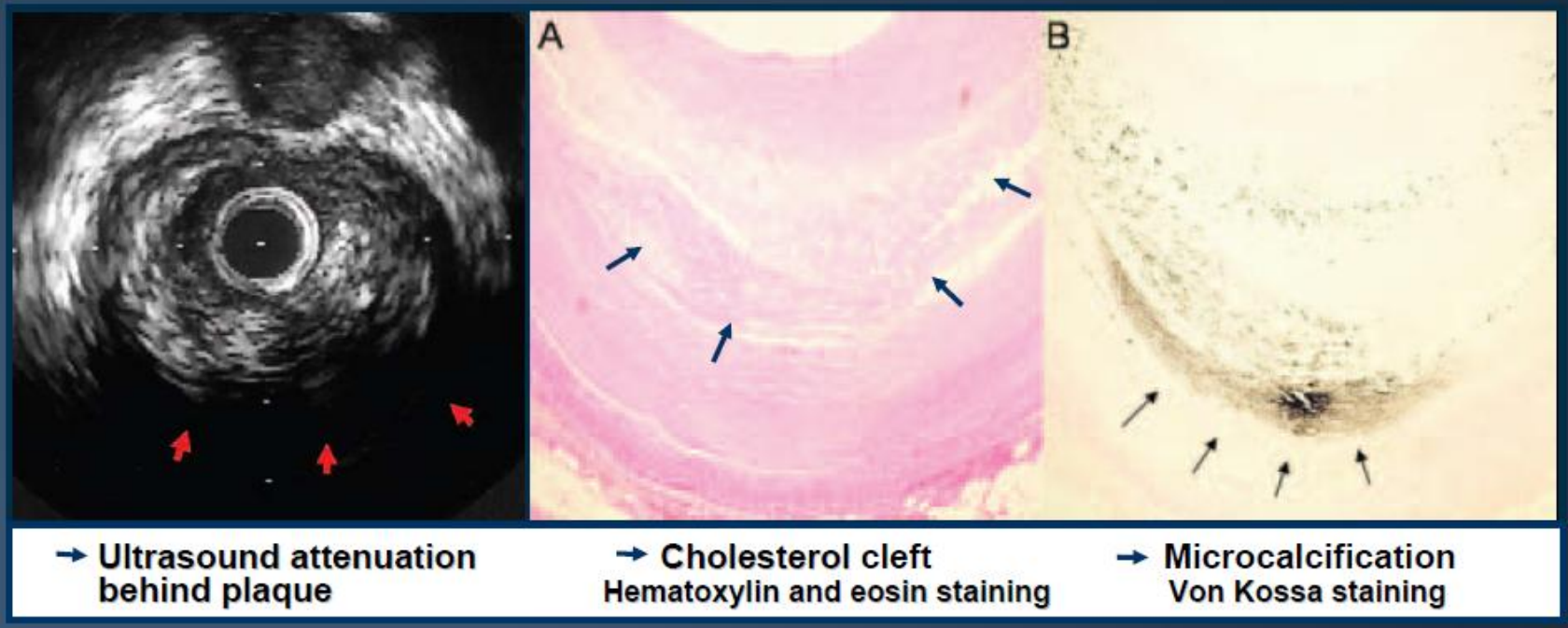




Hong YJ et al. J Cardiol 2009;54:36-44

Attenuated plaque & Histopathology

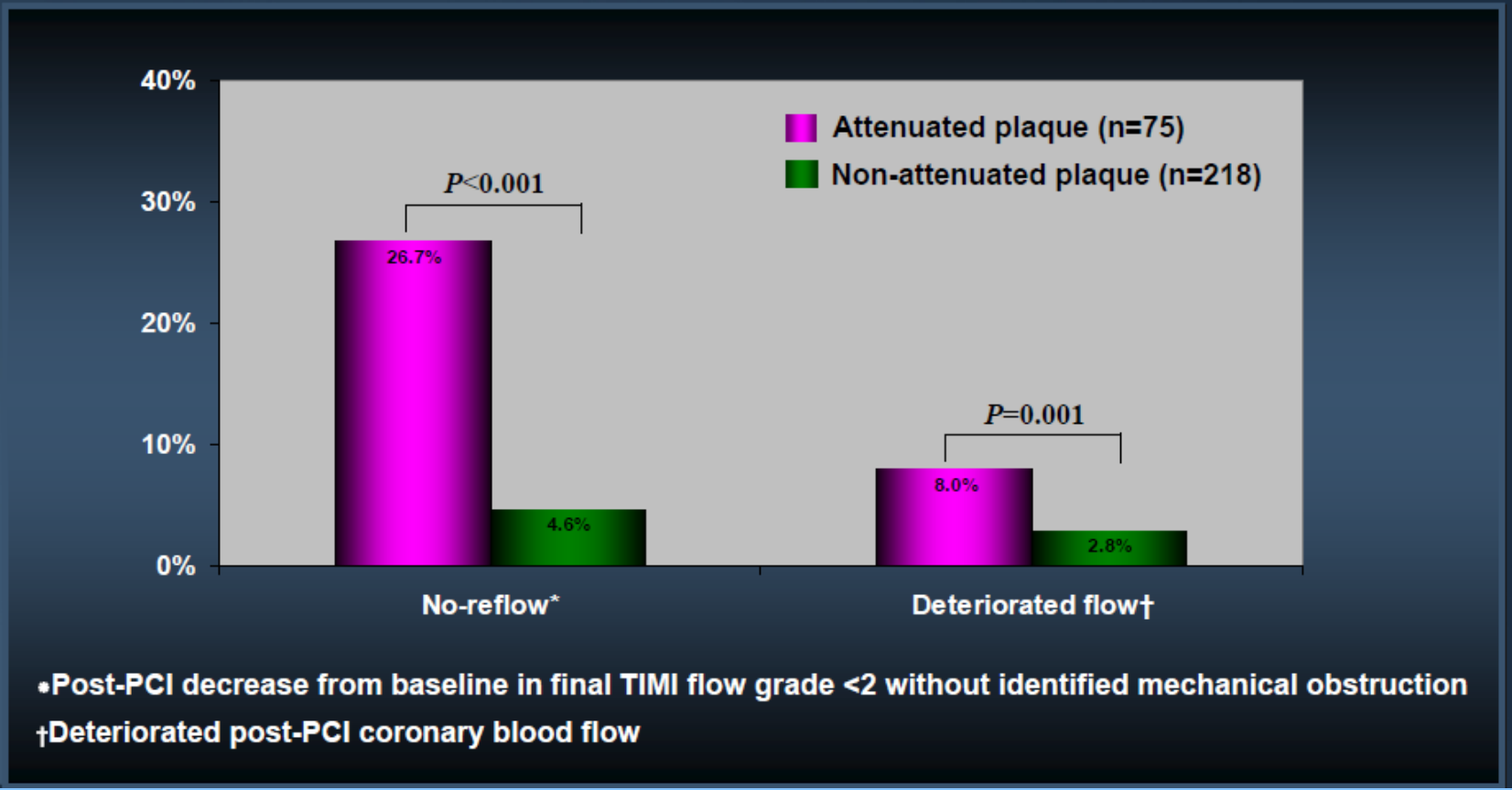
- Attenuated plaque is defined as hypoechoic or mixed atheroma with ultrasound attenuation without evidence of calcification in grayscale IVUS
- Histopathologically, attenuated plaque contains microcalcifications and cholesterol crystals



Hara H, et al. Acute Cardiac Care 2006;8:110-2

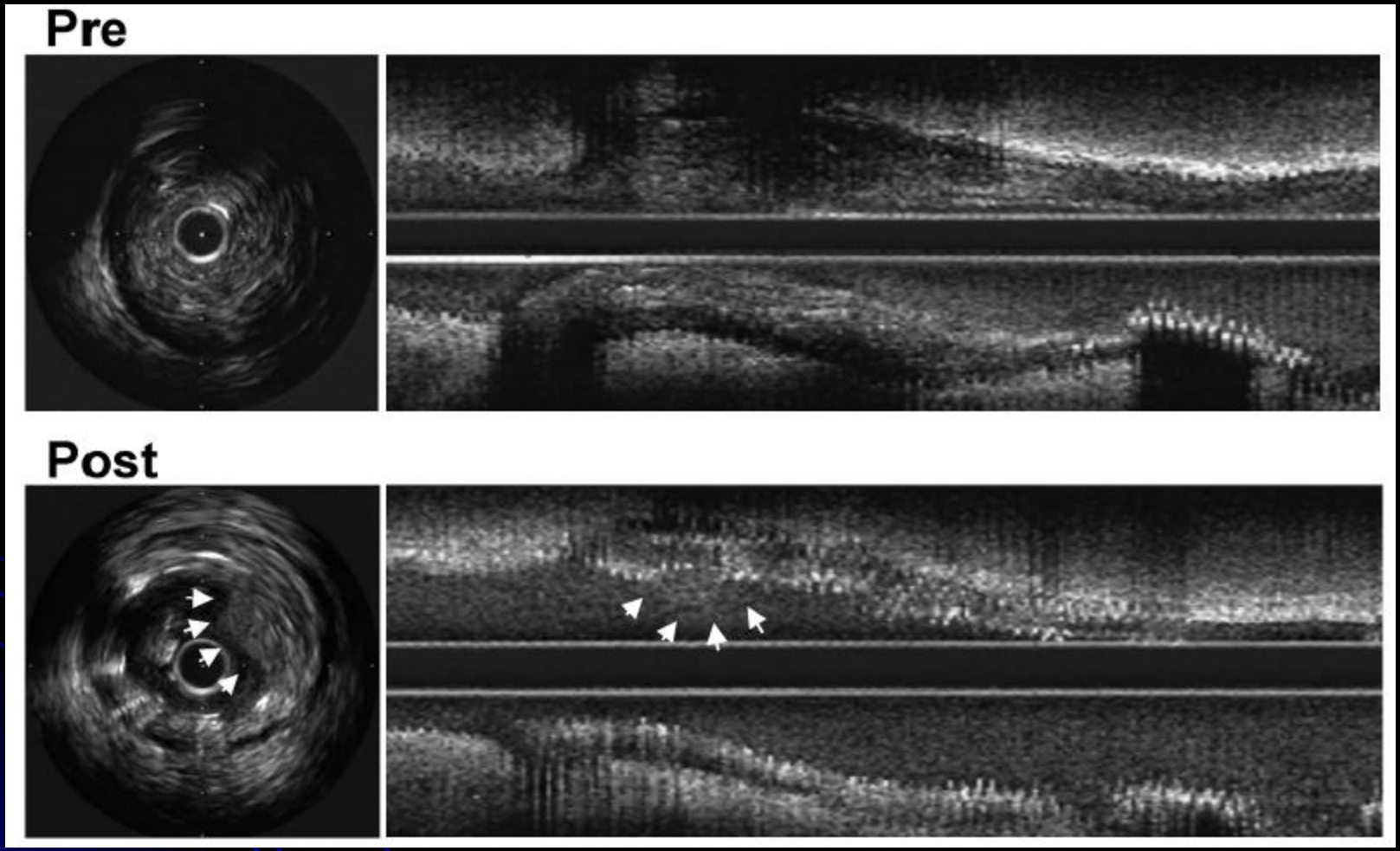
Attenuated plaque & No-reflow

- Attenuated plaques are often seen in ACS
- Attenuated plaques are associated with no-reflow and CK-MB elevation after PCI



Lee SY et al. J AM Coll Cardiol Inv 2009;2:65-72

Large amount of plaque w/ attenuation



Plaque/thrombus protrusion through the stent struts

Okura H et al. Circ J 2007;71:648-653

In-Hospital Complications

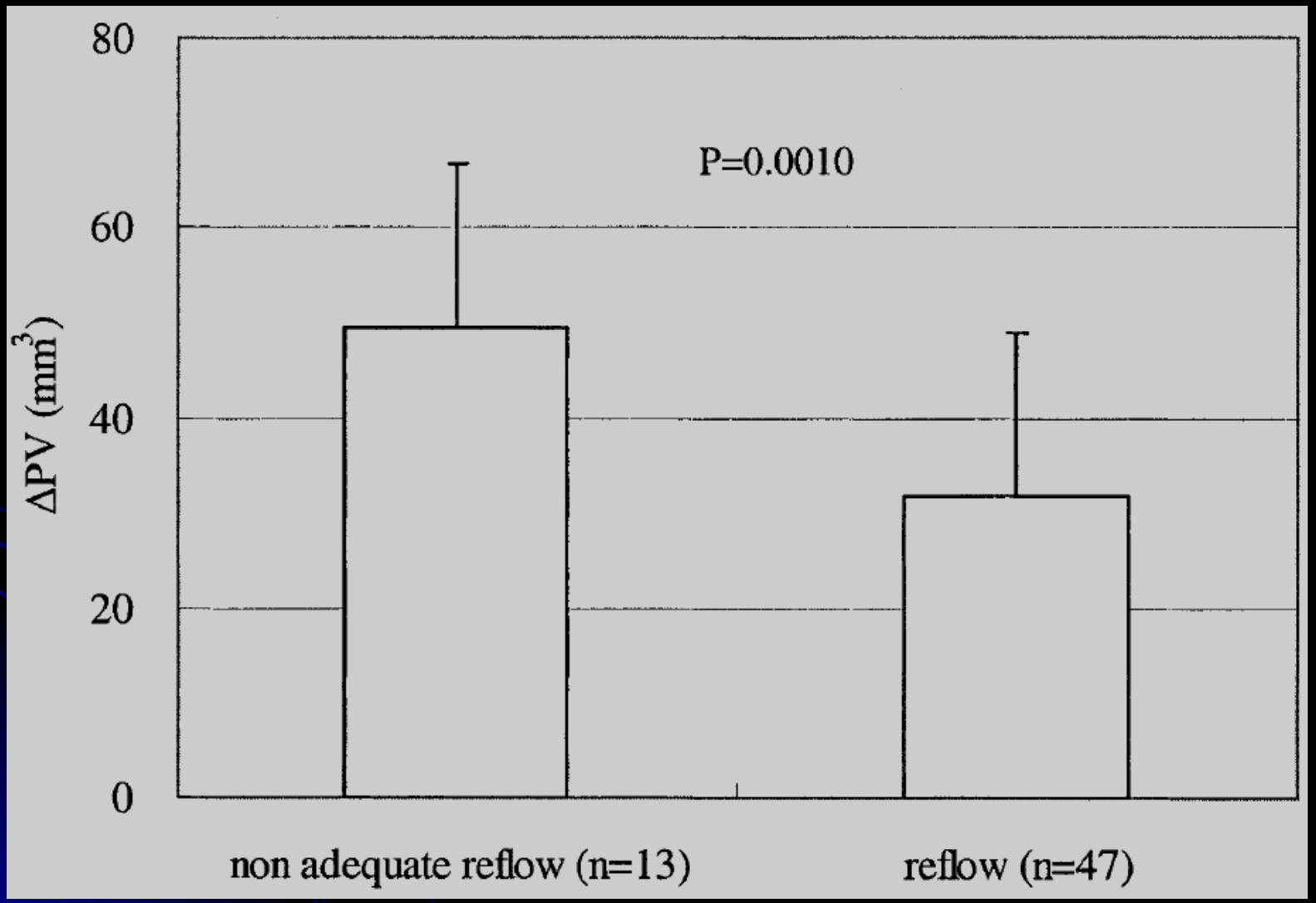
Group 1: Plaque without attenuation

Group 2: Plaque with attenuation

	Group 1 (n=37)	*Group 2 (n=73)*	*p value*
Death, n (%)	*1 (3)*	*2 (3)*	*0.99*
Congestive heart failure, n (%)	*1 (3)*	*4 (8)*	*0.51*
Myocardial infarction, n (%)	*0 (0)*	*1 (1)*	*0.47*
Cardiac rupture, n (%)	*0 (0)*	*0 (0)*	*0.99*
Stroke, n (%)	*0 (0)*	*0 (0)*	*0.99*
Fatal arrhythmia, n (%)	*1 (3)*	*12 (16)*	*0.04*
Peak CK, IU/L	*1,950±1,958*	*3,036±2,553*	*0.04*

Okura H et al. Circ J 2007;71:648-653

The Decrease of Plaque Volume During Percutaneous Coronary Intervention Has a Negative Impact on Coronary Flow in Acute Myocardial Infarction



Sato H et al. J Am Coll Cardiol 2004;44:300-4

Plaque Prolapse After Stent Implantation in Patients With Acute Myocardial Infarction

An Intravascular Ultrasound Analysis

Young Joon Hong, MD, PhD, Myung Ho Jeong, MD, PhD, FACC, Youngkeun Ahn, MD, PhD, FACC, Doo Sun Sim, MD, Jong Won Chung, MD, Jung Sun Cho, MD, Nam Sik Yoon, MD, Hyun Ju Yoon, MD, Jae Youn Moon, MD, Kye Hun Kim, MD, PhD, Hyung Wook Park, MD, PhD, Ju Han Kim, MD, PhD, Jeong Gwan Cho, MD, PhD, FACC, Jong Chun Park, MD, PhD, Jung Chaee Kang, MD, PhD

Gwangju, Korea

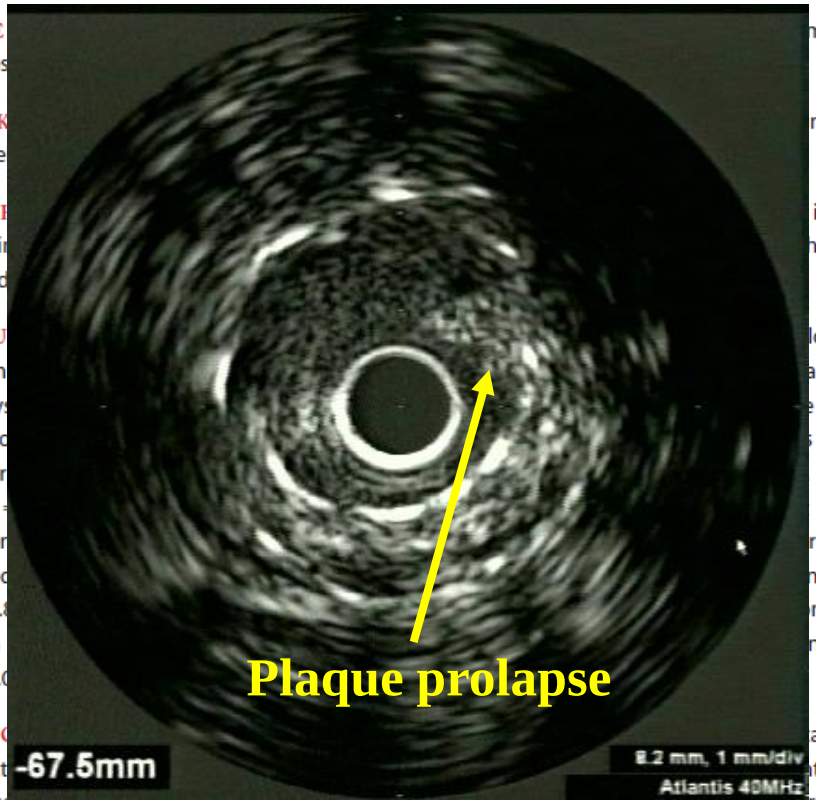
OBJE me of plaque prolaps

BACK nfarction are not we

METH immediately followi hic and IVUS derived

RESU longer (31 ± 13 mm aque rupture (51% vs e common in PP lesio s significantly greater −4.9 ± 46.1 U/l, p significantly differen riate analysis showed nd thrombus (OR: 1. n, and stent length ng (OR: 1.72, p = 0.

CONC ation. Lesion charact t predict PP. Although long-term follow-up is pending, PP is associated with more myonecrosis after stenting in patients with acute myocardial infarction. (J Am Coll Cardiol Img 2008;1:489–97) © 2008 by the American College of Cardiology Foundation



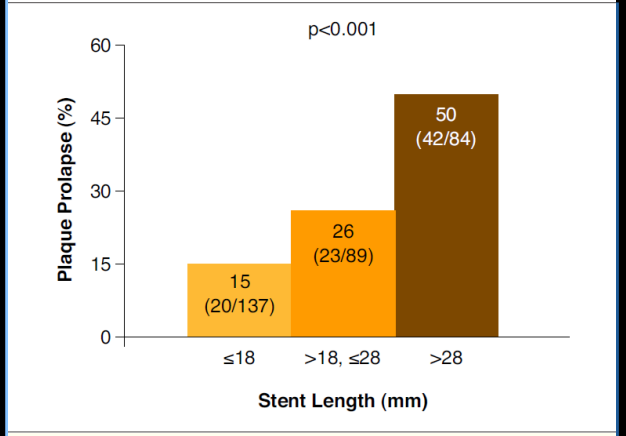


Figure 1. Incidence of PP in Relation to the Stent Length

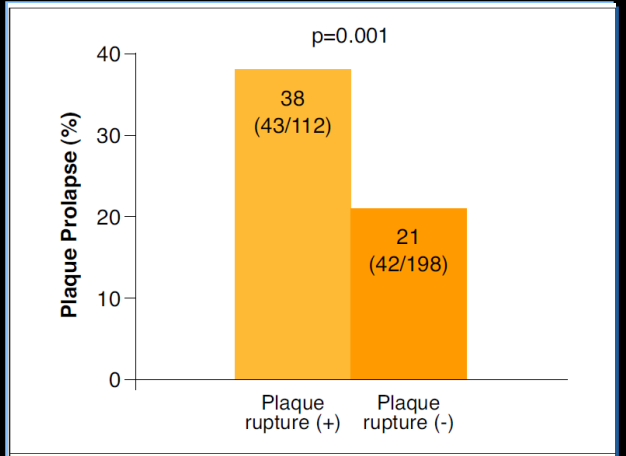


Figure 2. Incidence of PP in Relation to the Presence or Absence of the Plaque Rupture

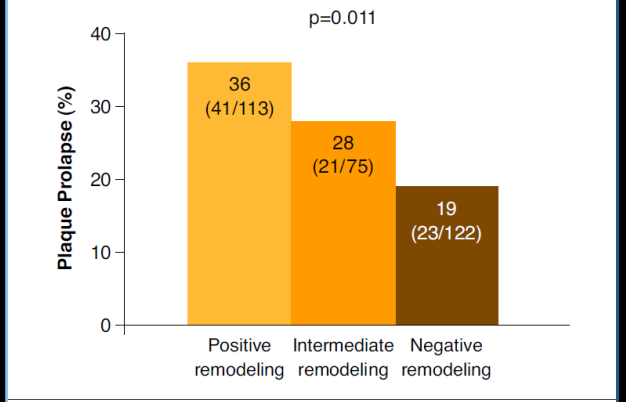


Figure 3. Incidence of PP in Relation to the Remodeling Pattern

Circulation Journal
Official Journal of the Japanese Circulation Society
http://www.j-circ.or.jp

ORIGINAL ARTICLE
Imaging

Relation Between Plaque Components and Plaque Prolapse After Drug-Eluting Stent Implantation

– Virtual Histology–Intravascular Ultrasound –

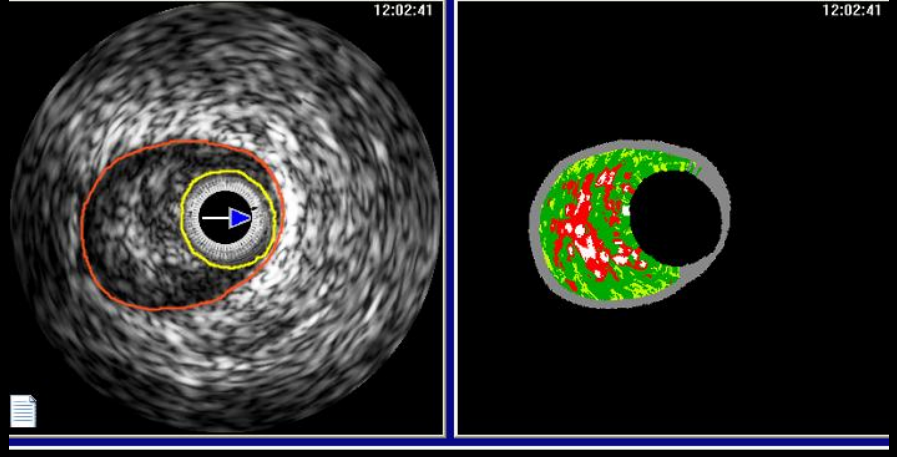
Young Joon Hong, MD; Myung Ho Jeong, MD; Sang Wook Kim, MD*; Yun Ha Choi; Eun Hae Ma; Jum Suk Ko, MD; Min Goo Lee, MD; Keun Ho Park, MD; Doo Sun Sim, MD; Nam Sik Yoon, MD; Hyun Ju Yoon, MD; Kye Hun Kim, MD; Hyung Wook Park, MD; Ju Han Kim, MD; Youngkeun Ahn, MD; Jeong Gwan Cho, MD; Jong Chun Park, MD; Jung Chaee Kang, MD

Background: It is not well known which plaque components are associated with the development of plaque prolapse (PP) and what are the major components in prolapsed plaque. The relationship between pre-stenting plaque components and post-stenting PP was assessed and the plaque components of prolapsed plaque were evaluated in patients who underwent drug-eluting stent (DES) implantation using virtual histology–intravascular ultrasound (VH-IVUS).

Methods and Results: The study group consisted of 132 patients who underwent DES implantation and pre- and post-stenting VH-IVUS. Of these patients, 68 patients had 76 PP lesions and 64 patients had 76 non-PP lesions. Intra-stent PP volume was 3.6±1.5 mm^3. Plaque volume was significantly greater and absolute fibrotic (FT) and necrotic core (NC) volumes were significantly greater in PP lesions compared with non-PP lesions. On multivariate analysis, absolute NC (odds ratios [OR]=1.14, P<0.001) and FT volume (OR=1.09, P<0.001) were independently associated with the development of PP. In intra-stent prolapsed plaque the FT component was greatest, but the NC component was also large, and %NC volume correlated positively with Δcreatine kinase-MB (r=0.489, P<0.001) and Δtroponin-I (r=0.679, P<0.001), and %FT volume correlated negatively with ΔCK-MB (r=–0.539, P<0.001) and Δtroponin-I.

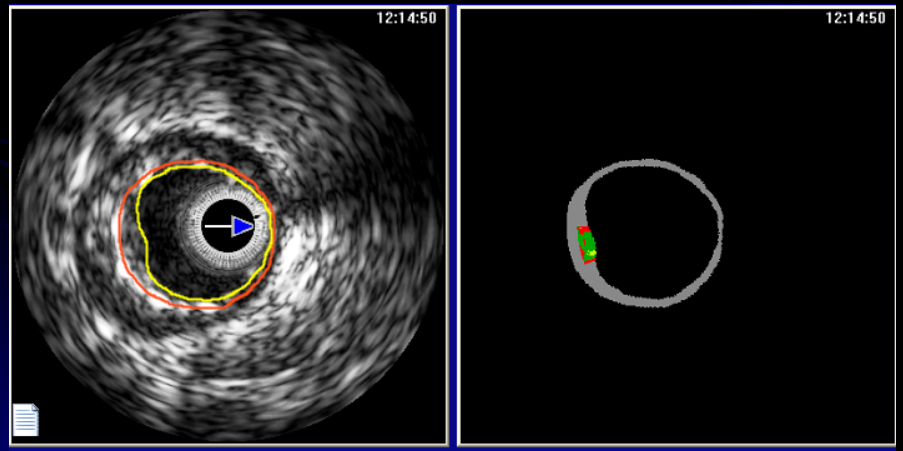
Conclusions: NC and FT components were associated with development of PP; and NC and FT components in prolapsed plaque were associated with cardiac enzyme elevation after DES implantation. (*Circ J* 2010; **74:** 1142–1151)

Key Words: Atherosclerosis; Coronary disease; Intravascular ultrasound; Stent



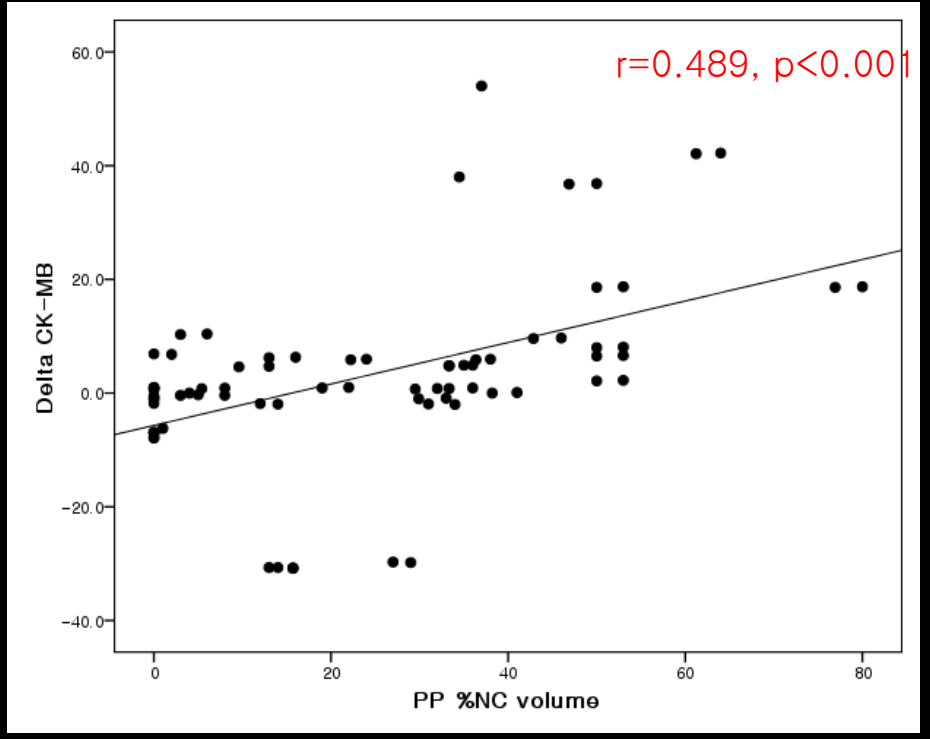
Lumen Area	3.9 mm²	
Vessel Area	15.0 mm²	
Plaque Area	11.1 mm²	
% Plaque Burden	74 %	
FI Green Area	4.6 mm²	58 %
FF Light Green Area	0.9 mm²	11 %
DC White Area	0.5 mm²	7 %
NC Red Area	1.9 mm²	24 %

More ...



Lumen Area	7.7 mm²	
Vessel Area	10.2 mm²	
Plaque Area	2.6 mm²	
% Plaque Burden	25 %	
FI Green Area	0.2 mm²	66 %
FF Light Green Area	0.0 mm²	7 %
DC White Area	0.0 mm²	0 %
NC Red Area	0.1 mm²	27 %

More ...



Plaque Component, Plaque Prolapse, Post-PCI CK-MB Elevation

Hong YJ et al., Circ J 2010;74:1142- 51

JACC: CARDIOVASCULAR IMAGING VOL. 2, NO. 4, 2009

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Impact of Plaque Composition on Cardiac Troponin Elevation After Percutaneous Coronary Intervention

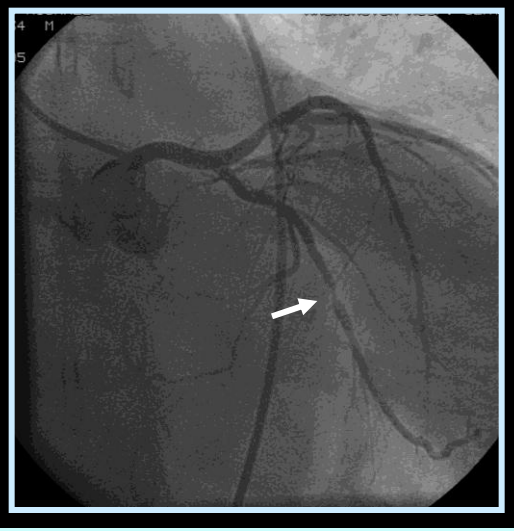
An Ultrasound Analysis

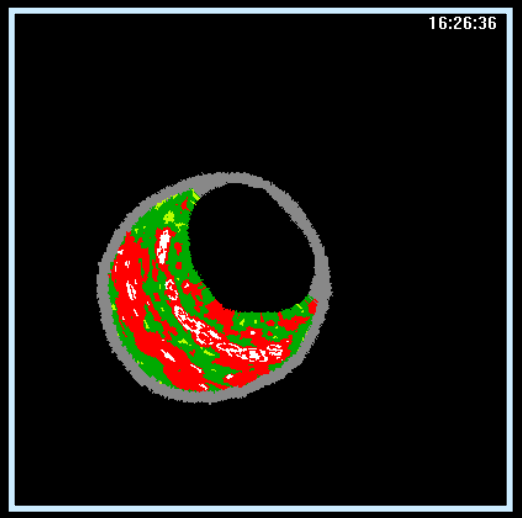
Young Joon Hong, MD,* Gary S. Mintz, MD,† Sang Wook Kim, MD,*
Sung Yun Lee, MD,* Teruo Okabe, MD,* Augusto D. Pichard, MD,* Lowell F. Satler, MD,*
Ron Waksman, MD,* Kenneth M. Kent, MD, PHD,* William O. Suddath, MD,*
Neil J. Weissman, MD*

Washington, DC; and New York, New York

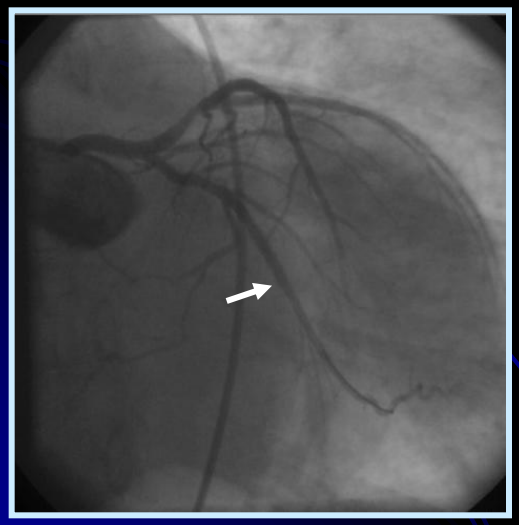
Plaque Component and TnI Elevation

Pre-PCI (cTnI=0ng/ml)

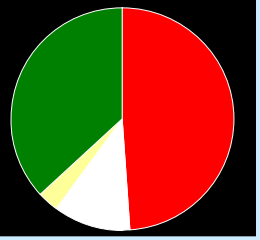




Cypher (cTnI=3.24ng/ml)

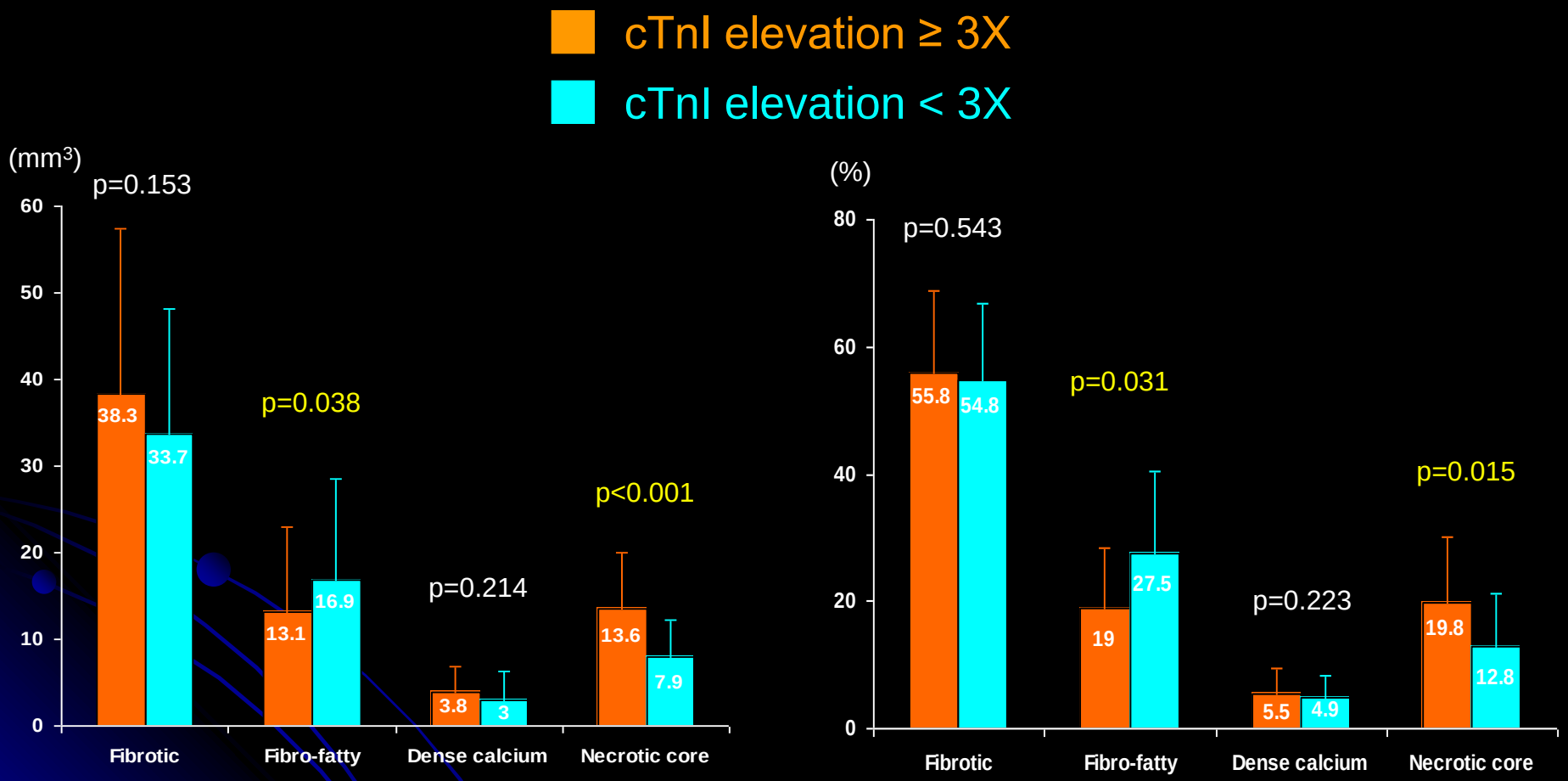


Lumen Area	3.8 mm^2	
EEL Area	16.0 mm^2	
Plaque Area	12.2 mm^2	
% Plaque Burden	76%	
Fibrous Area	3.7 mm^2	37%
Fibro-Fatty Area	0.3 mm^2	3%
Dense Calcium Area	1.1 mm^2	11%
Necrotic Core Area	5.0 mm^2	49%



Hong YJ, et al. JACC Cardiovasc Imaging 2009;2:458-68

Plaque Component and TnI Elevation



Hong YJ, et al. JACC Cardiovasc Imaging 2009;2:458-68

European Heart Journal (2011) **32**, 2059–2066
doi:10.1093/eurheartj/ehp034

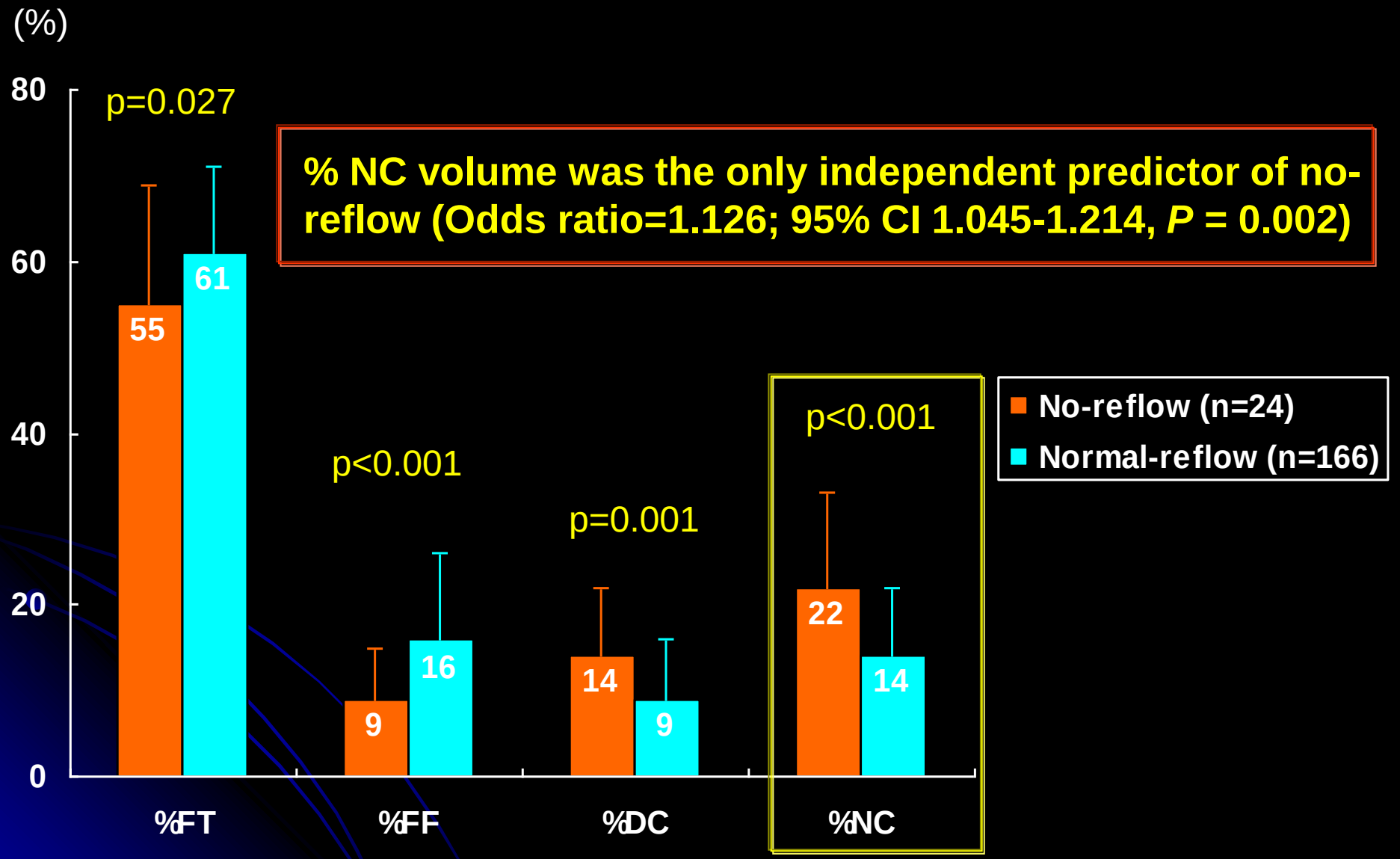
CLINICAL RESEARCH
Interventional cardiology

Impact of plaque components on no-reflow phenomenon after stent deployment in patients with acute coronary syndrome: a virtual histology-intravascular ultrasound analysis

Young Joon Hong, Myung Ho Jeong*, Yun Ha Choi, Jum Suk Ko, Min Goo Lee, Won Yu Kang, Shin Eun Lee, Soo Hyun Kim, Keun Ho Park, Doo Sun Sim, Nam Sik Yoon, Hyun Ju Youn, Kye Hun Kim, Hyung Wook Park, Ju Han Kim, Youngkeun Ahn, Jeong Gwan Cho, Jong Chun Park, and Jung Chaee Kang

Heart Center of Chonnam National University Hospital, Chonnam National University Research Institute of Medical Sciences, 671 Jaebongro, Dong-gu, Gwangju 501-757, Republic of Korea

Plaque Component and No-Reflow



% NC volume was the only independent predictor of no-reflow (Odds ratio=1.126; 95% CI 1.045-1.214, *P* = 0.002)

Hong YJ et al., Eur Heart J 2011;32:2059-2066

Plaque in MI

Plaque rupture

Thrombus

Positive remodeling

Attenuated plaque

Necrotic core

Thin-cap fibroatheroma

Tissue prolapse

No- reflow

Cardiac enzyme

IVUS-Guided PCI in AMI vs. Clinical Outcome

혈관내 초음파 유도하에 시행된 경색관련관동맥내 스텐트 시술 후 6개월 추적 혈관 조영술

울산대학교 의과대학 서울중앙병원 내과학교실
최시완 · 홍명기 · 박성욱 · 이철환 · 이경석
송종민 · 강덕현 · 송재관 · 김재중 · 박승정

Six-Month Angiographic Follow-up after Intravascualr Ultrasound Guided Stenting of Infarct Related Artery

Si-Wan Choi, MD, Myeong-Ki Hong, MD, Seong-Wook Park, MD, Cheol Whan Lee, MD, Kyoung-Suk Rhee, MD, Jong-Min Song, MD, Duk-Hyun Kang, MD, Jae-Kwan Song, MD, Jae-Joong Kim, MD, and Seung-Jung Park, MD

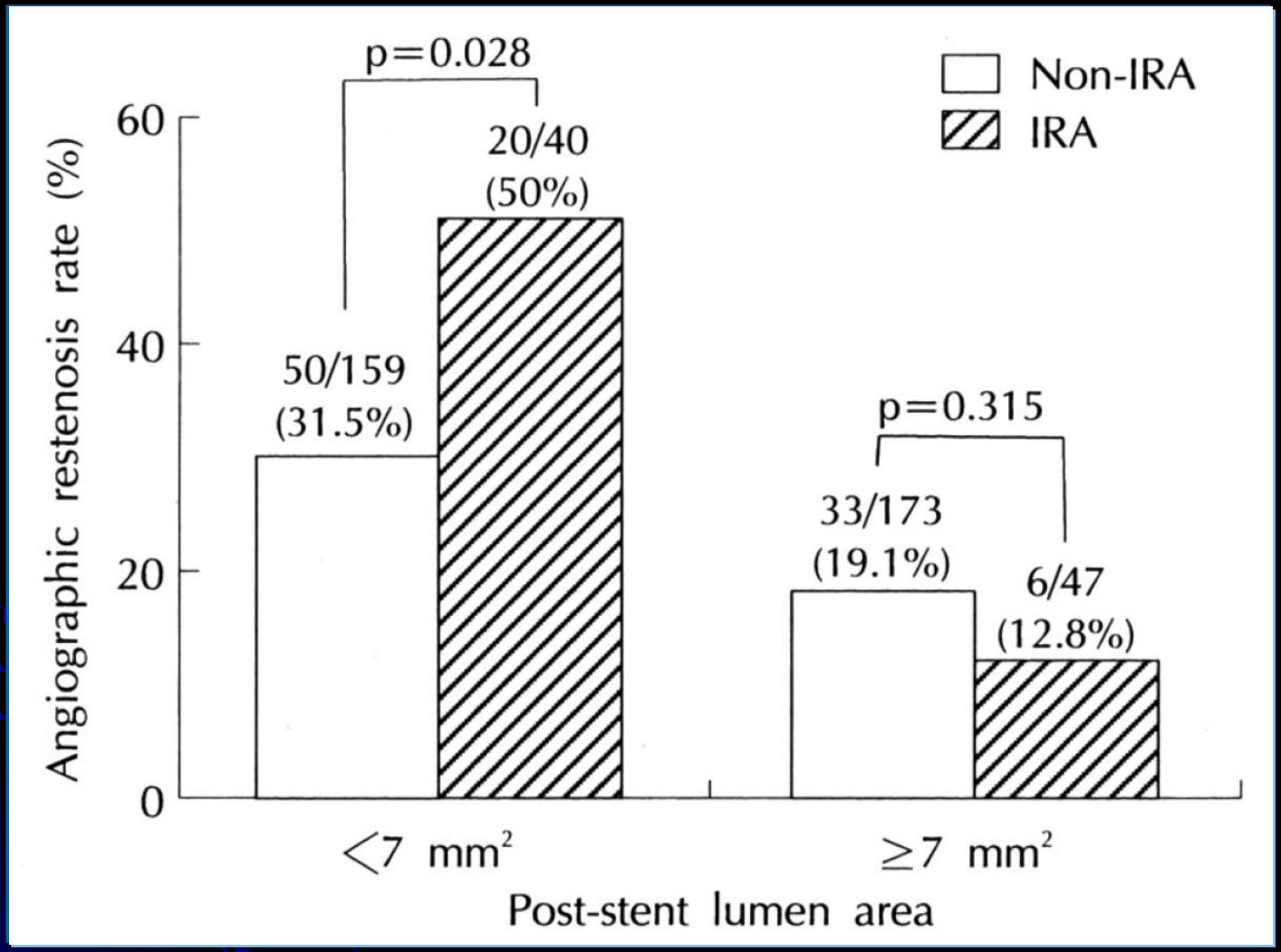
Department of Internal Medicine, College of Medicine, University of Ulsan, Cardiac Center, Asan Medical Center, Seoul, Korea

ABSTRACT

Background and Objectives : Intracoronary Stenting has been established as an effective treatment modality for the reduction of restenosis in patients with acute myocardial infarction. This study was performed in order to evaluate the long-term outcomes of stenting for infarct-related artery (IRA) lesions using intravascular ultrasound (IVUS) and compare these results with the stenting of non infarct-related artery (non-IRA) lesions. **Subjects and Methods** : IVUS-guided coronary stenting was successfully performed in 510 native coronary lesions (105 IRA vs. 405 non-IRA). A six-month angiography was performed in 419 lesions (82.2%) : 87 IRA lesions (82.9%) and 332 non-IRA lesions (82.0%). The results were evaluated using clinical, angiographic and IVUS methods. **Results** : There were no significant differences in the clinical and angiographic variables between the two groups. IVUS variables including reference vessel area and minimal stent area were also similar between the two groups. There was no significant difference in the angiographic restenosis rate between the two groups in cases of minimal stent area ≤ 7 mm^2 : 12.8% (6/47) in IRA vs. 19.1% (33/173) in non-IRA lesions ($p = 0.315$). However, the angiographic restenosis rate in cases of minimal stent area <7 mm^2 was 50% (20/40) in IRA lesions vs. 31.5% (50/159) in non-IRA lesions ($p = 0.028$). **Conclusion** : The rate of angiographic restenosis is significantly higher in stenting for IRA lesions as compared with that for non-IRA lesions in cases of minimal stent area <7 mm^2. **(Korean Circulation J 2002;32(4):309-316)**

KEY WORDS : Stents ; Coronary restenosis.

Angiographic Restenosis Rate

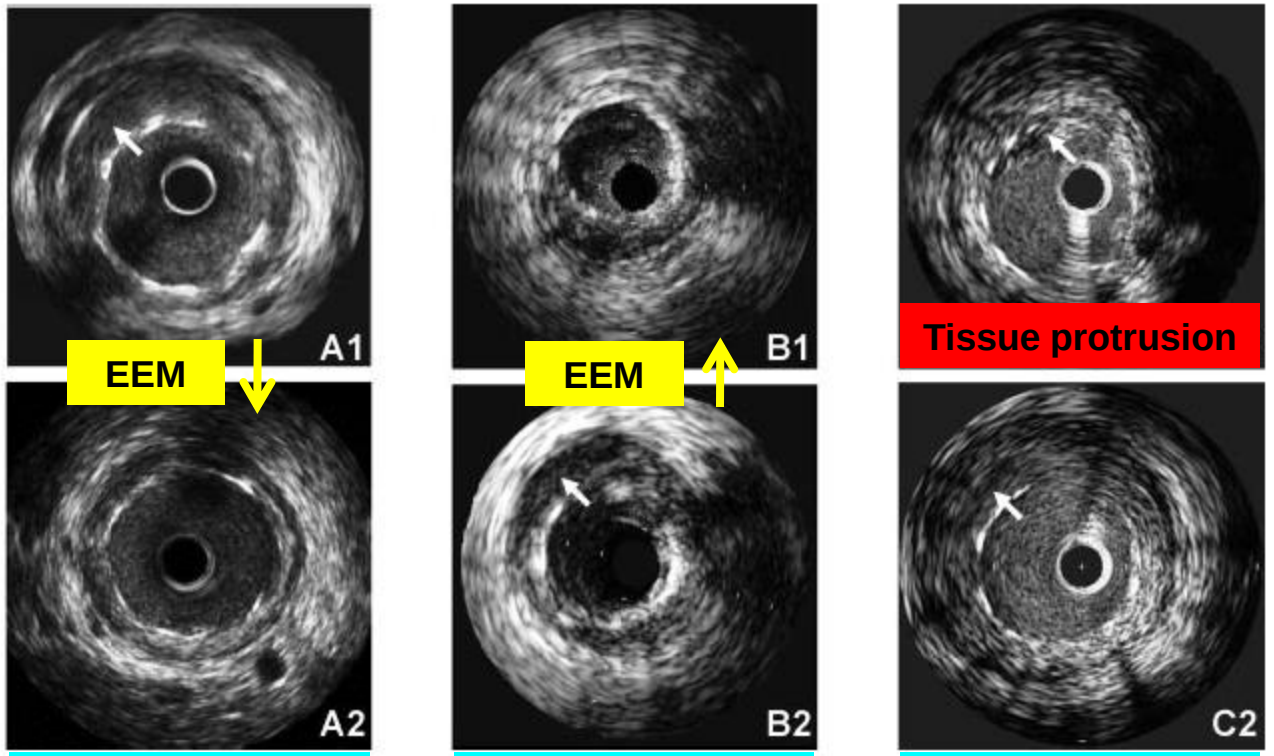


Cho SW, et al., Korean Circulation J 2002;32(4):309-316

Incidence, Mechanisms, Predictors, and Clinical Impact of Acute and Late Stent Malapposition After Primary Intervention in Patients With Acute Myocardial Infarction

An Intravascular Ultrasound Substudy of the Harmonizing Outcomes

Late acquired stent malapposition was due mainly to positive remodeling and plaque/thrombus resolution



(*Circulation*. 2010;122:1077-1084.)

Catheterization and Cardiovascular Interventions 75:86–92 (2010)

Impact of Intravascular Ultrasound Guidance in Patients with Acute Myocardial Infarction Undergoing Percutaneous Coronary Intervention

Gabriel Maluenda, MD, Gilles Lemesle, MD, Itsik Ben-Dor, MD, Sara D. Collins, MD, Asmir I. Syed, MD, Rebecca Torguson, MPH, Kimberly Kaneshige, BS, Zhenyi Xue, MS, William O. Suddath, MD, Lowell F. Satler, MD, Kenneth M. Kent, MD, PhD, Joseph Lindsay, MD, Augusto D. Pichard, MD, and Ron Waksman,* MD

Objectives: The aim of this study was to examine the utility of routine intravascular ultrasound (IVUS) guidance in patients with acute myocardial infarction (MI) undergoing percutaneous coronary intervention (PCI) with stent implantation. Background: Stent thrombosis (ST) is a serious complication of PCI with stent implantation for patients presenting with acute MI. Mechanical factors such as incomplete stent expansion and smaller stent diameters are known to correlate with ST and restenosis. IVUS guidance for stent deployment is reported to reduce these events in stable patients. Methods: We analyzed a cohort of 905 consecutive patients who underwent primary PCI for acute MI and were discharged alive. The clinical outcomes of 382 patients who underwent IVUS-guided PCI were compared to those of 523 patients who did not. Patients who presented with cardiogenic shock and rescue PCI were excluded. The primary composite endpoint of death, MI, and target lesion revascularization at 1-year follow-up was systematically indexed and a propensity score was performed with regard to the use of IVUS-guided PCI. Results: Patients undergoing IVUS-guided PCI were older, more diabetic and hypertensive, but presented with less history of previous MI. The severity of coronary artery disease was balanced between both groups. The number of treated lesions and stents used was higher in the IVUS-guided group, with a longer procedural duration. The overall rates of the composite primary outcome were similar (14.5% vs. 14.3%, $P = 0.94$) as were the rates of definite and probable stent thrombosis at 1 year (2.1% vs. 2.1%, $P = 0.99$) in the IVUS-guided and no-IVUS groups, respectively. After multivariate and propensity score adjustment, IVUS guidance was not an independent predictor for the primary endpoint. Conclusion: This study does not support the routine use of IVUS guidance for stent deployment in patients who present with acute MI and undergo primary PCI.

Clinical Outcomes at 30 Days and 1 Year

Variable, *n* (%)	IVUS (*n* = 382)	No IVUS (*n* = 523)	*P*-value
30-day outcomes			
MACE (Death-QWMI-TLR)	12 (3.1%)	26 (5.0%)	0.17
Death	4 (1.0%)	6 (1.2%)	0.99
Cardiac death	0	3 (0.6%)	0.27
Noncardiac death	4 (1.0%)	3 (0.6%)	0.46
Q-wave myocardial infarction	5 (1.3%)	14 (2.7%)	0.16
Non-Q-wave myocardial infarction	14 (3.7%)	20 (3.9%)	0.88
Target lesion revascularization	3 (0.8%)	9 (1.7%)	0.22
Target vessel revascularization	11 (2.9%)	13 (2.5%)	0.73
Definite stent thrombosis	0	4 (0.8%)	0.14
Definite and probable stent thrombosis	3 (0.8%)	6 (1.1%)	0.68
1-year outcomes			
MACE (Death-QWMI-TLR)	55 (14.5%)	74 (14.3%)	0.94
Death	24 (6.4%)	26 (5.1%)	0.44
Cardiac death	8 (2.1%)	8 (1.6%)	0.55
Noncardiac death	16 (4.2%)	18 (3.5%)	0.60
Q-wave myocardial infarction	7 (1.9%)	16 (3.2%)	0.25
Non Q-wave myocardial infarction	23 (6.3%)	31 (6.2%)	0.99
Target lesion revascularization	27 (7.3%)	40 (8.0%)	0.72
Target vessel revascularization	44 (11.8%)	56 (11.0%)	0.69
Definite stent thrombosis	0	5 (1.0%)	0.08
Definite and probable stent thrombosis	8 (2.1%)	11 (2.1%)	0.99

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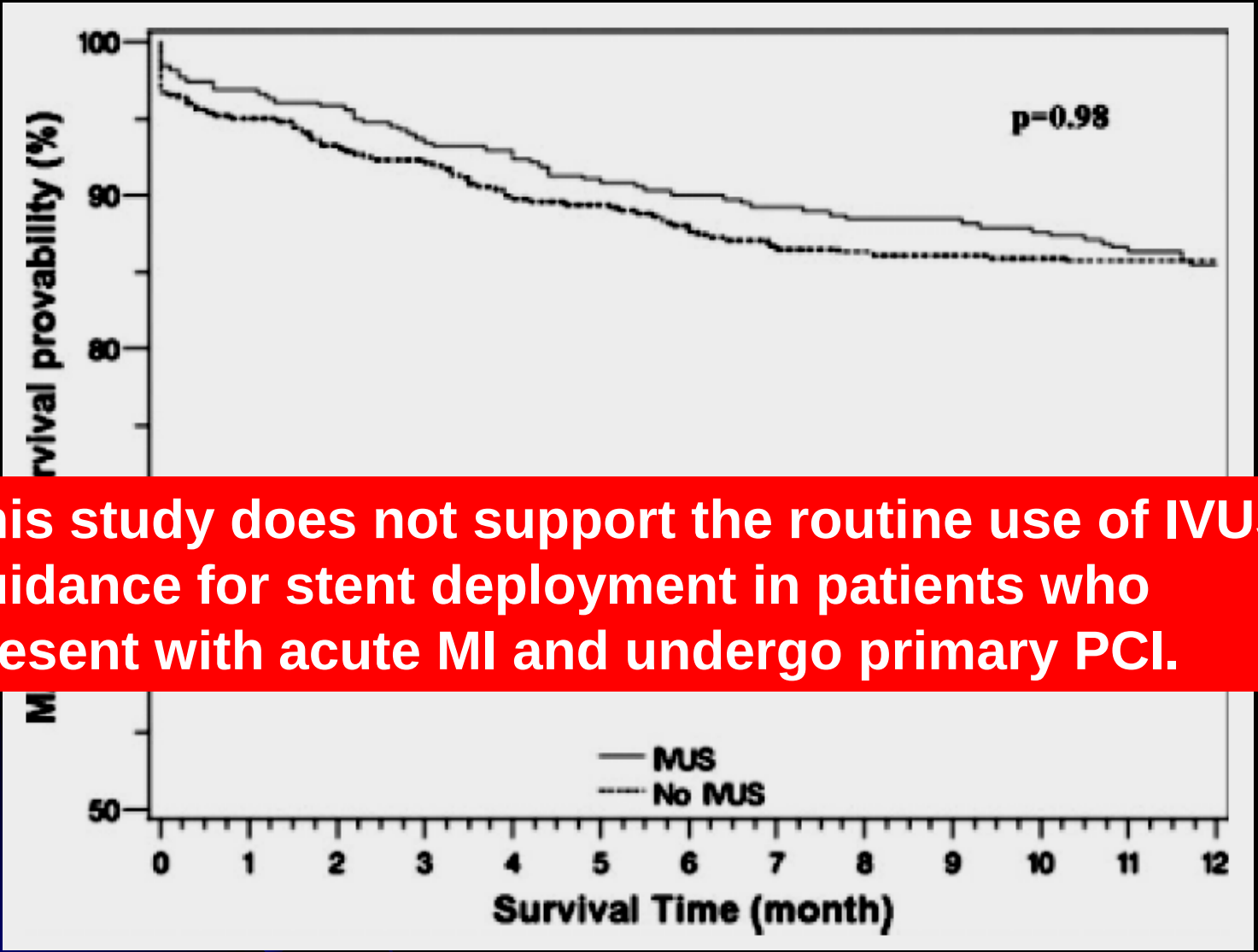
MACE-Free Survival Over 12 Months



This study does not support the routine use of IVUS guidance for stent deployment in patients who present with acute MI and undergo primary PCI.

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Role of Intravascular Ultrasound in Patients with Acute Myocardial Infarction Undergoing Percutaneous Coronary Intervention

Khurshid Ahmed, MD[a,b], Myung Ho Jeong, MD, PhD[a,*], Rabin Chakraborty, MD[b], Youngkeun Ahn, MD, PhD[a], Doo Sun Sim, MD[a], Keunho Park, MD[a], Young Joon Hong, MD[a], Ju Han Kim, MD[a], Kyung Hoon Cho, MD[a], Min Chol Kim, MD[a], Daisuke Hachinohe, MD[a], Seung Hwan Hwang, MD[a], Min Goo Lee, MD[a], Myeong Chan Cho, MD[c], Chong Jin Kim, MD[d], Young Jo Kim, MD[e], Jong Chun Park, MD[a], Jung Chaee Kang, MD[a], and Other Korea Acute Myocardial Infarction Registry Investigators

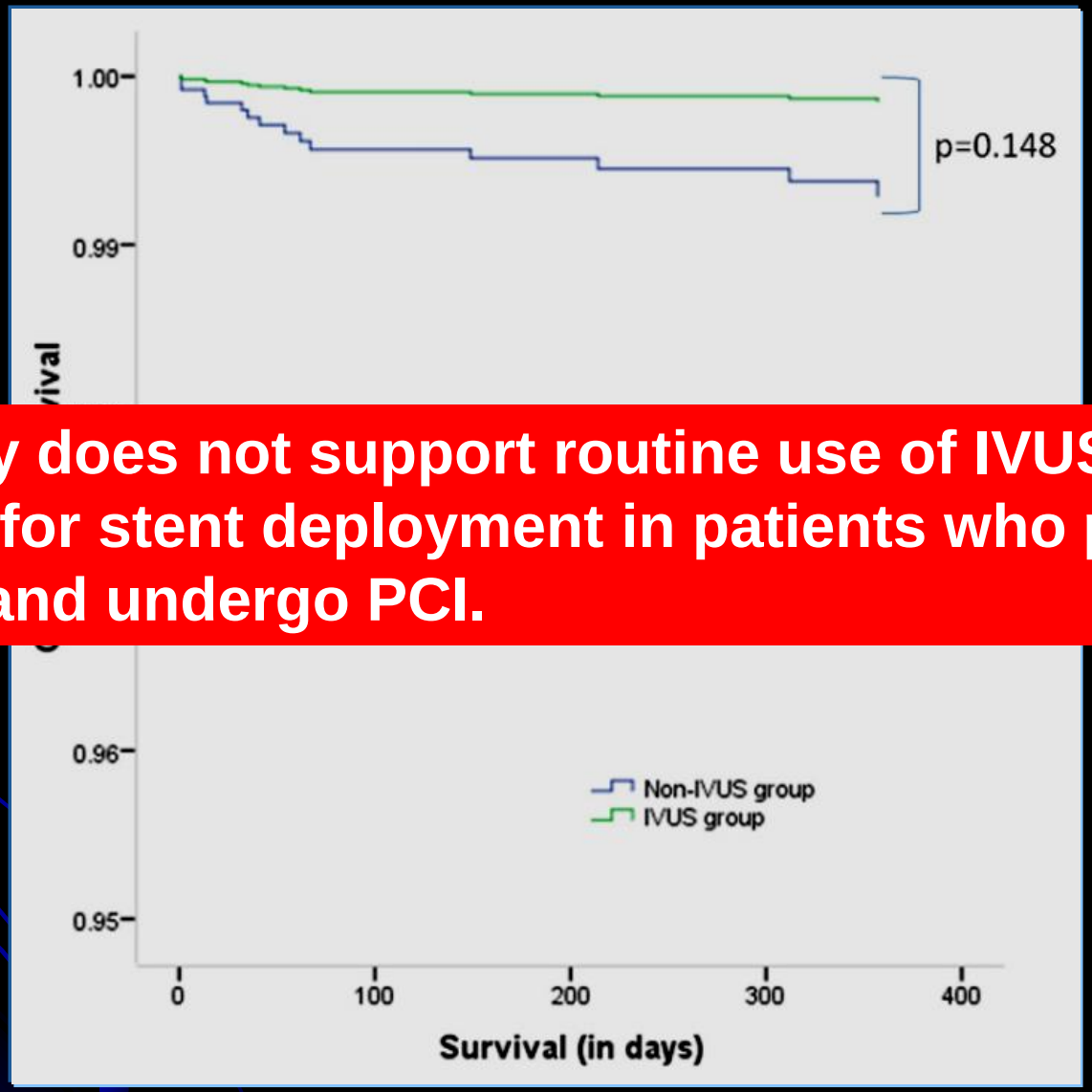
Stent thrombosis and restenosis remain drawbacks of drug-eluting stents in patients with acute myocardial infarction (AMI). Intravascular ultrasound (IVUS) guidance for stent deployment helps optimize its results in stable patients. The aim of this study was to examine the utility of routine IVUS guidance in patients with AMI undergoing percutaneous coronary intervention (PCI). Employing data from Korea Acute Myocardial Infarction Registry (KAMIR), we analyzed 14,329 patients with AMI from April 2006 through September 2010. Patients with cardiogenic shock and rescue PCI after thrombolysis were excluded. Clinical outcomes of 2,127 patients who underwent IVUS-guided PCI were compared to those of 8,235 patients who did not. Mean age was 63.6 ± 13.5 years and 72.3% were men. Patients undergoing IVUS-guided PCI were younger, more often men, more hyperlipemic, and had increased body mass index and left ventricular ejection fraction. Number of treated vessels and stents used, stent length, and stent diameter were increased in the IVUS-guided group. Multivessel involvement was less frequent and American College of Cardiology/American Heart Association type C lesion was more frequent in the IVUS-guided group. Drug-eluting stents were more frequently used compared to bare-metal stents in the IVUS group. There was no significant relation of stent thrombosis between the 2 groups. Twelve-month all-cause death was lower in the IVUS group. After multivariate analysis and propensity score adjustment, IVUS guidance was not an independent predictor for 12-month all-cause death (hazard ratio 0.212, 0.026 to 1.73, $p = 0.148$). In conclusion, this study does not support routine use of IVUS guidance for stent deployment in patients who present with AMI and undergo PCI. (Am J Cardiol 2011;108:8–14)

Clinical Outcomes at 12 Months

Variables	IVUS Group (n = 1,635)	Non-IVUS Group (n = 6,075)	p Value
Major adverse cardiac events	108 (6.6%)	374 (6.1%)	0.295
All-cause death	16 (1.0%)	121 (2.0%)	0.006
Cardiac death	5 (0.3%)	76 (1.3%)	0.003
Noncardiac death	11 (0.7%)	45 (0.7%)	0.87
Nonfatal myocardial infarction	23 (1.4%)	48 (0.8%)	0.018
Repeated revascularization			
Target lesion revascularization	34 (2.0%)	90 (1.5%)	0.561
Target vessel revascularization	7 (0.4%)	41 (0.7%)	0.171

Ahmed K et al. Am J Cardiol 2011;108:8-14

Cumulative Survival



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Clinical Investigations

Address for correspondence:
Junghan Yoon, MD, PhD
Division of Cardiology
Department of Internal Medicine
Wonju College of Medicine
Yonsei University, 162 ilsan
Wonju 220-060, South Korea
jyoon@yonsei.ac.kr

Intravascular Ultrasound-Guided Primary Percutaneous Coronary Intervention With Drug-Eluting Stent Implantation in Patients With ST-Segment Elevation Myocardial Infarction

Young Jin Youn, MD; Junghan Yoon, MD, PhD; Jun-Won Lee, MD; Sung-Gyun Ahn, MD; Min-Soo Ahn, MD; Jang-Young Kim, MD, PhD; Byung-Soo Yoo, MD, PhD; Seung-Hwan Lee, MD, PhD; Kyung-Hoon Choe, MD, PhD
Division of Cardiology, Department of Internal Medicine, Wonju College of Medicine, Yonsei University, Wonju, South Korea

ABSTRACT

Background: Studies investigating the clinical outcome of intravascular ultrasound (IVUS)-guided primary percutaneous coronary intervention (PPCI) in patients with ST-segment elevation myocardial infarction (STEMI) show conflicting results. The aim of our study was to evaluate whether IVUS-guidedPPCI with drug-eluting stents (DESs) in STEMI patients improves clinical outcome.

Hypothesis: IVUS-guided PPCI is superior to angio-guided PPCI.

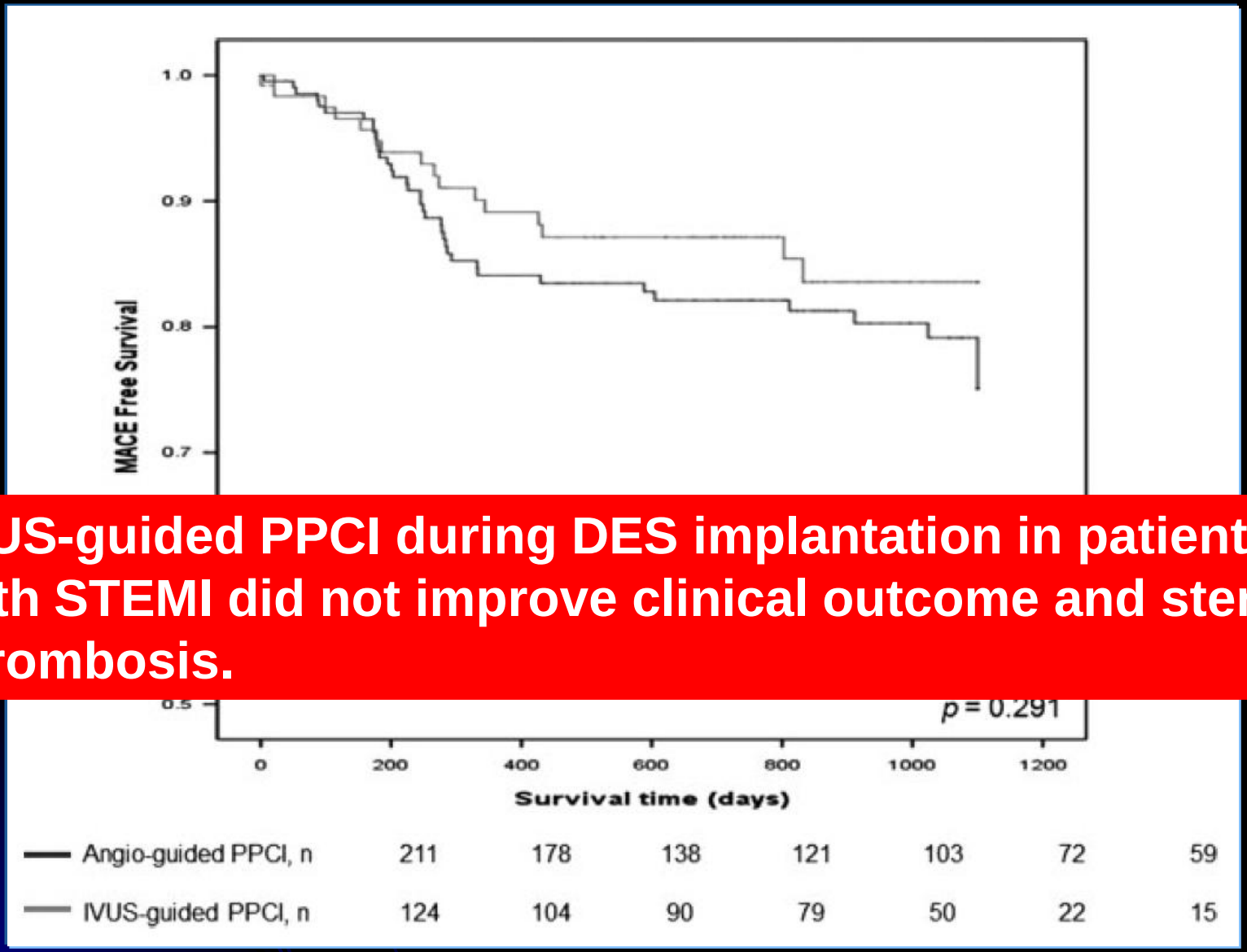
Methods: Three hundred forty-one patients who underwent PPCI for STEMI and survived the hospitalization were enrolled in this study. Two hundred sixteen (63.3%) patients were treated with angio-guided PPCI and 125 (36.7%) patients were treated with IVUS-guided PPCI. The primary endpoint was defined as the composite of death, myocardial infarction, target vessel revascularization, and target lesion revascularization at the 3-year follow-up visit.

Results: Male gender, dyslipidemia, and smoking were frequent in the IVUS-guided PPCI group. These patients had a higher rate of radial approach, adjunctive ballooning, thrombectomy, and the use of a glycoprotein IIb/IIIa inhibitor. The number and length of implanted stents were higher in the IVUS-guided PPCI group. The primary end point (18.1% vs 12.8%, $P = 0.22$) and stent thrombosis (2.8% vs 2.4%, $P = 1.00$) was not different between the groups.

Conclusions: In our observational study, IVUS-guided PPCI with DESs in patients with STEMI did not improve clinical outcome or stent thrombosis.

Young YJ et al., Clin Cardiol 2011; 34:706–713

MACE-Free Survival



IVUS-guided PPCI during DES implantation in patients with STEMI did not improve clinical outcome and stent thrombosis.

Young YJ et al., Clin Cardiol 2011; 34:706–713

Conclusion

There is every reason to believe that IVUS will continue to play a critical role in the development of interventional techniques and provide further insights into the pathophysiology of coronary artery disease; IVUS guidance of DES implantation may be of particular importance.

However, routine IVUS guidance of coronary stent implantation is not supported by this critical reappraisal of the available evidence, and the safety, efficacy, and effectiveness of this imaging technology should be taken into account when considering the goals, risks, benefits, and alternatives to such a treatment strategy.

J Am Coll Cardiol 2004;43:1335–42

IVUS-Guided PCI in AMI

A large-scale, randomized, controlled trial should be performed.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광주무등산