Acute Coronary Syndrome

- Case Review -

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Case 1

M / 39

#4306212

CC : Severe squeezing chest pain

D : 4 hours, aggravated since 1 hr ago

Risk factors : HTN (-), DM (-)

Smoking - 30 PYs

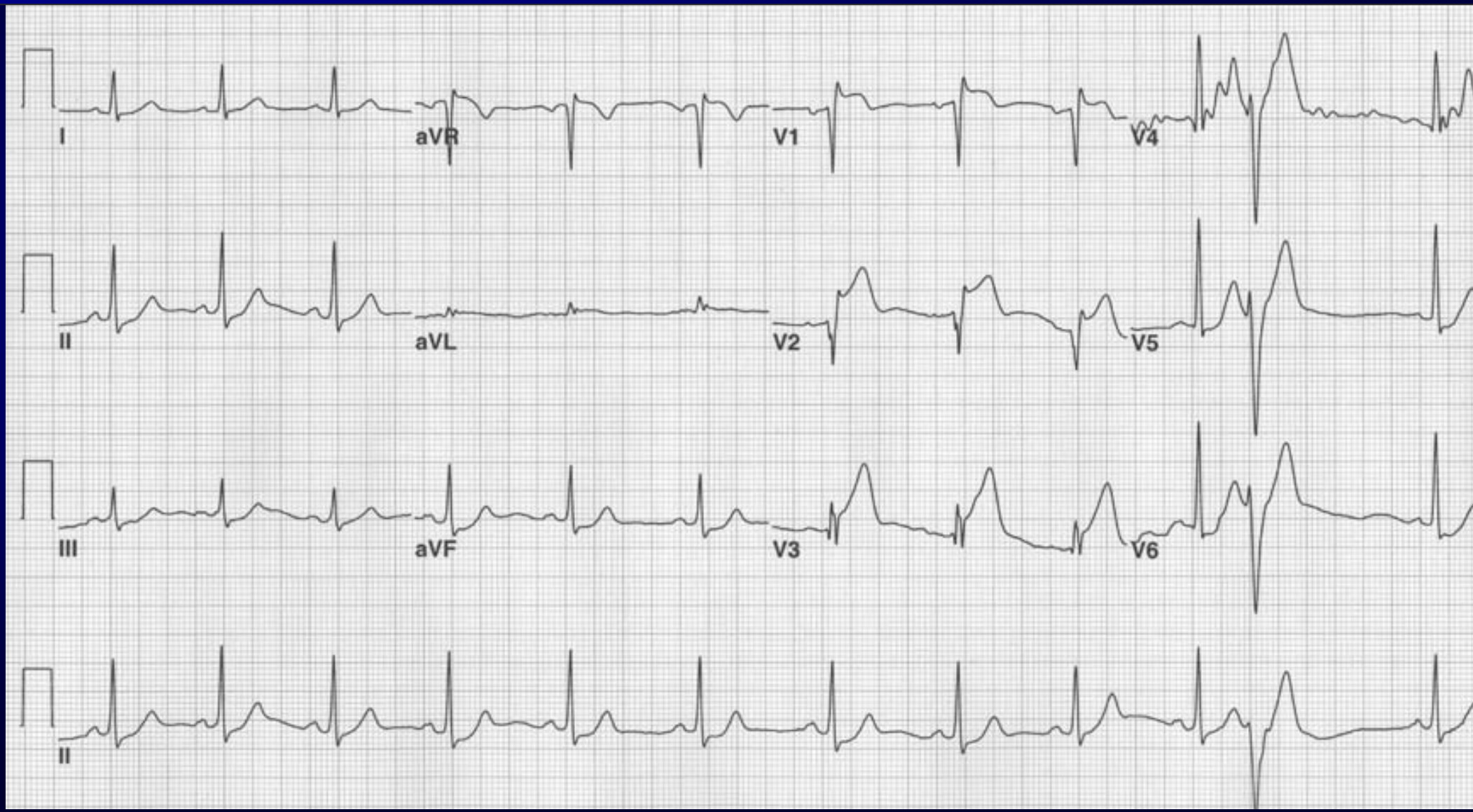
P/Ex : BP 150/65 mmHg, PR 71/min

Lab : initial CKMB 3.04 ng/mL, Troponin-T <0.01 ng/mL

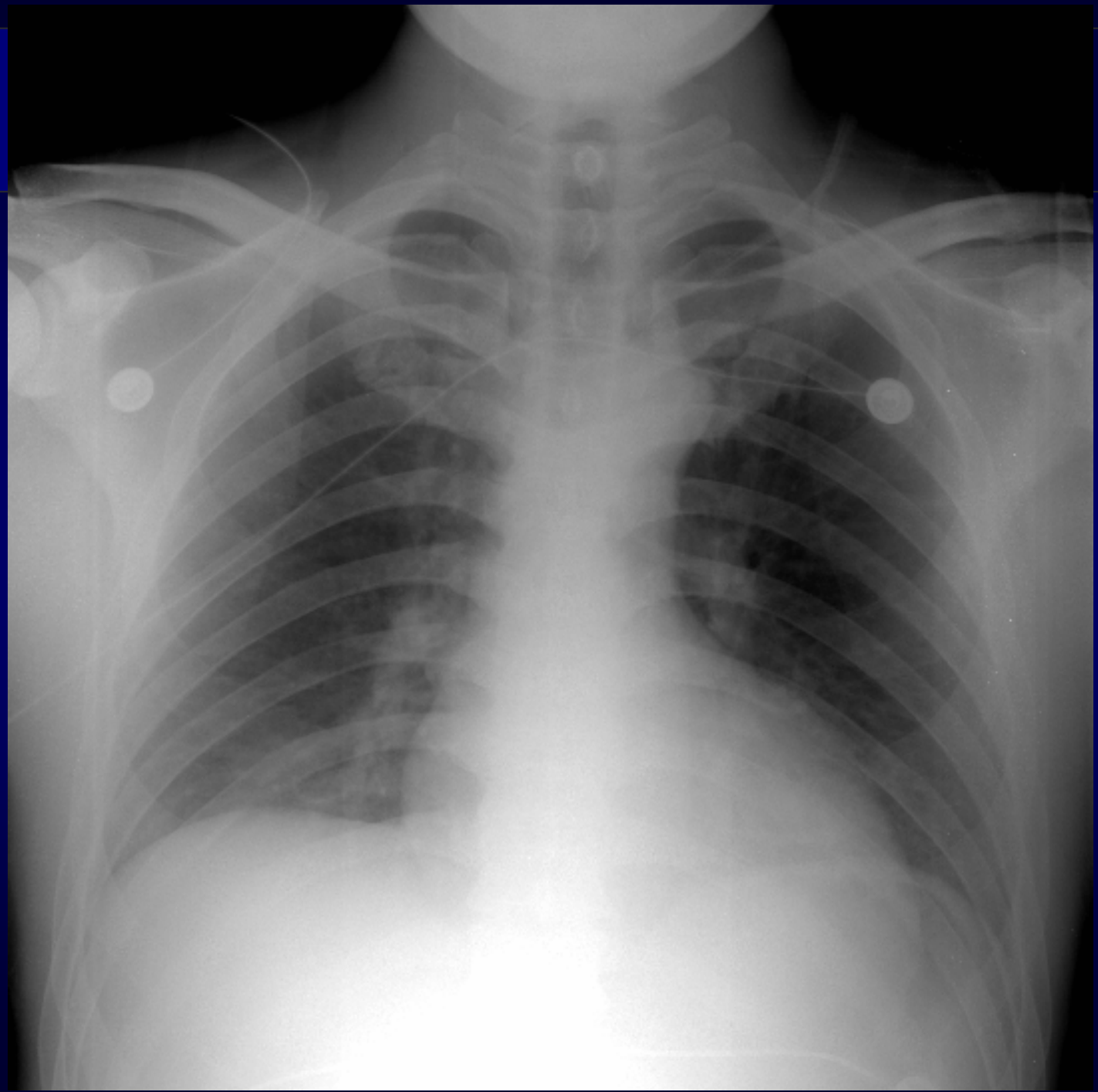
=> peak CKMB (12 hr later) 435.4 ng/mL

T.chol/TG/HDL/LDL 180/150/48/102 mg/dL

EKG : Initial in ER



Chest AP

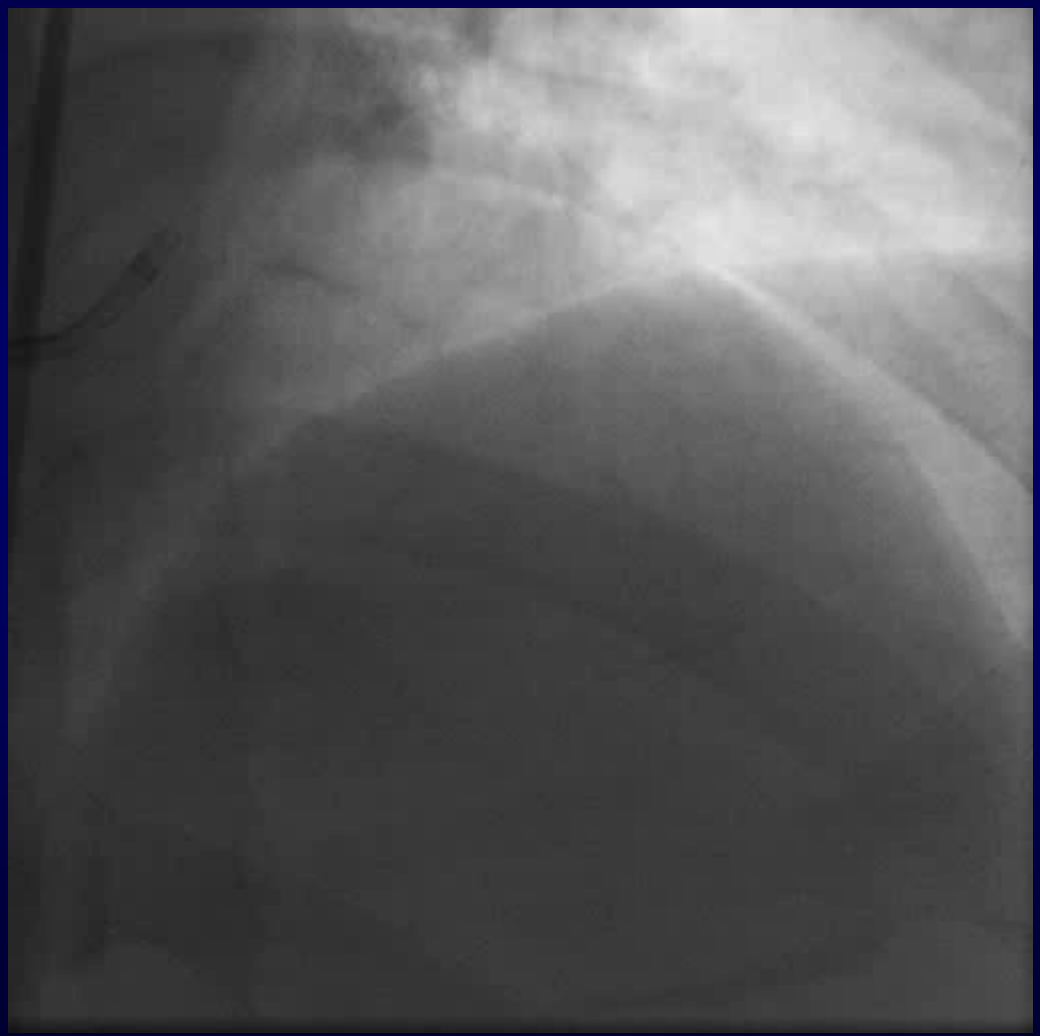


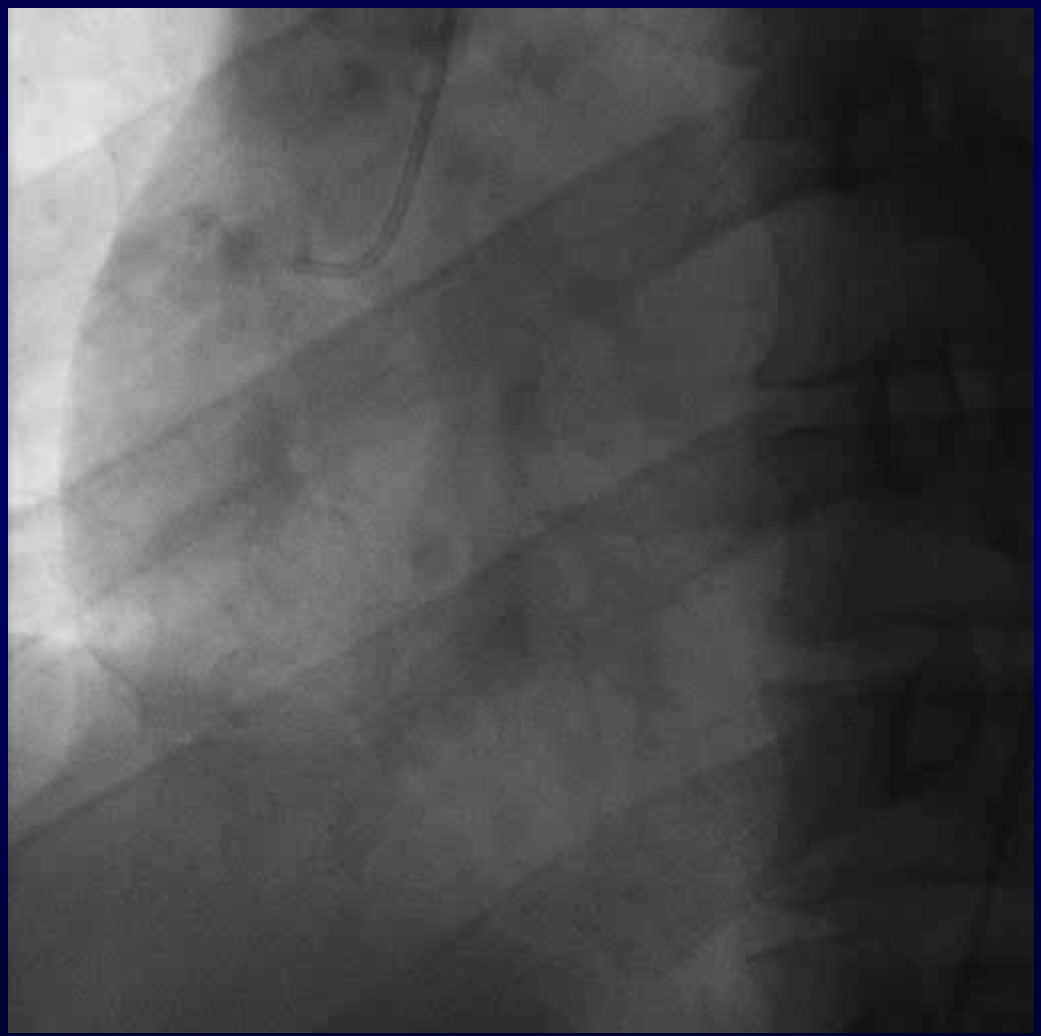
Management in ER

- Aspirin 250 mg p.o.
- Clopidogrel 300 mg p.o.
- Nasal O_2
- Heparin i.v. 5000 IU
- Morphin 3 mg

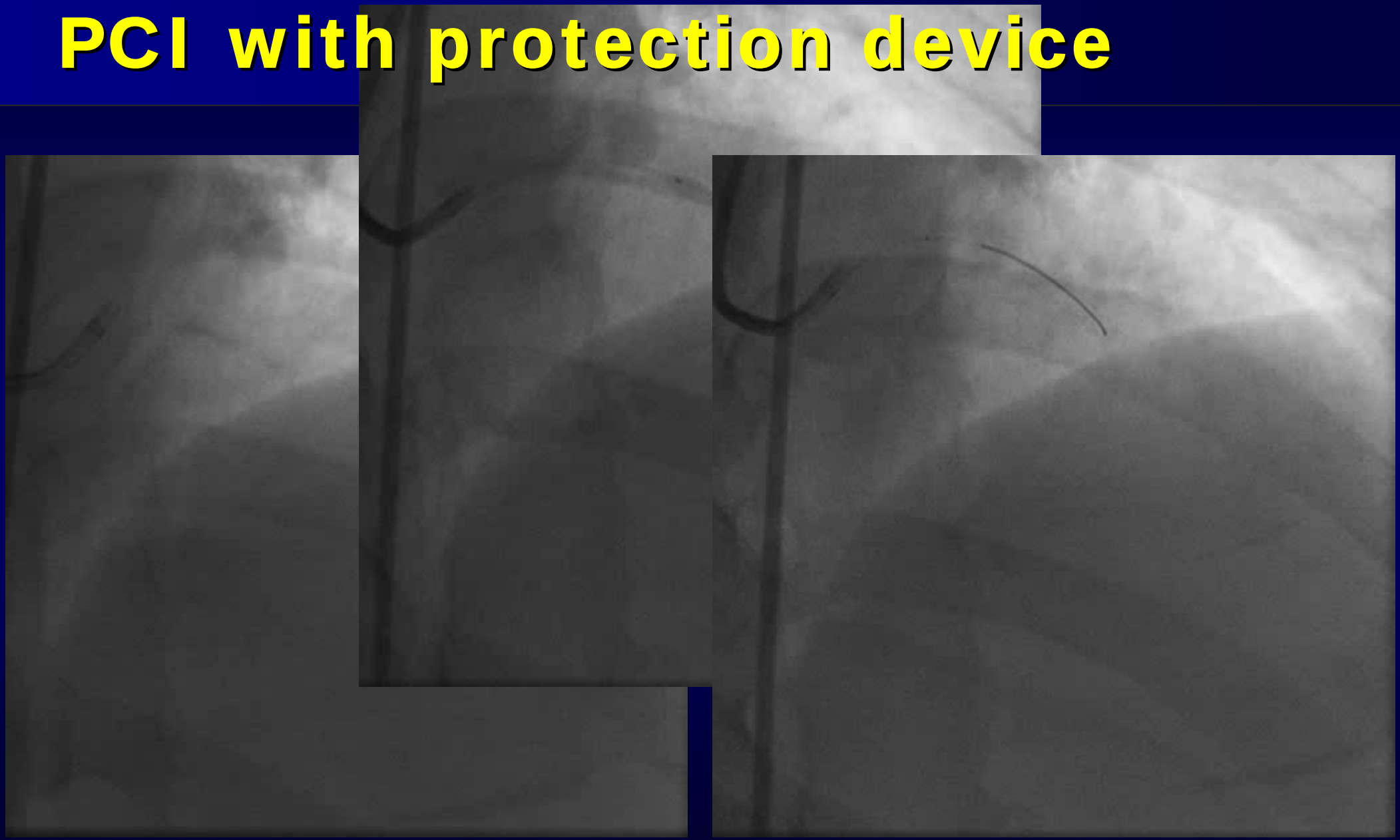
=> Cath room

Coronary Angiography



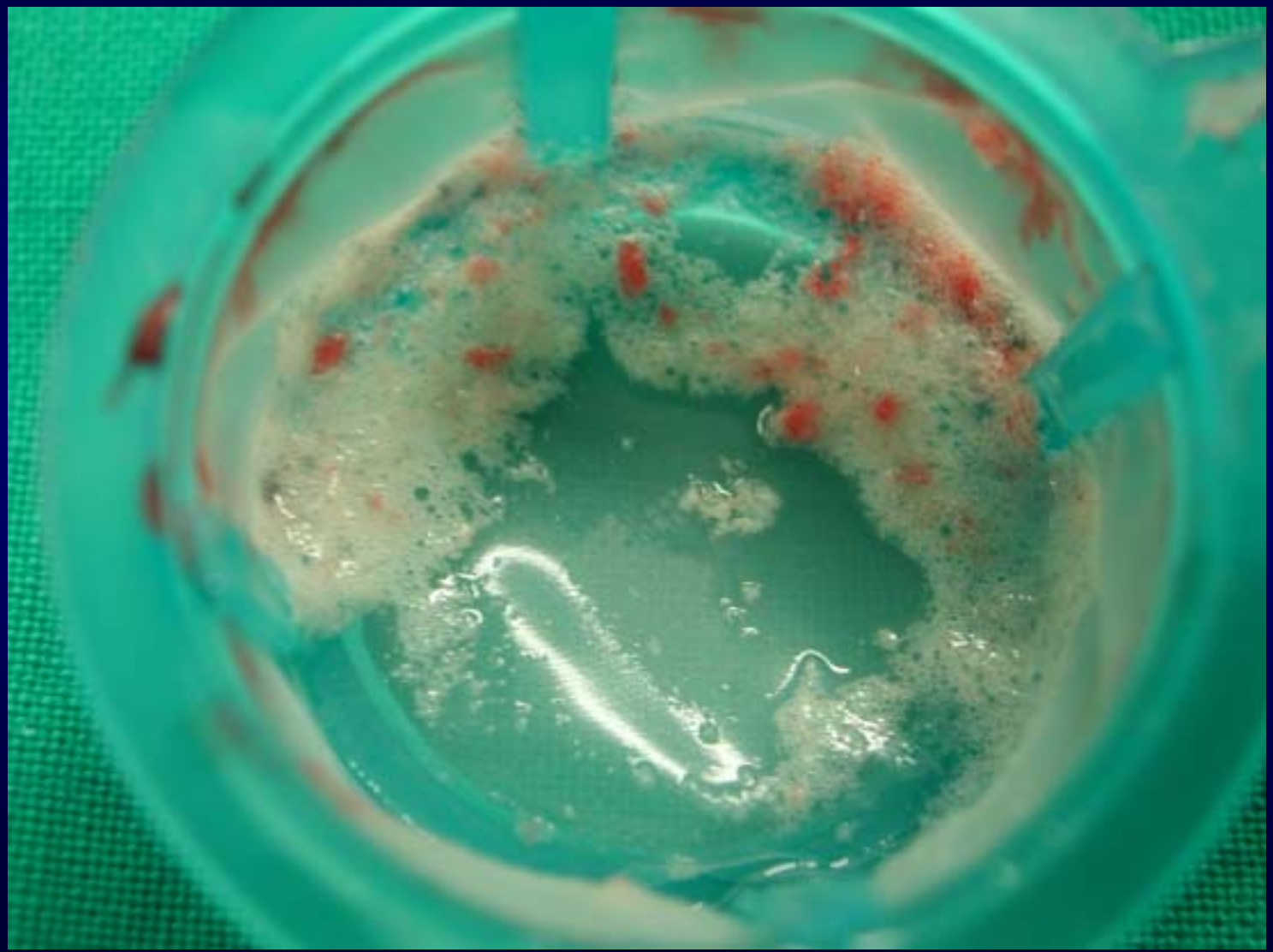


PCI with protection device

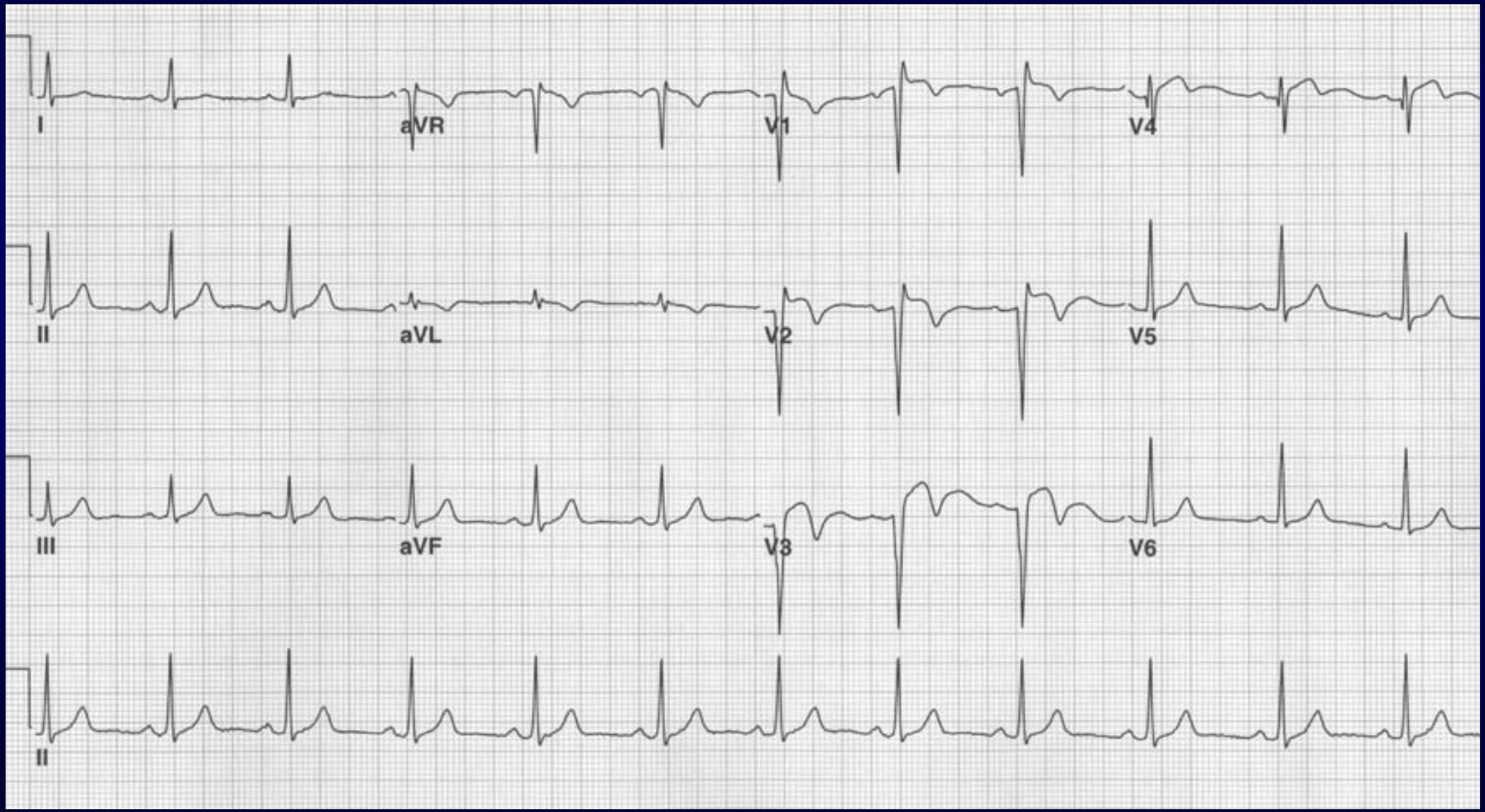


Cypher 3.0 x 18 mm

Aspirate from culprit coronary artery

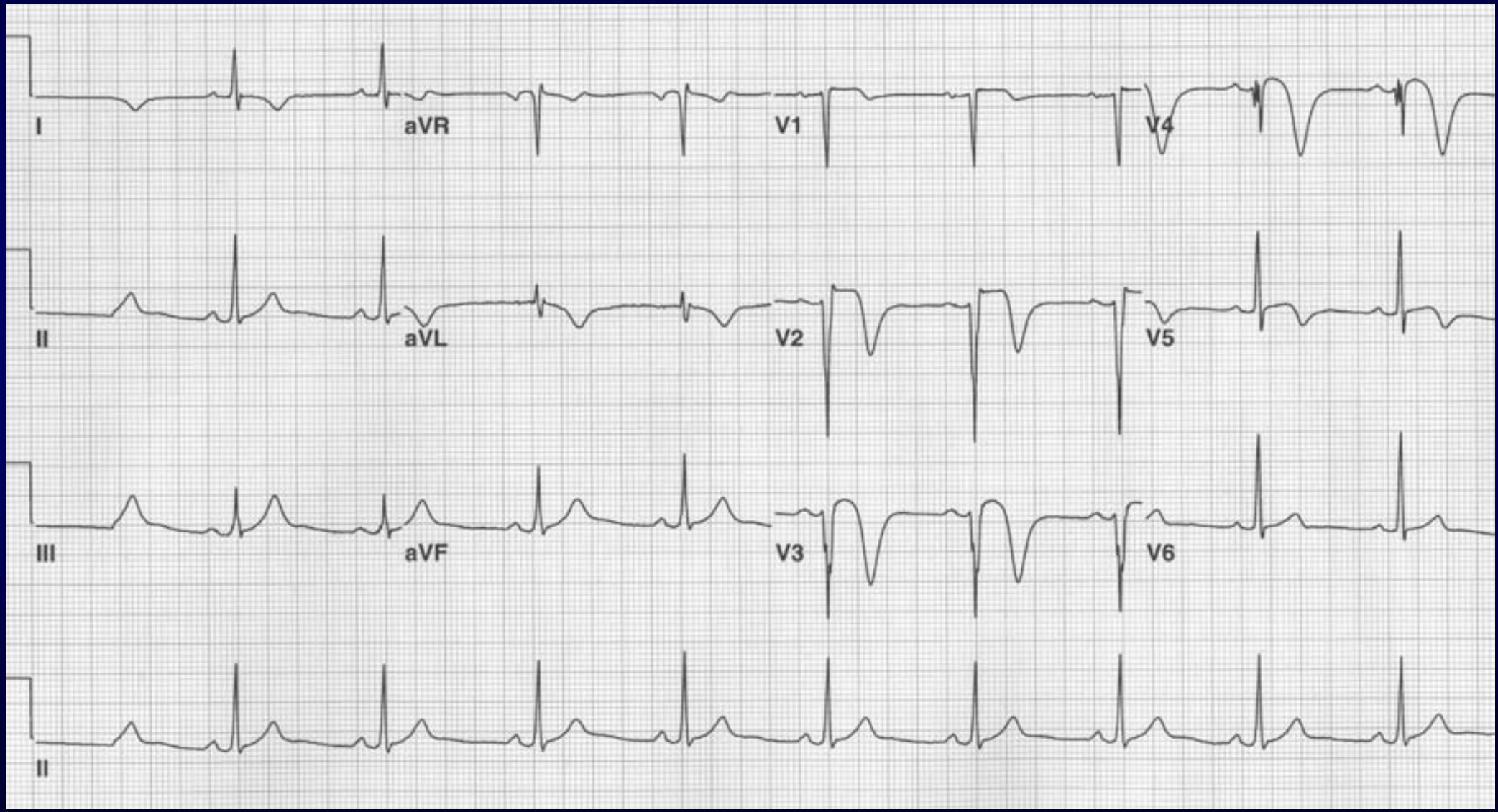


EKG : 90 min after PCI

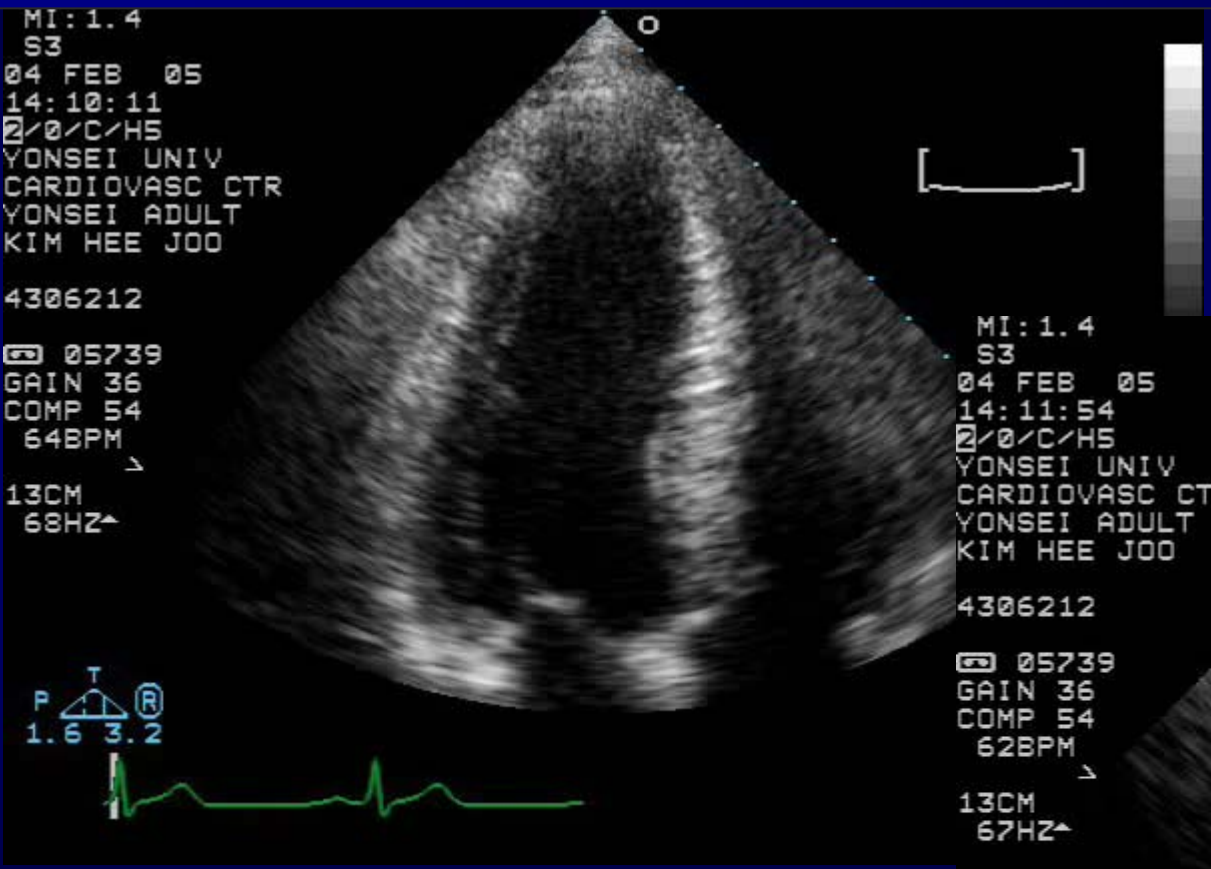


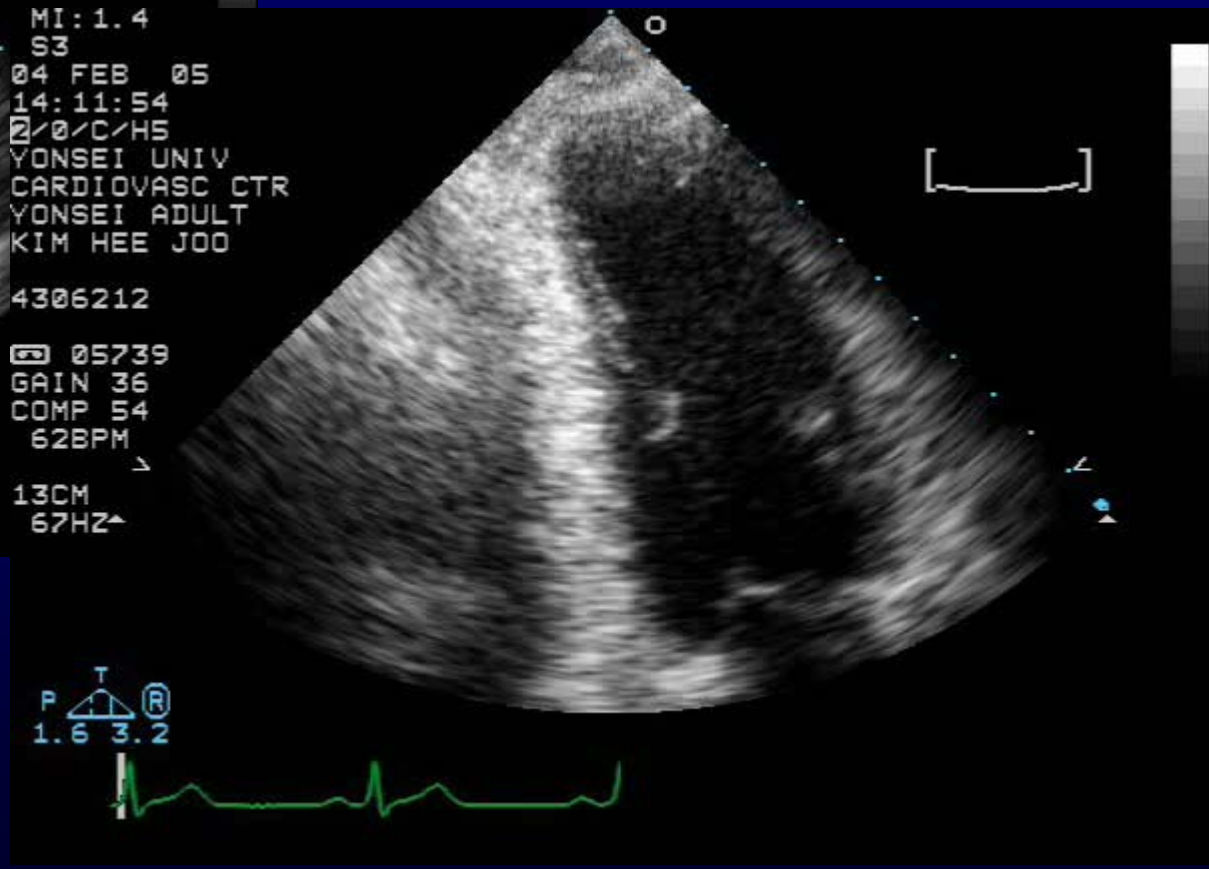
EKG : at discharge

HD #4



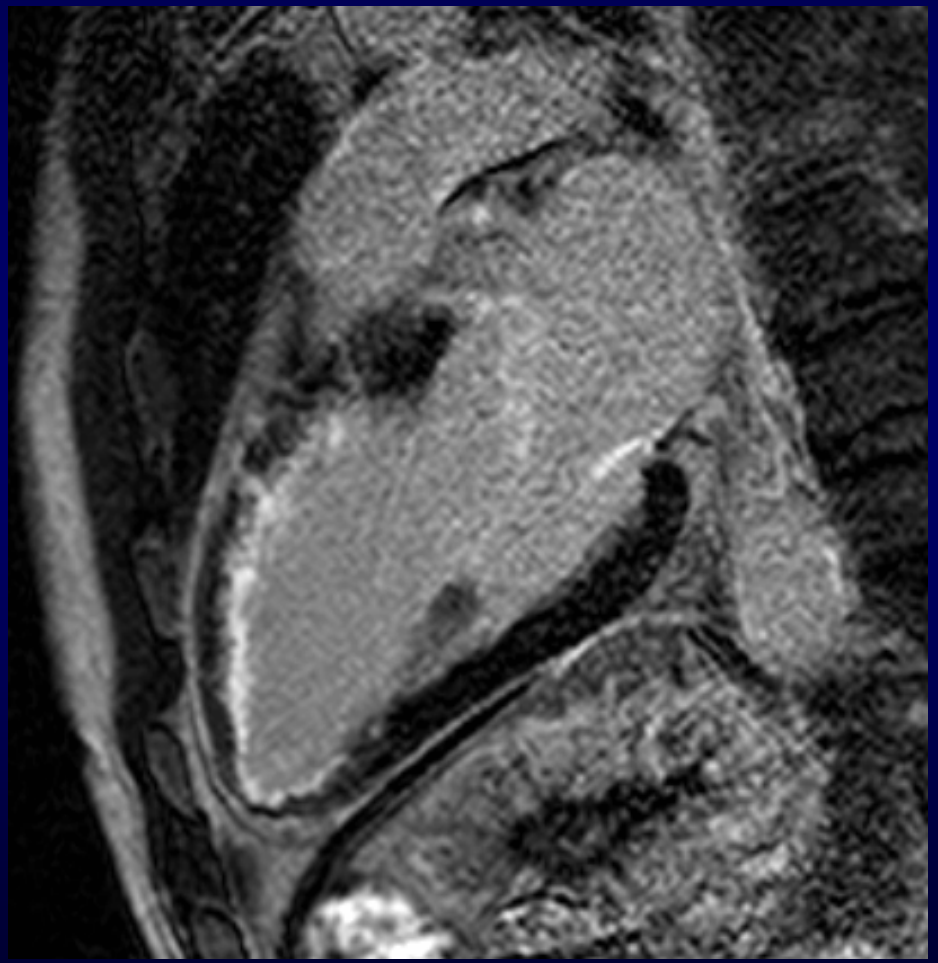
Echocardiography

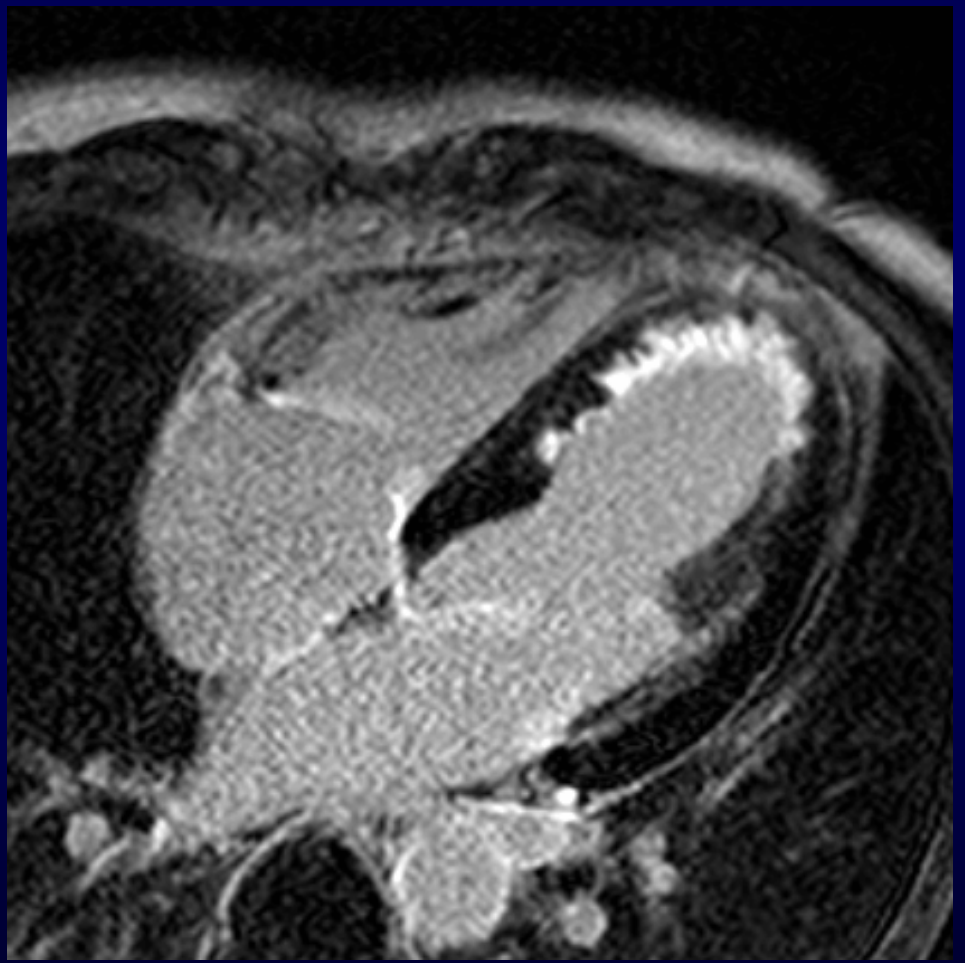




LVEF 55%

Heart MRI

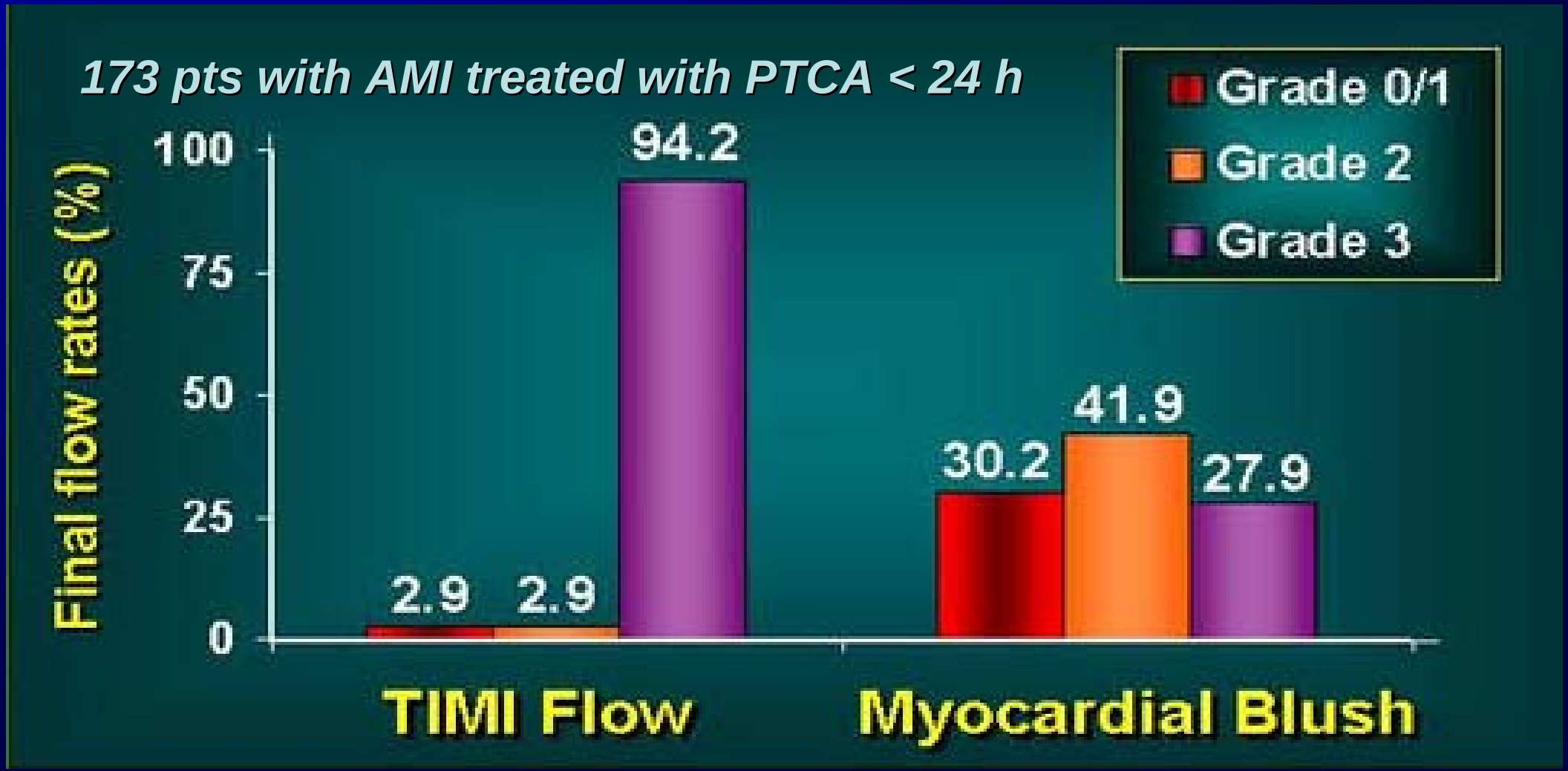




Medication

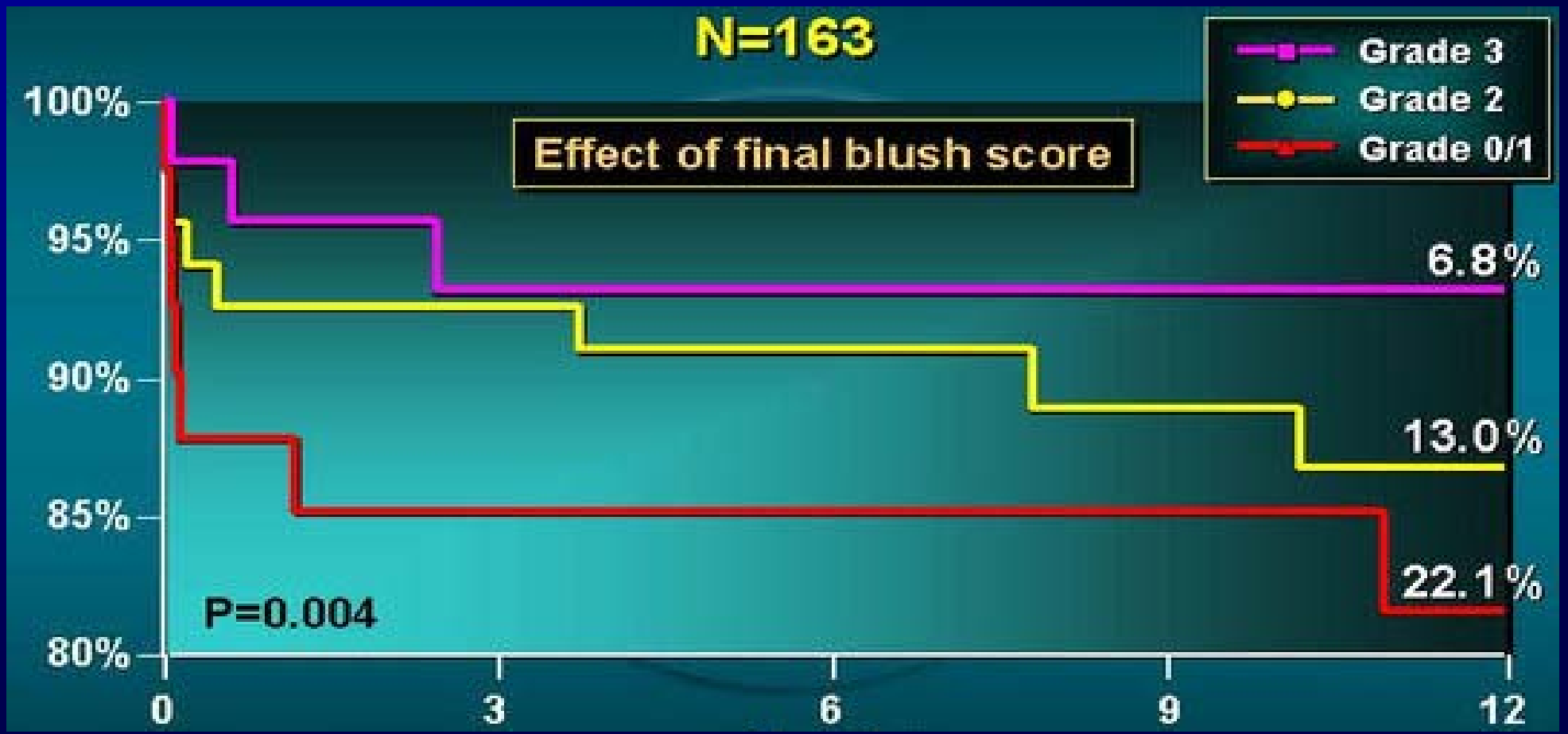
- Aspirin 100 mg # 1
- Clopidogrel 75 mg # 1
- Propanolol 120 mg # 3
- Captopril 150 mg # 3
- Atorvastatin 10 mg #1

Post Procedure Angiography



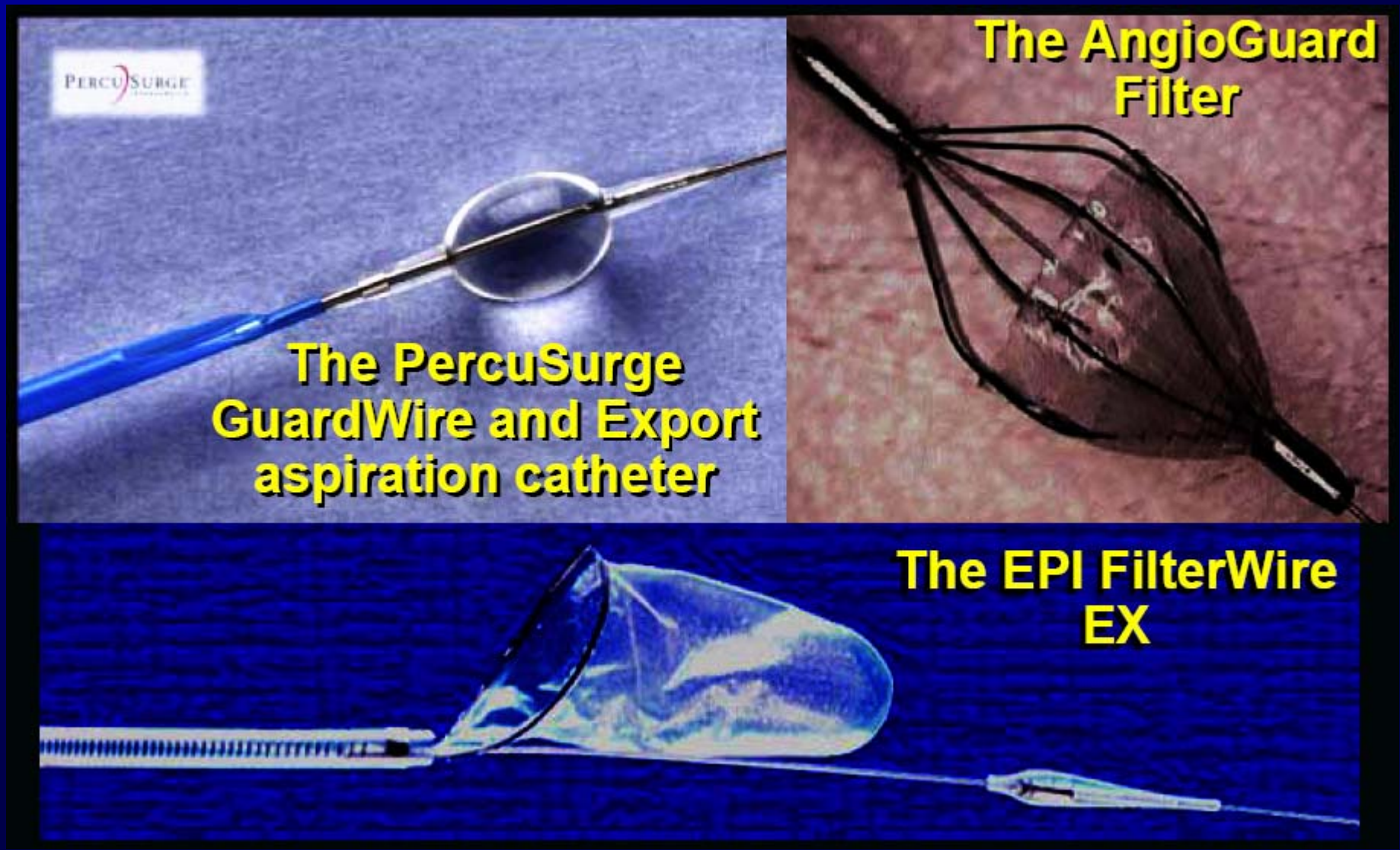
Stone GW et al. JACC 2002

Survival in Patients with TIMI-3 Flow



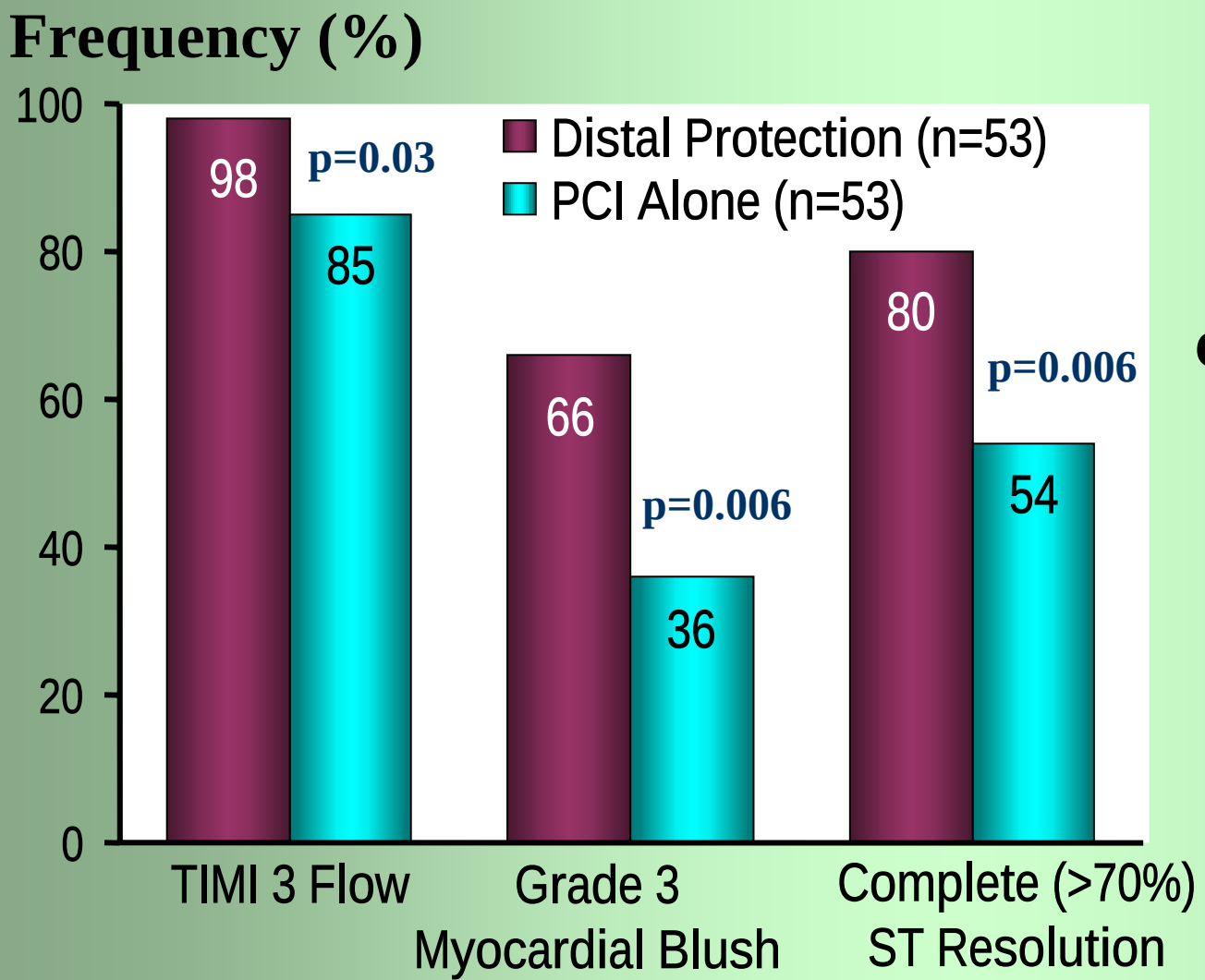
Stone GW et al. JACC 2002

Protection Devices



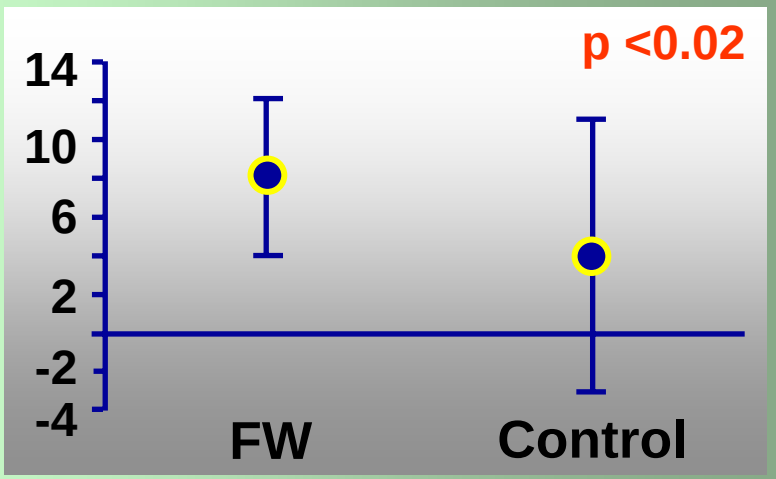
FilterWire™ System

- Case-matched controlled study, Single center, Pisa -



n=47 (FW group)

Change in LVEF (%) at 30D

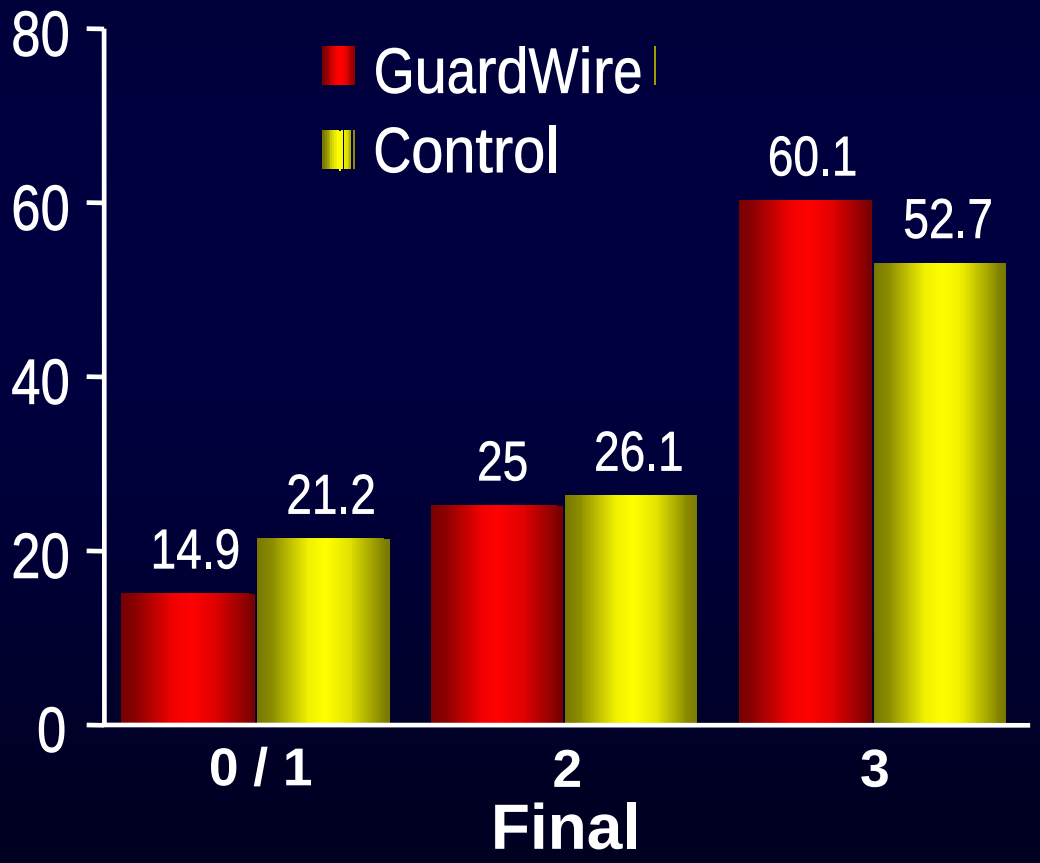


Limbruno U, et al. Circulation 2003;108:171-6.

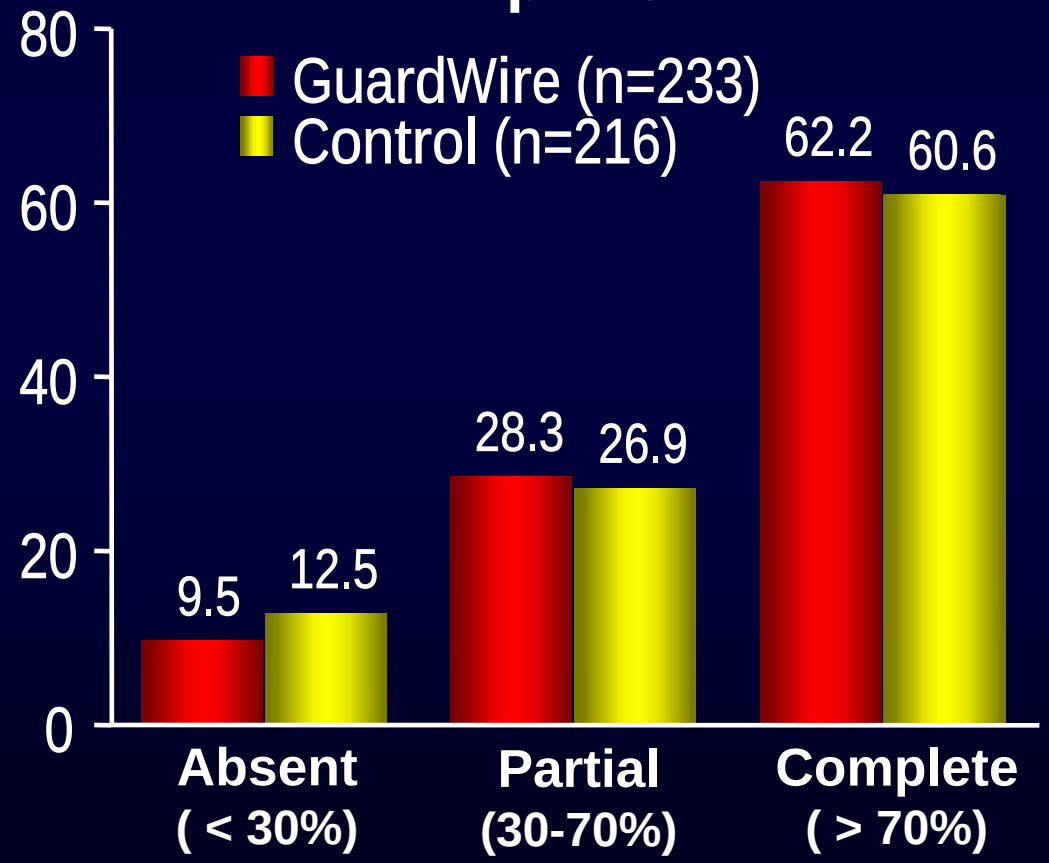
EMERALD (1)

n=501, STEMI ≤ 6 hr, ≥ 2mm ST ↑ or LBBB, No cardiogenic shock

Myocardial Blush (% Patient)



ST-Segment Resolution at 30min



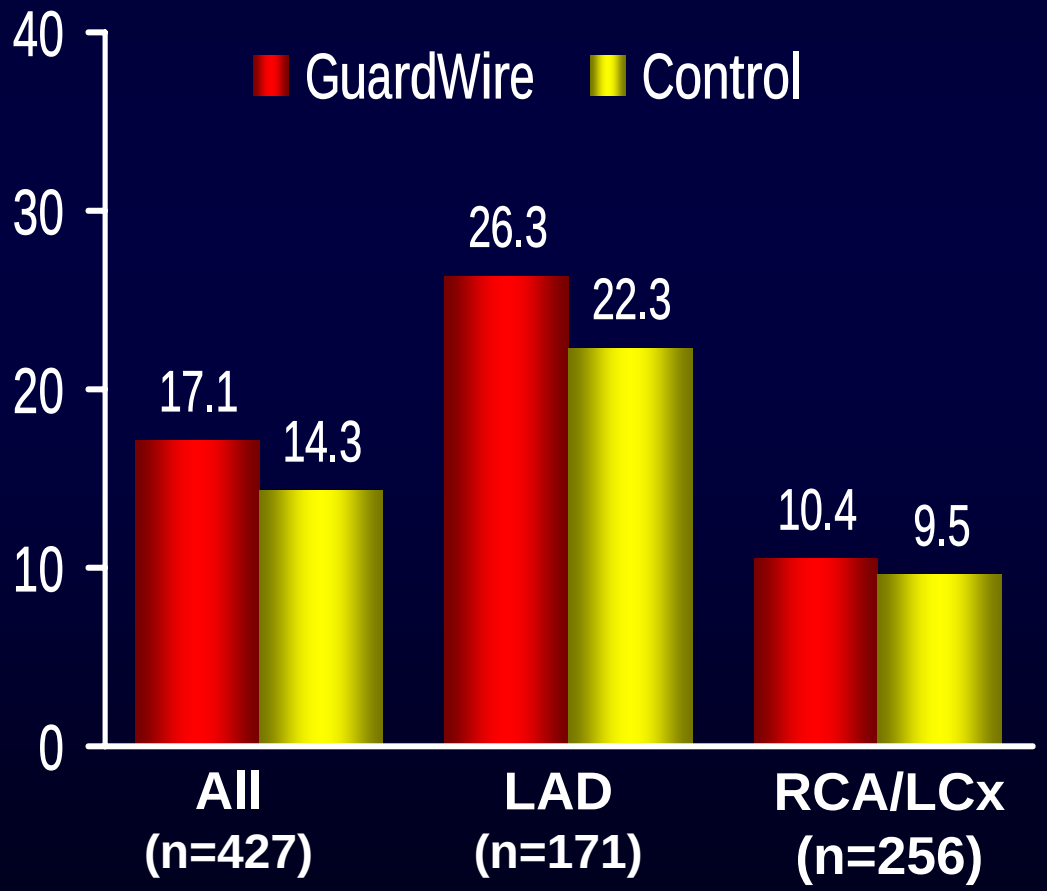
Stone GW. JAMA. 2005;293:1063-1072.

EMERALD (2)

n=501, STEMI ≤ 6 hr, ≥ 2mm ST ↑ or LBBB, No cardiogenic shock

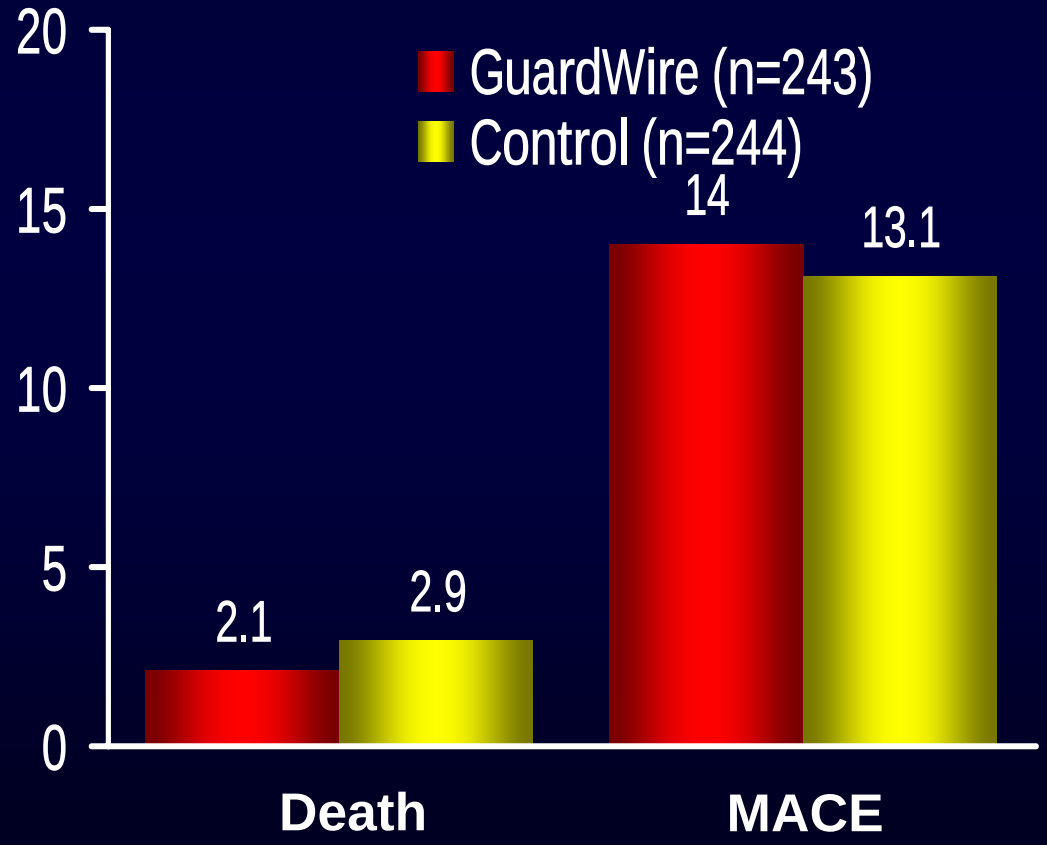
Infarct Size by ^{99m}Tc-SPECT

p=NS



30 Days MACE (% Patient)

p=NS



Stone GW. JAMA. 2005;293:1063-1072.

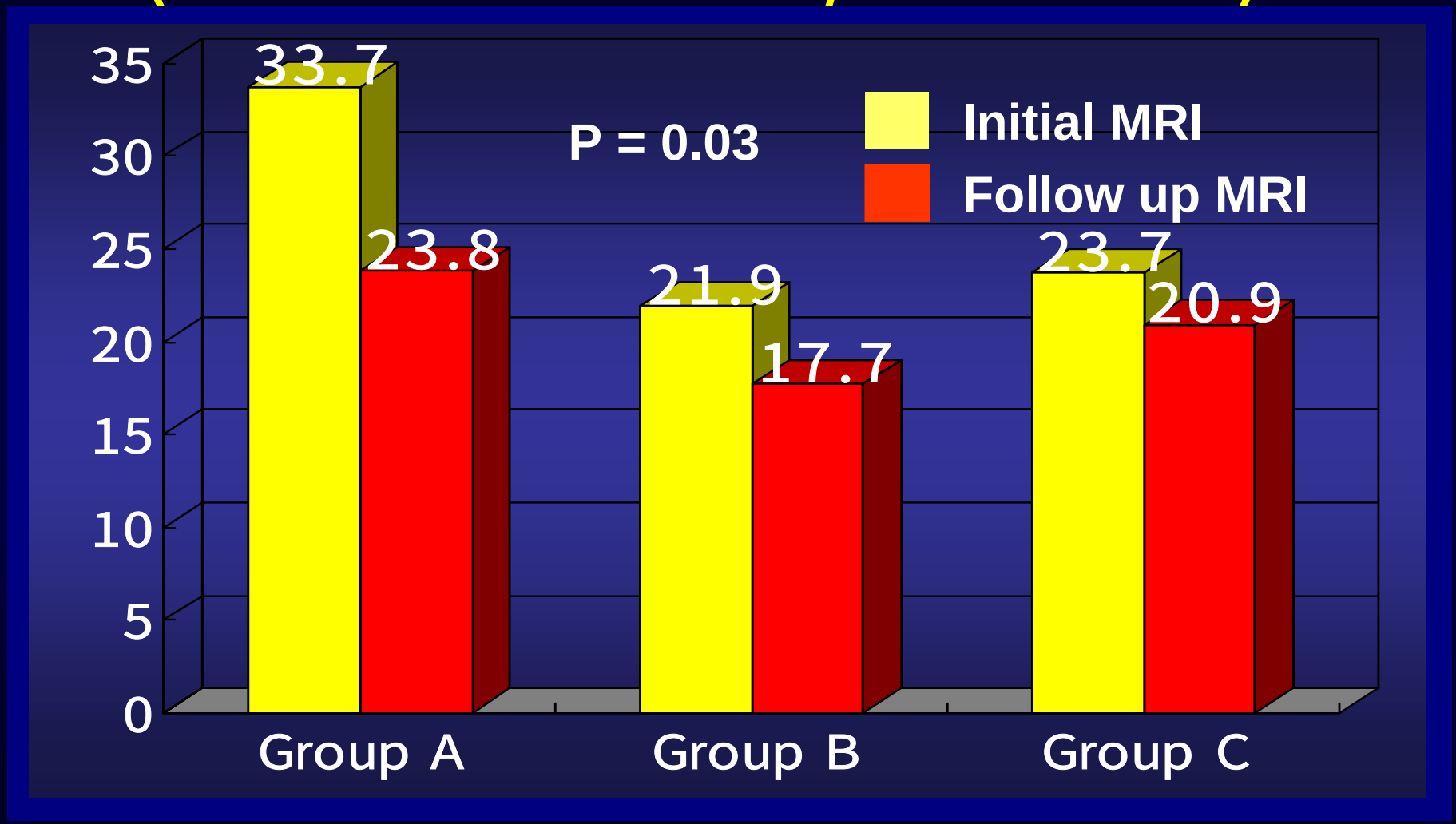
Protection device & DE in MRI

- 27 patients with STEMI who underwent PCI
- Classification
  * Group A: primary PCI with protection devices within 6hrs
  * Group B: without protection devices within 6 hours from event onset
  * Group C: elective PCI after 12 hours of symptom onset

- Gadolinium contrast enhanced MRI
  : 4-6 days and 3-4 months after PCI

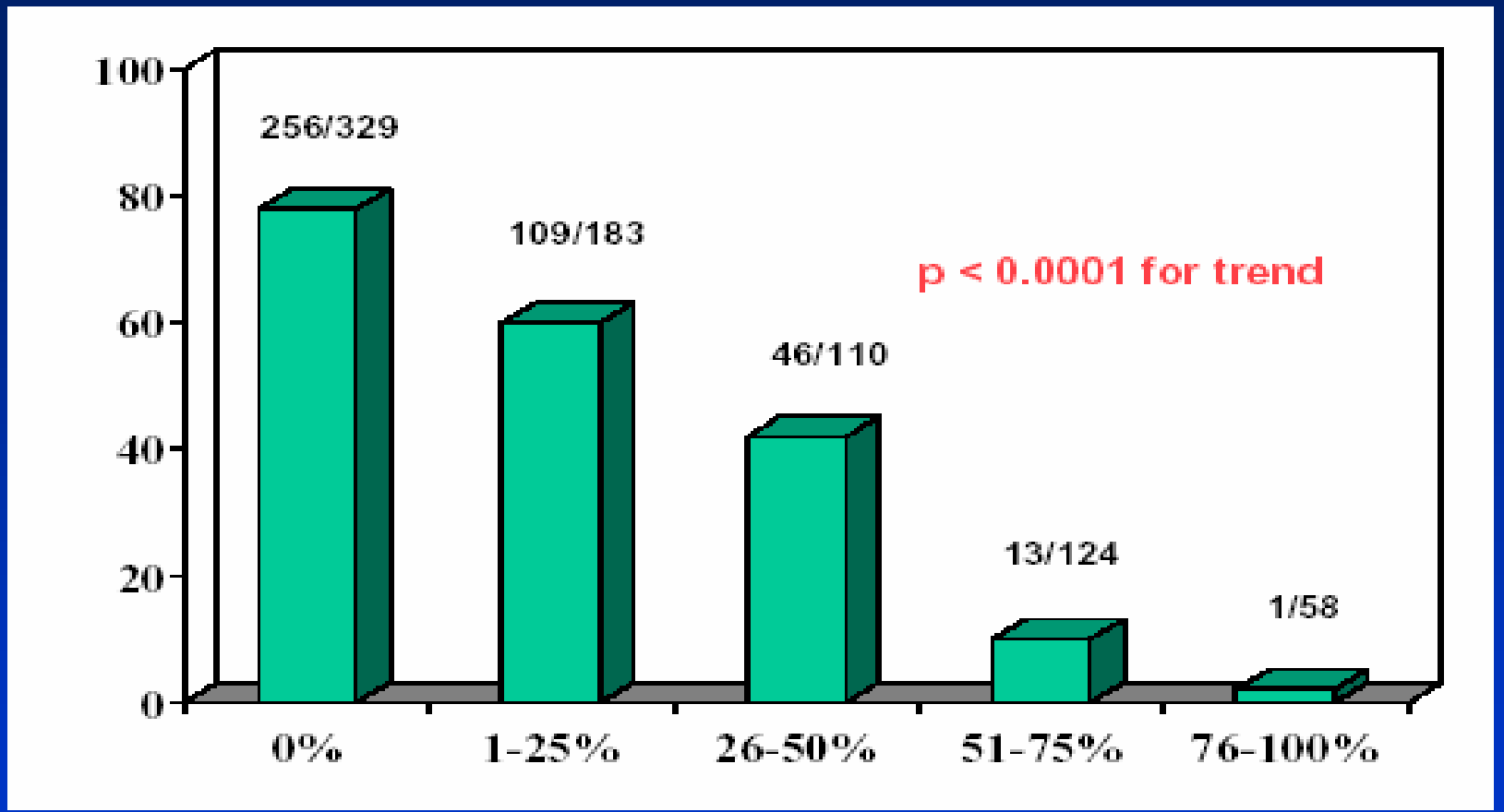
YUMC data

Reduction in infarcted mass percent (infarcted mass/LV mass)



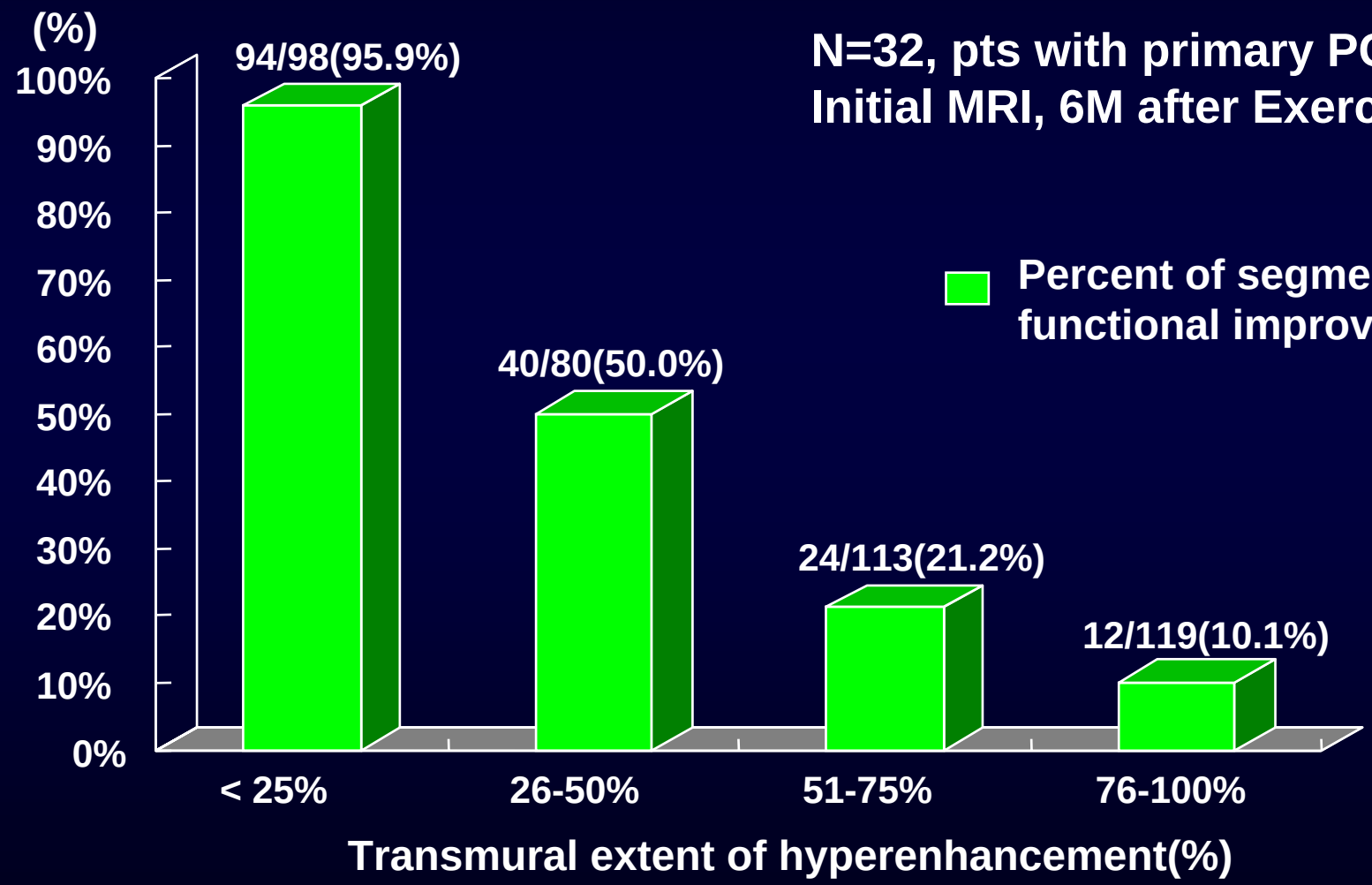
YUMC data

Delayed hyperenhancement at MRI in patients with AMI



Kim et al. NEJM 2000;343:1445-53

MRI hyperenhancement thickness & contractile function reserve



2005. ACC abstract, YUMC data

Case 2

F / 66

#4315619

CC : Epigastric pain with nausea

D : 1½ hours

Risk factors : HTN (-), DM (-)

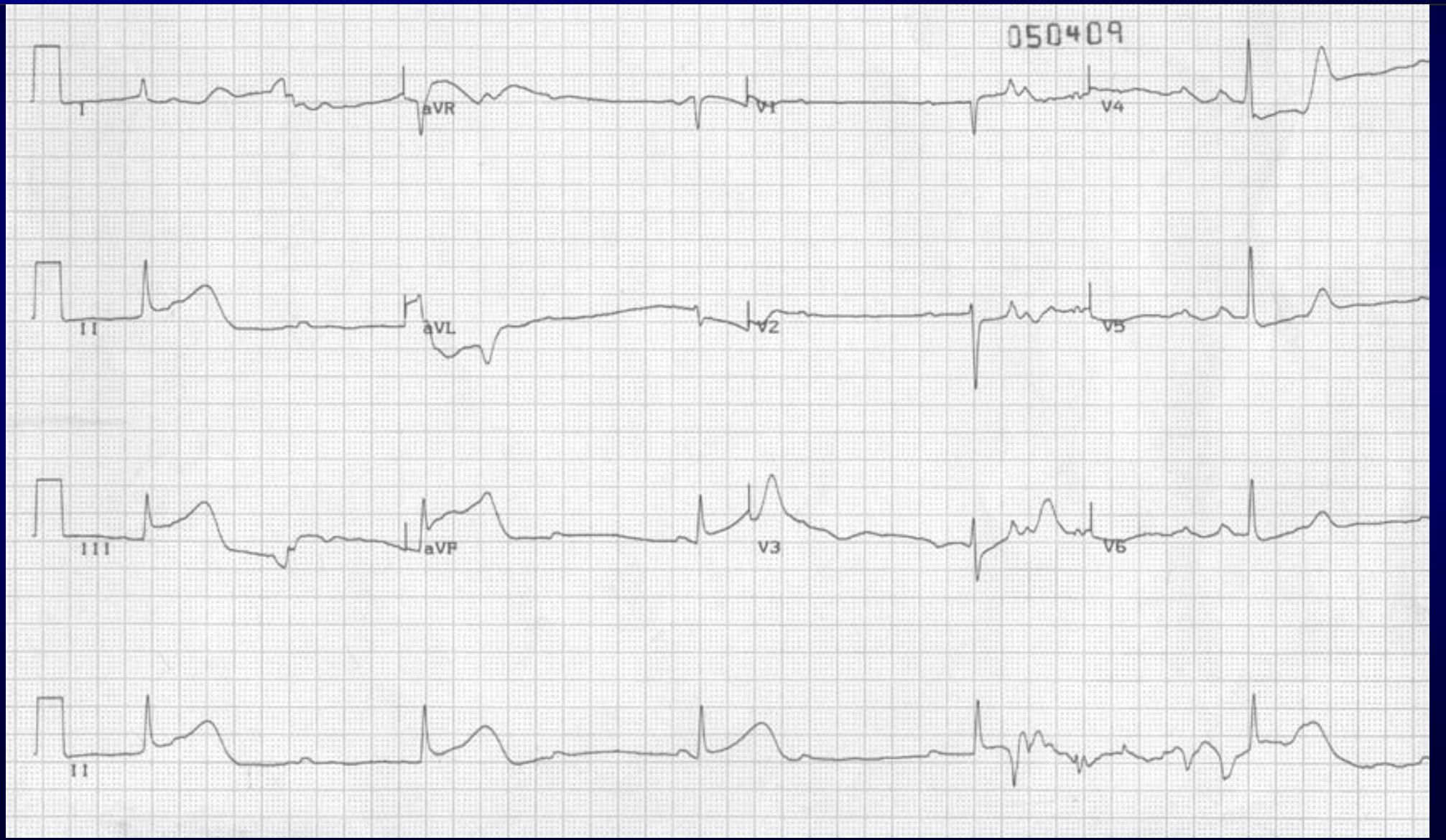
P/Ex : BP 95/55, PR 29/min

Lab : initial CKMB 3.06 ng/mL TnT <0.01 ng/mL

=> peak CKMB 194.9 ng/mL

T.chol/TG/HDL/LDL 187/34/46/134 mg/dL

EKG : Initial in ER

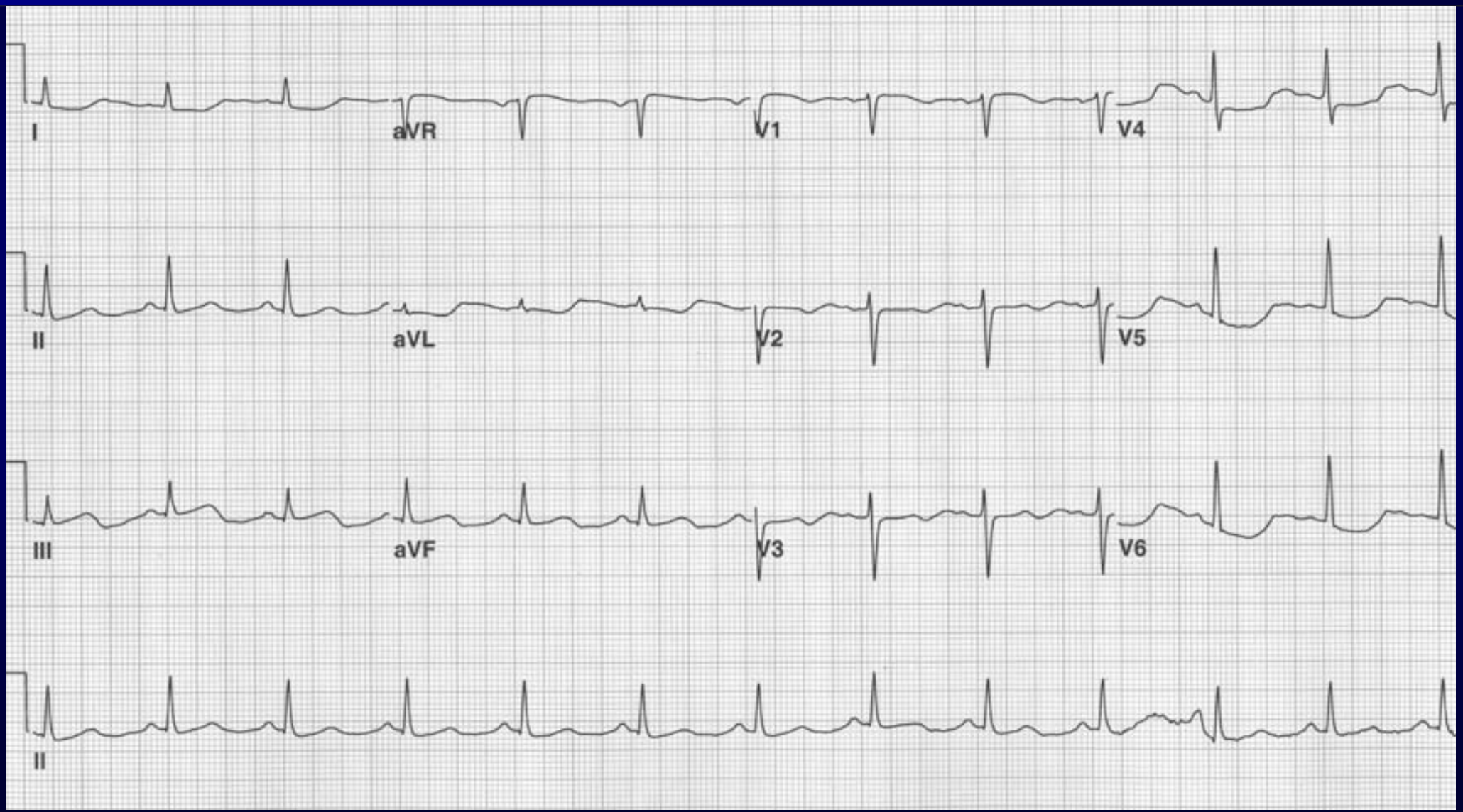


Management in ER

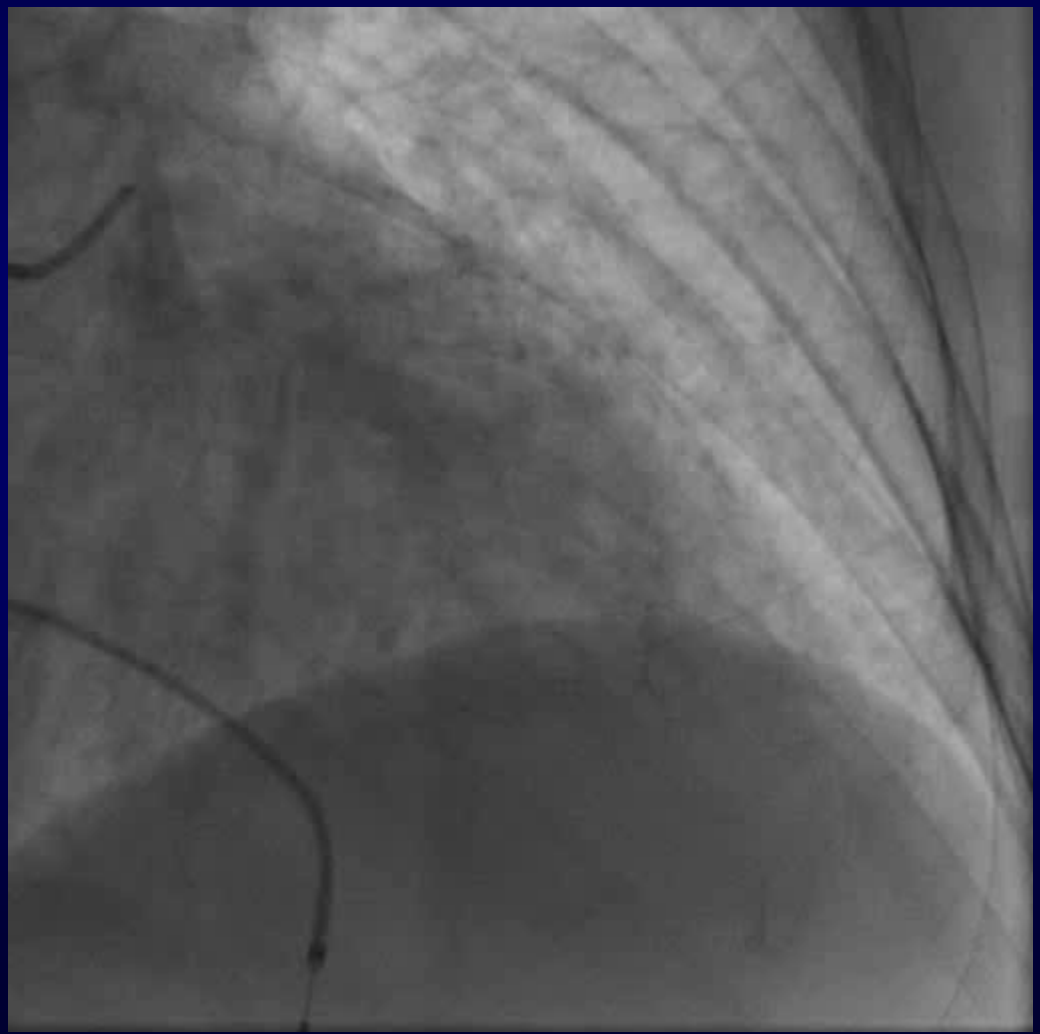
- Aspirin 250 mg p.o.
- Clopidogrel 300 mg p.o.
- Nasal O_2
- Heparin 4000 IU i.v.
- **Tenecplase (TNK) 30 mg i.v. bolus**

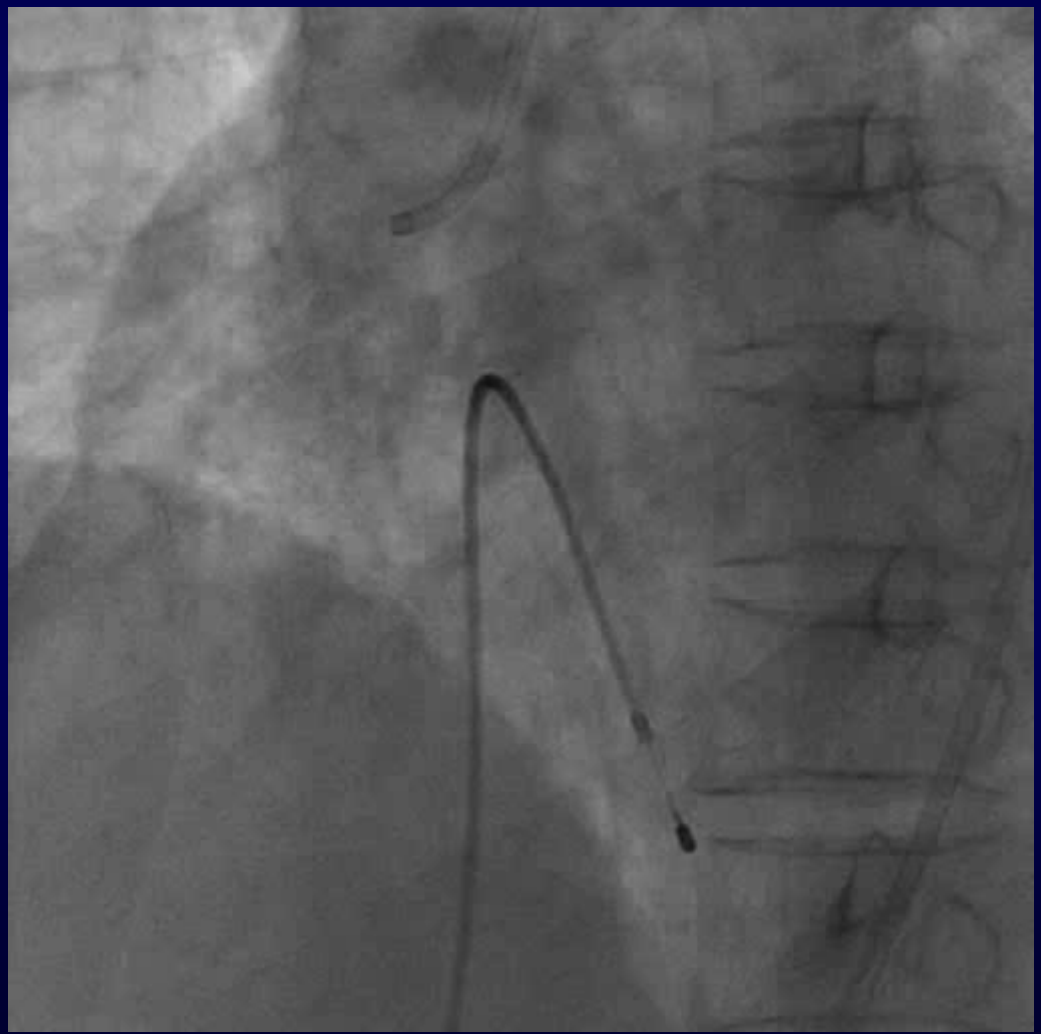
=> Cath room

EKG : 10 min after TNK injection

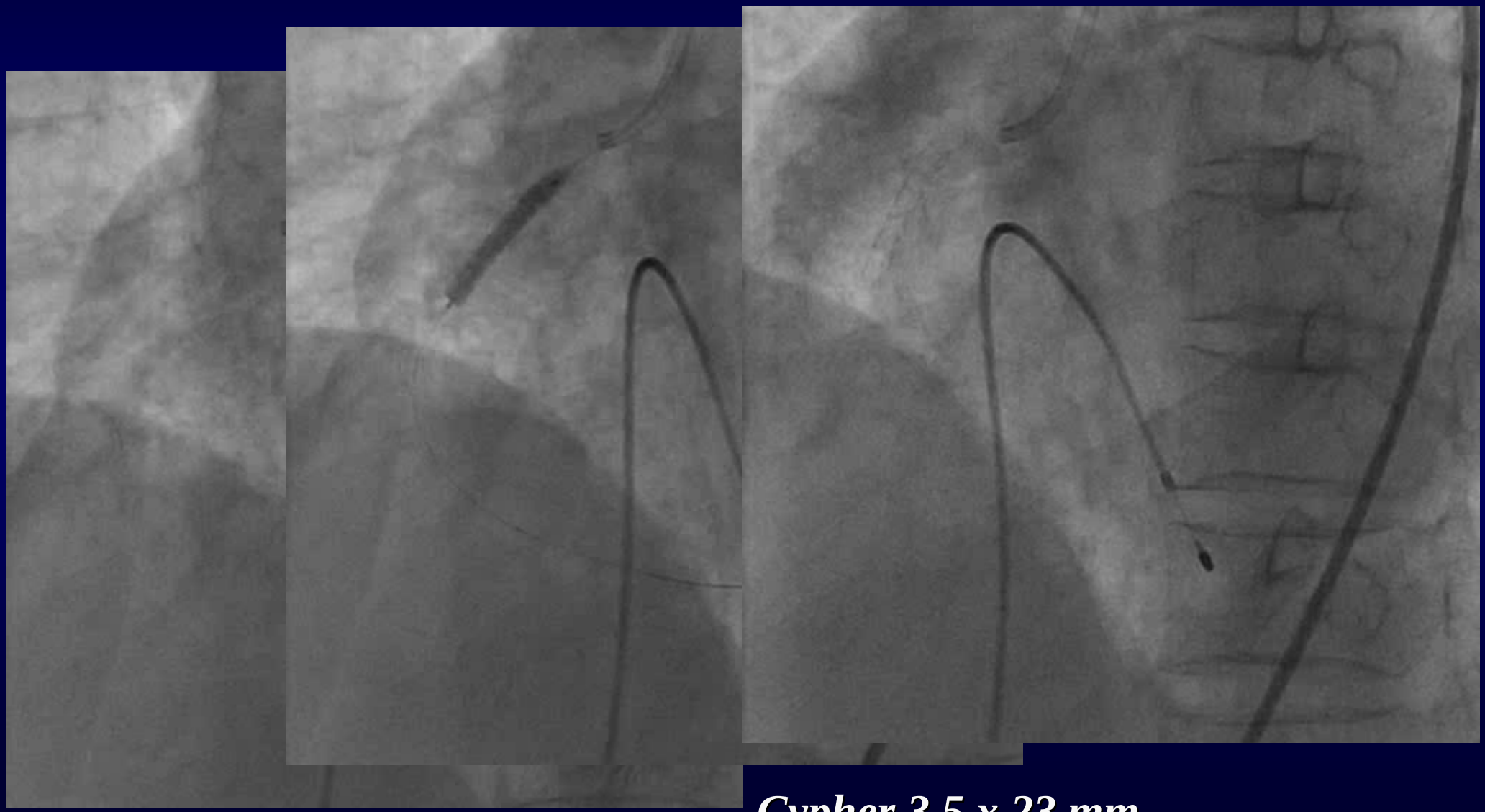


Coronary Angiography



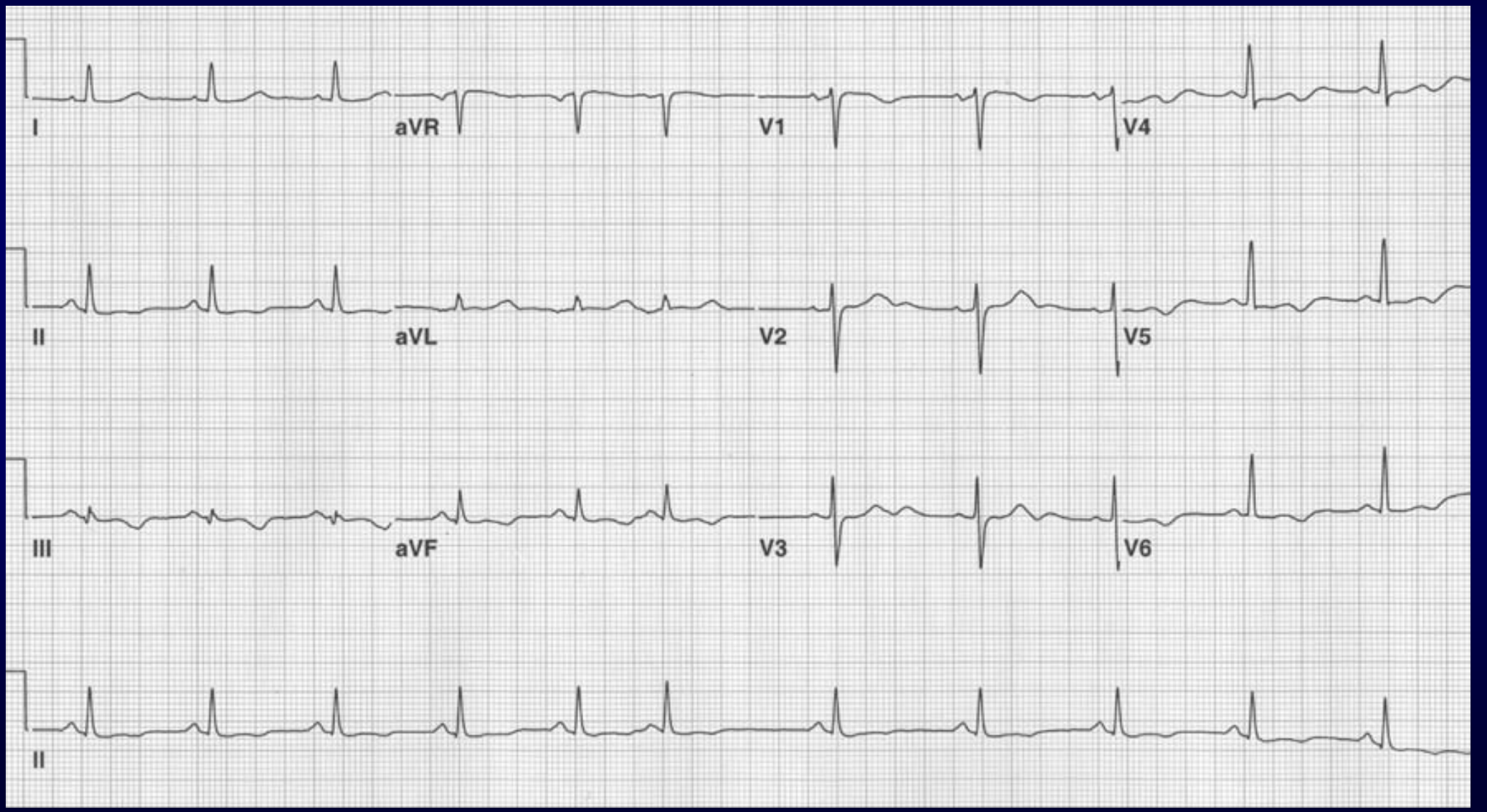


PCI



Cypher 3.5 x 23 mm

EKG : 90 min after PCI



Large AMI, < 6 hr from symptom onset, age ≥ 18 years
Expected delay until arrival at cath lab, 1-3 hours

GROUP A
ASA
UFH
TENECTEPLASE
2000 pts

Randomise open label

GROUP B
ASA
UFH
2000 pts

Angiography / PCI

GP IIb/IIIa **NOT** allowed
Clopidogrel for stenting allowed

GP IIb/IIIa allowed (not before cath lab)
Clopidogrel for stenting allowed

Follow-up at day 30 and day 90

Primary endpoint (composite):
Death or Congestive Heart Failure or Cardiogenic Shock

Case 3

M / 50

#4315619

CC : Sudden substernal chest pain at rest

D : 30 min

PI : intermittent effort chest pain for 1 year

Risk factors : HTN (+) for 6 months, on med

DM (+) for 2 years, on oral med

Smoking (+) 30 PYs

P/Ex : BP 130/80, PR 60/min

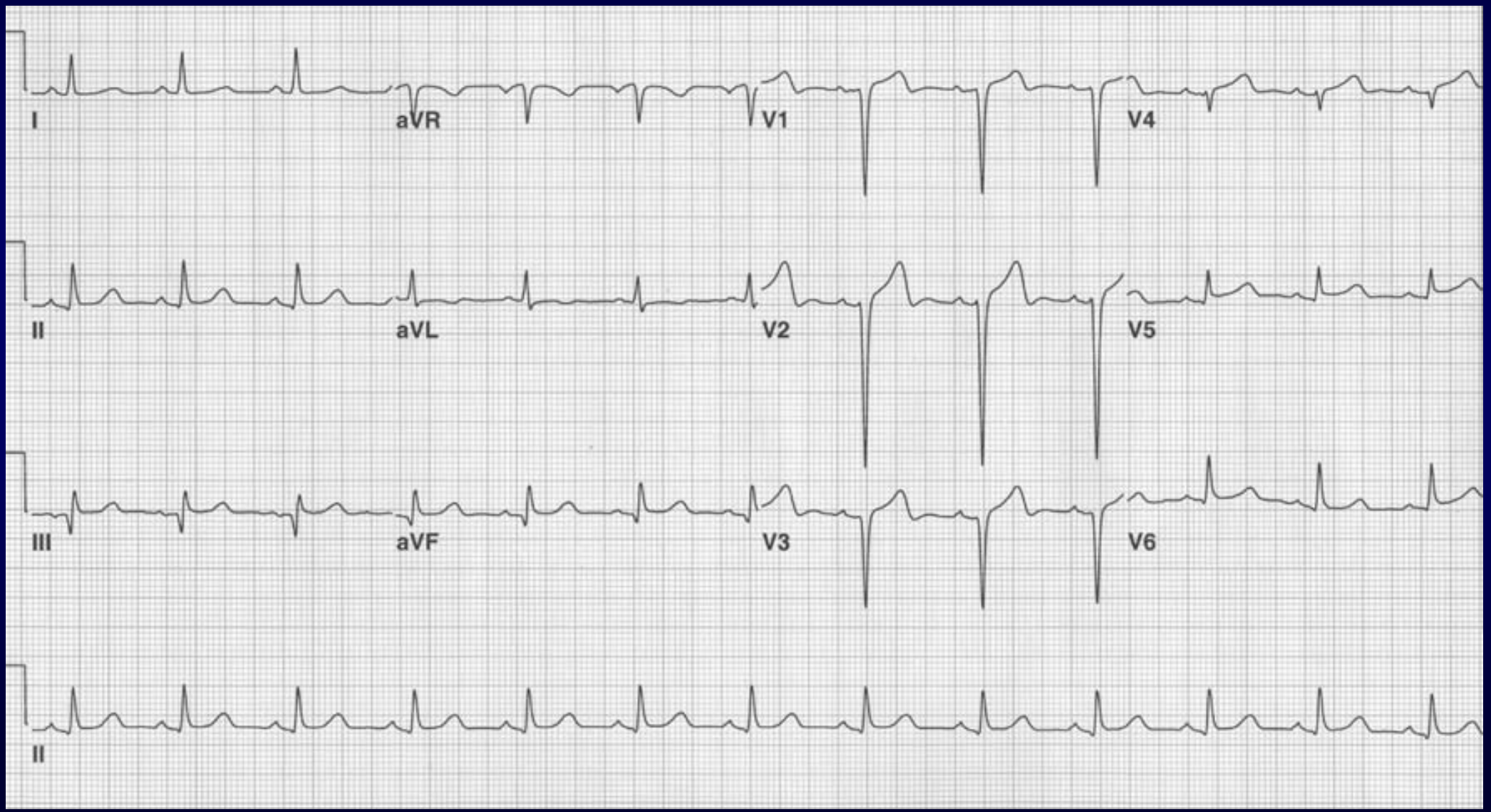
Lab : Initial CKMB 3.04 ng/mL, Troponin-T <0.01 ng/mL

=> peak CKMB 236.2 ng/mL

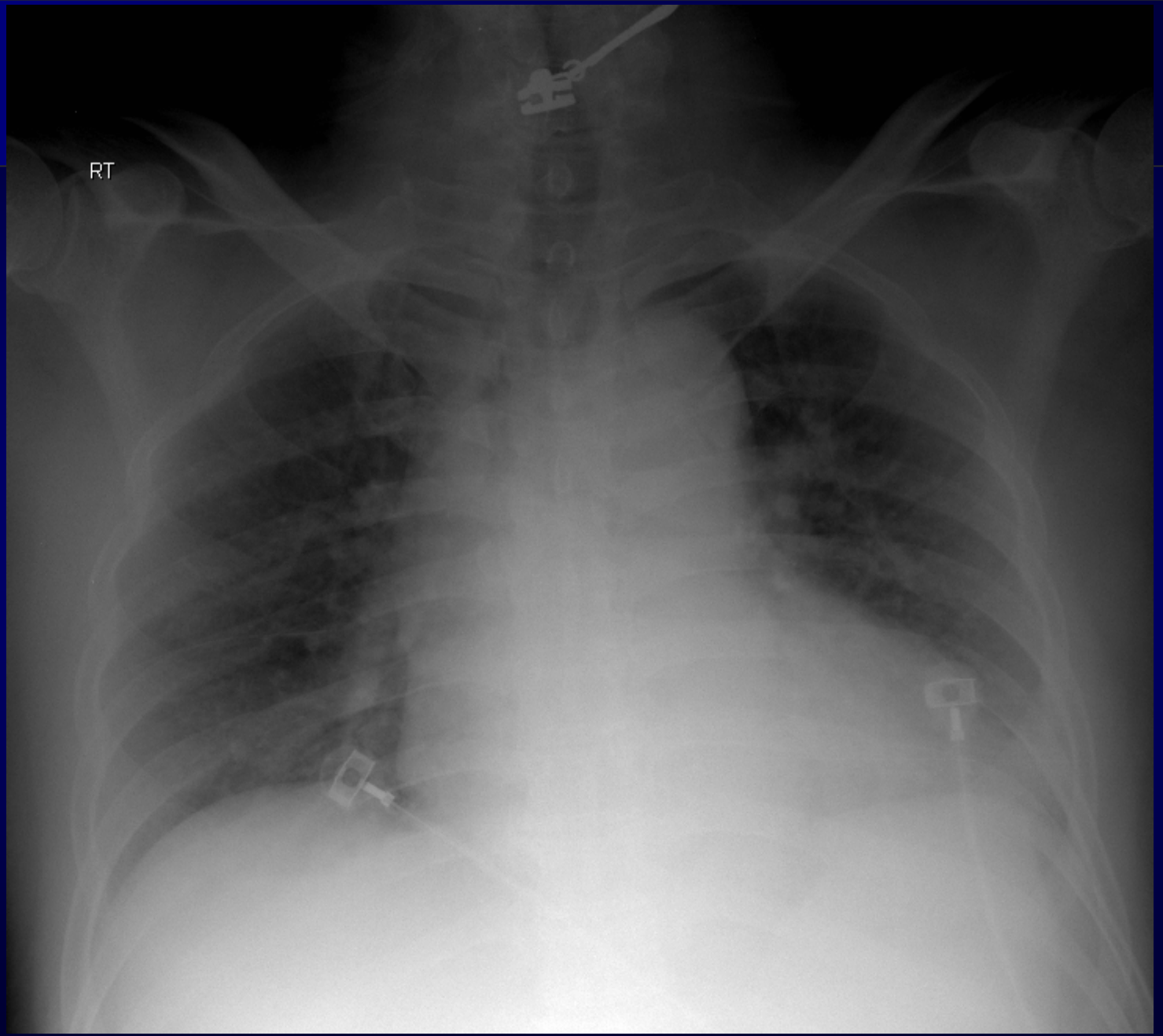
AC Glucose 182 mg/dL, HbA1c 7.2%

T.chol/TG/HDL/LDL 180/150/48/102 mg/dL

EKG : Initial in ER



Chest AP

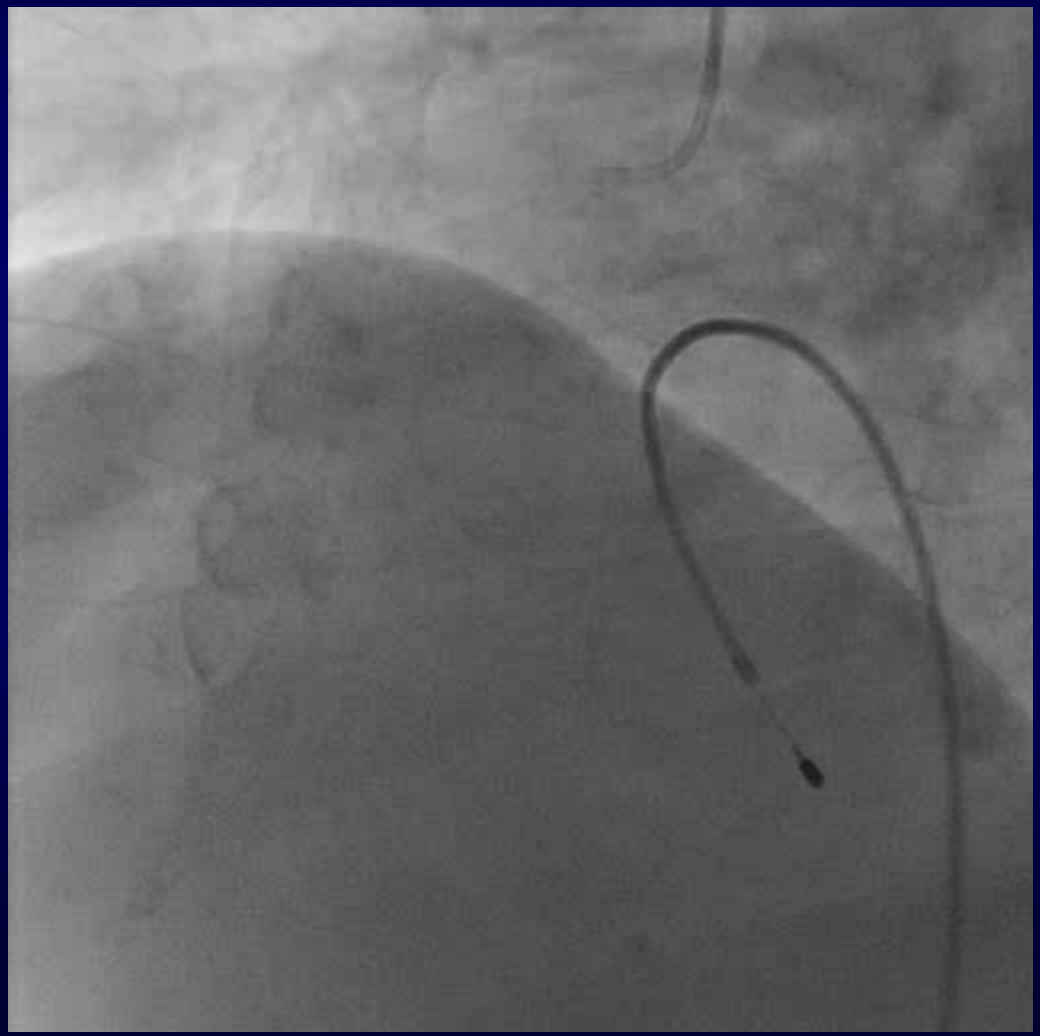


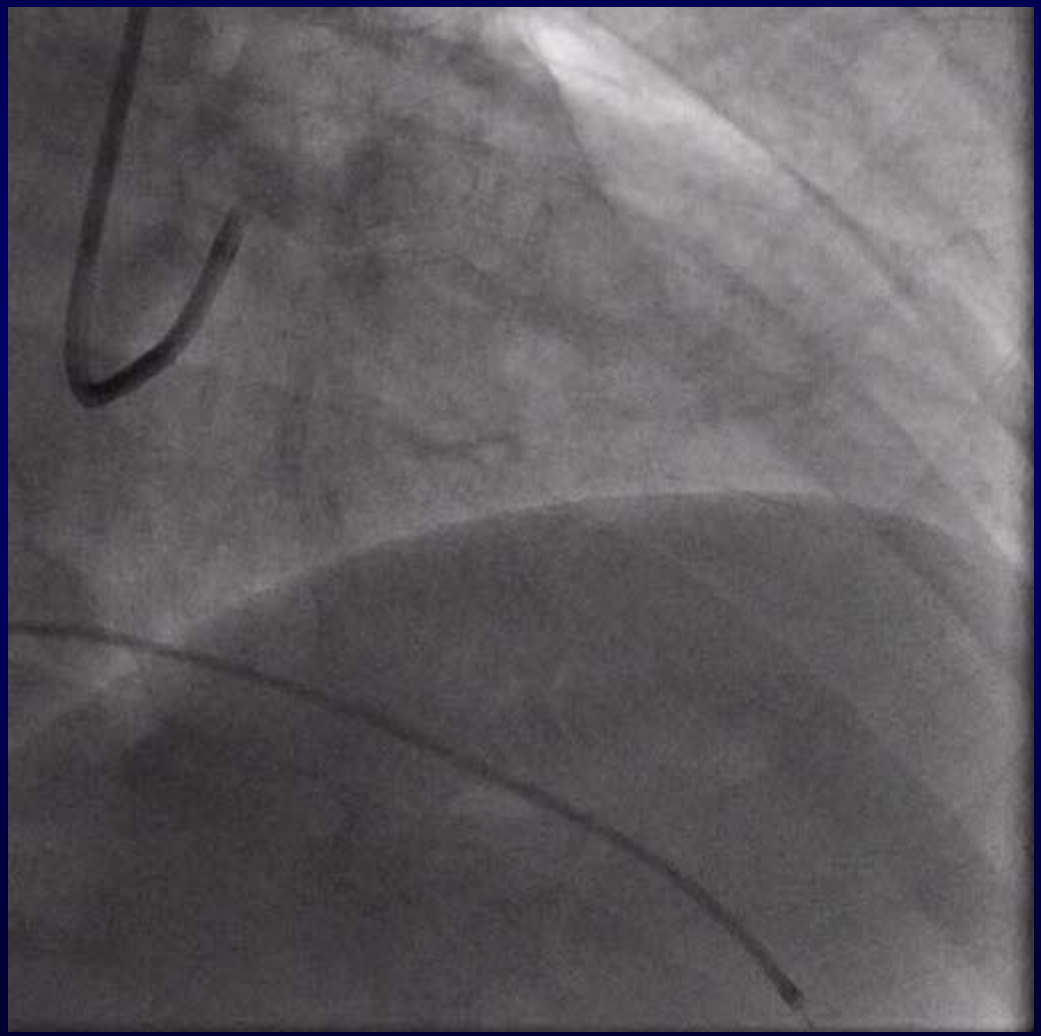
Management in ER

- Aspirin 250 mg p.o.
- Clopidogrel 300 mg p.o.
- Nasal O_2
- Heparin 4000 IU i.v.
- **Tenecplase (TNK) 40 mg i.v. bolus**

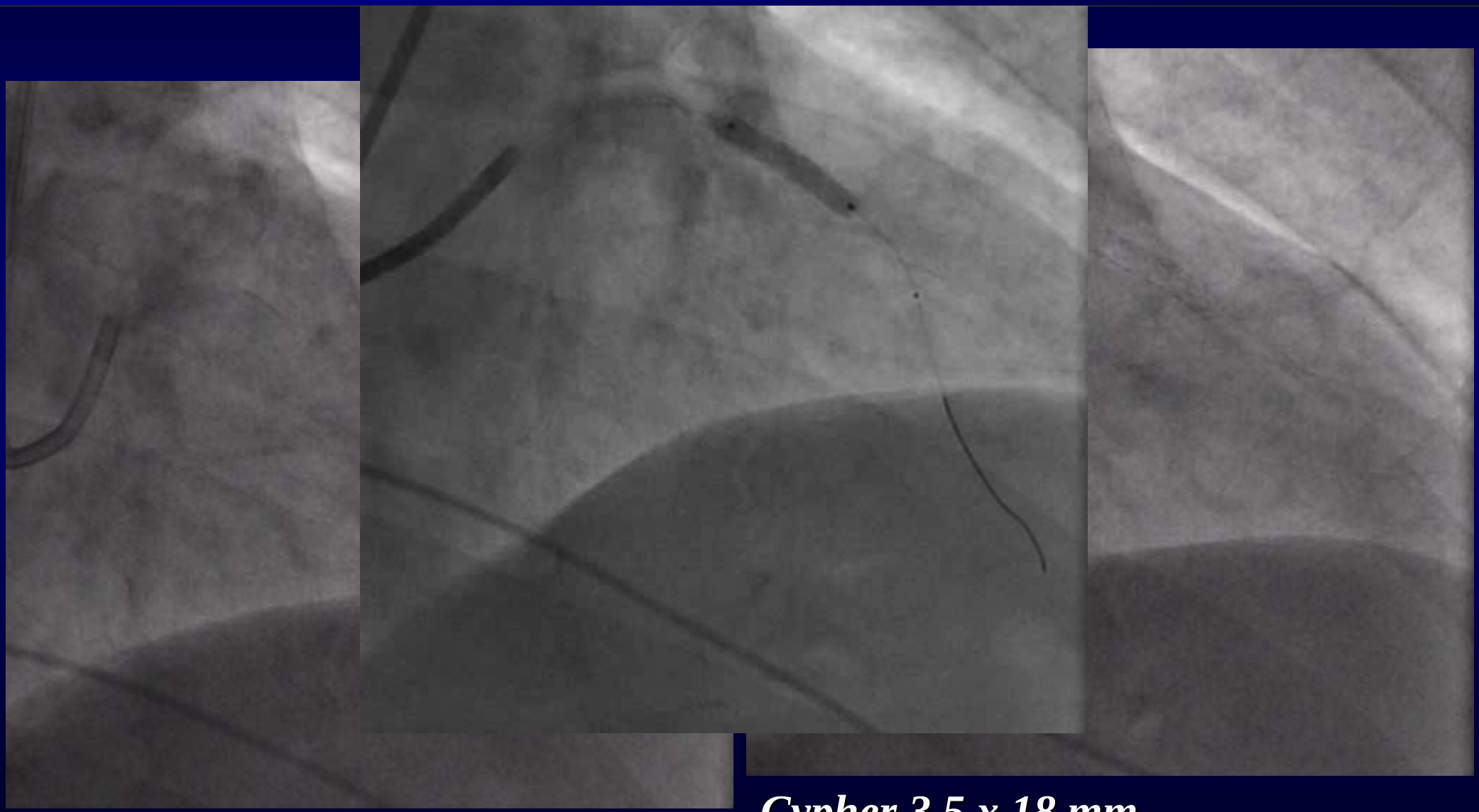
=> Cath room

Coronary Angiography



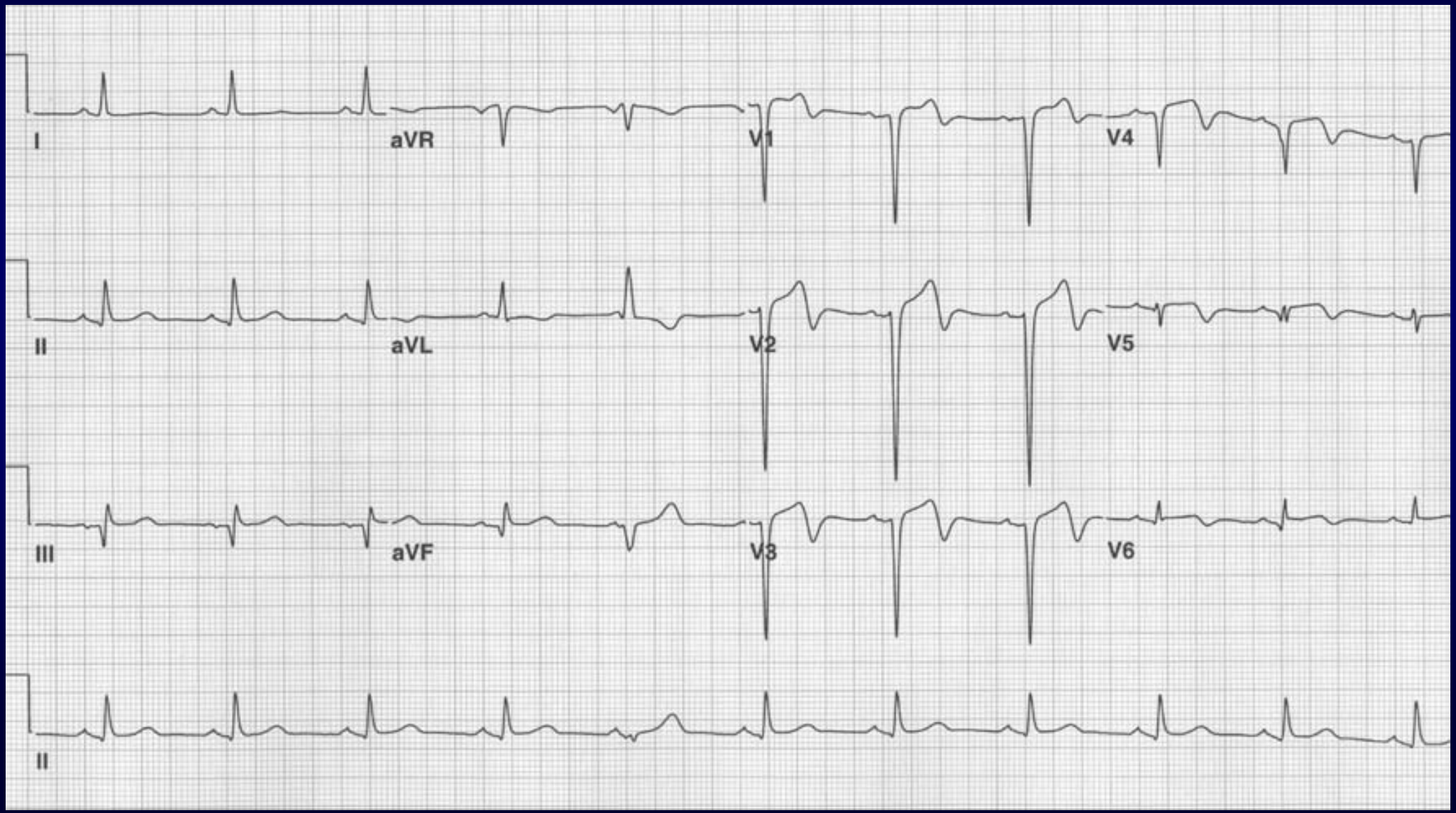


PCI with protection device

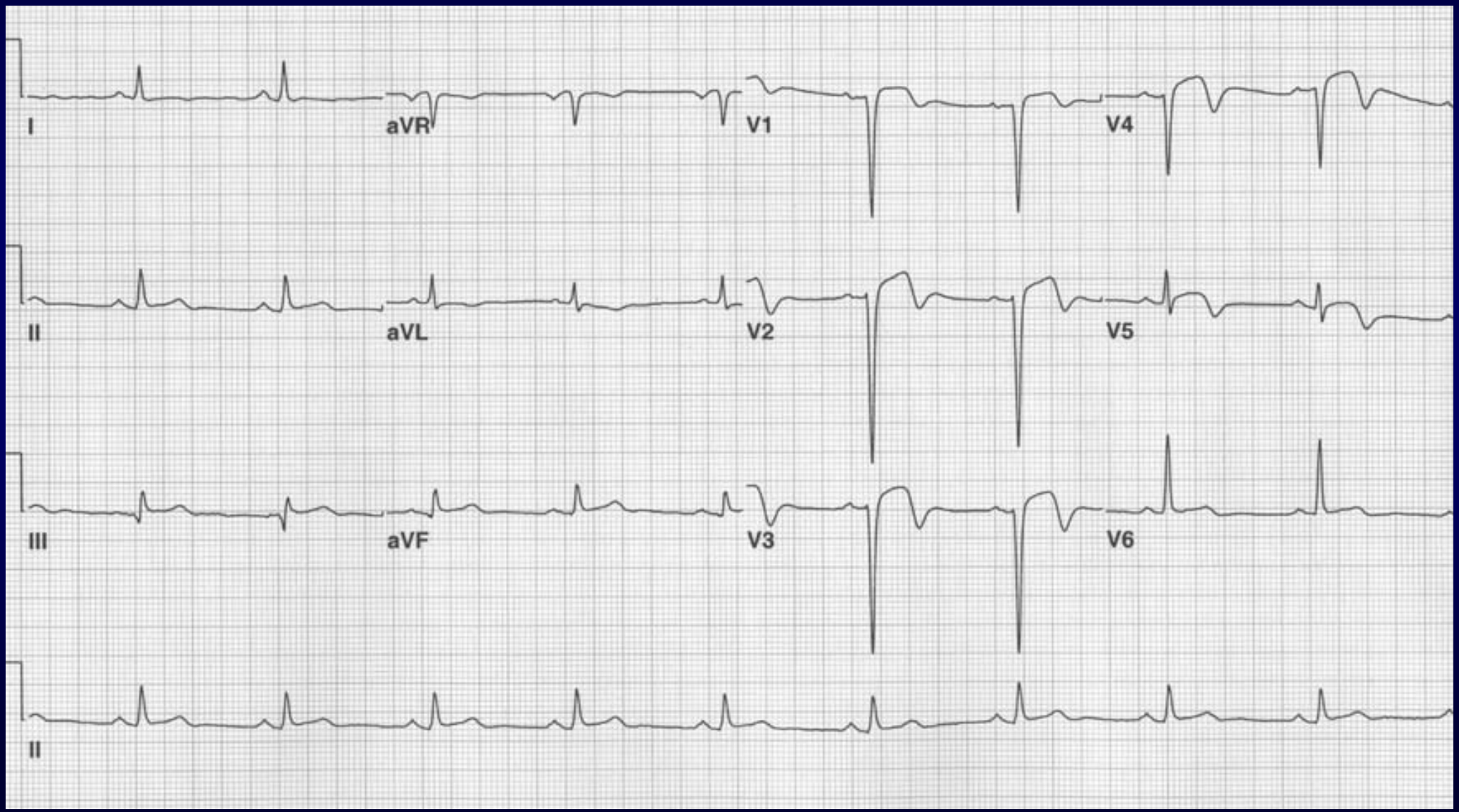


Cypher 3.5 x 18 mm

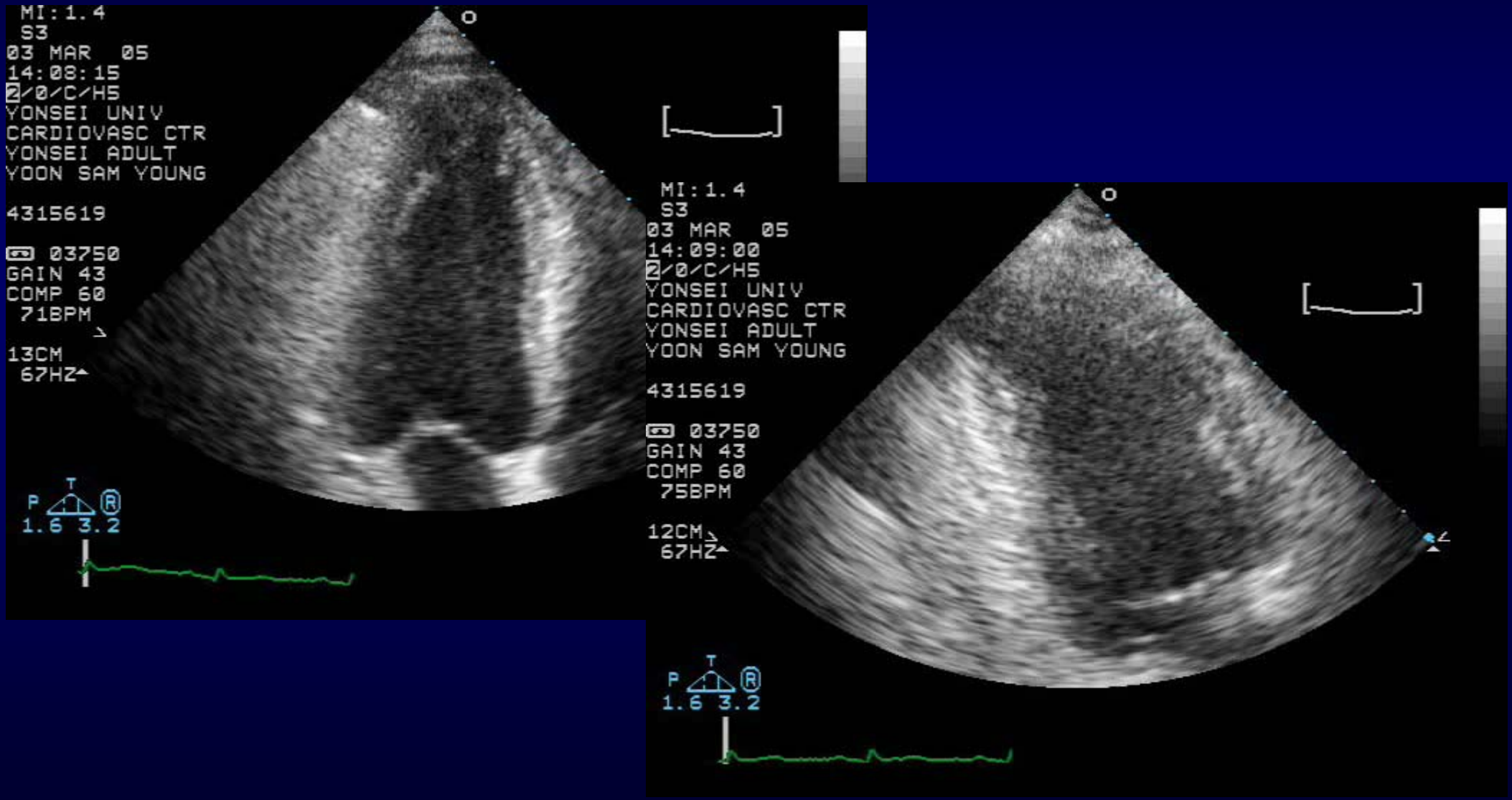
EKG : 90 min after PCI



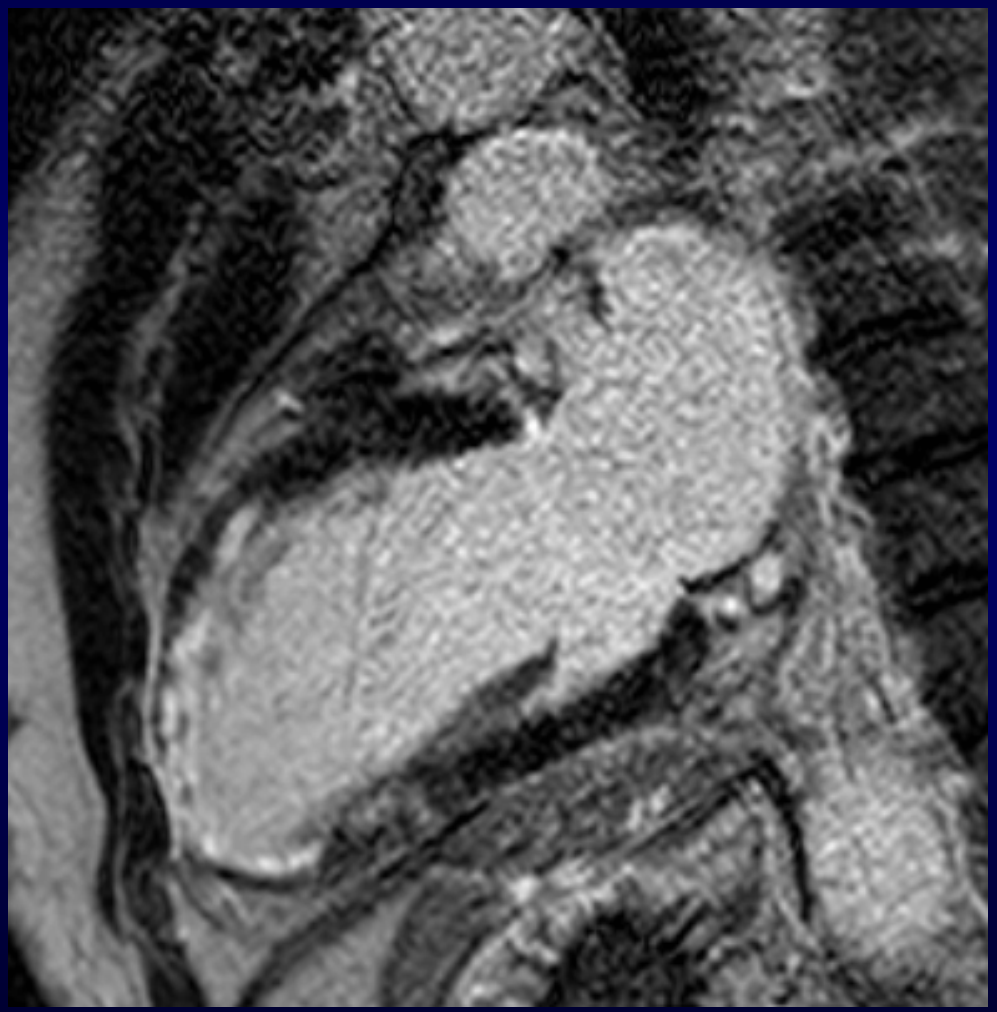
EKG : at discharge

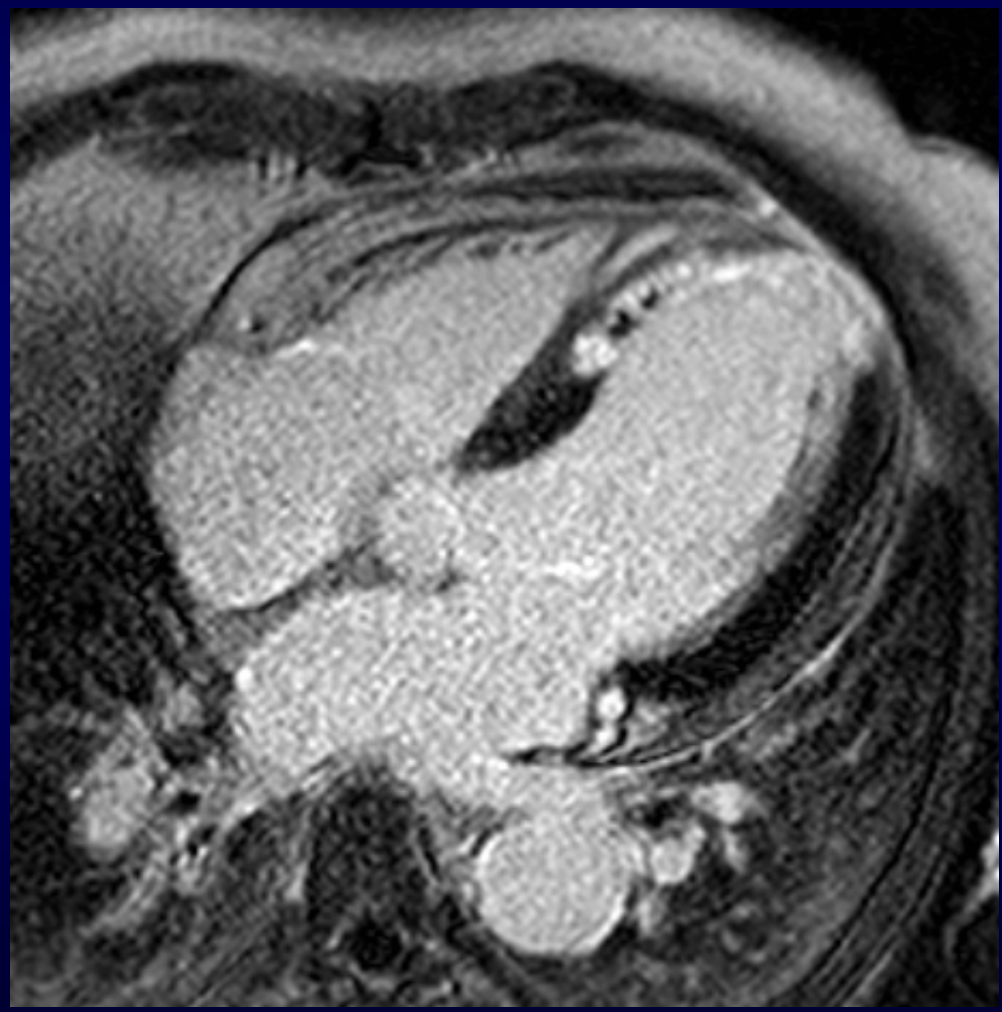


Echocardiography



Heart MRI





Medication

- Aspirin 100 mg # 1
- Clopidogrel 75 mg # 1
- Propanolol 120 mg # 3
- Captopril 150 mg # 3
- Atorvastatin 10 mg #1
- Glimepiride 2mg #1

Why facilitated PCI is needed ?

- **"Time is myocardium"**

  Door-to-balloon time < 90 min

  But, US NRMI data

  → 111 min for all, 198 min for transfer

- **Importance of complete restoration of flow**

  TIMI 3 after thrombolysis → 50~60%

→ Pharmacoinvasive recanalization !

Dauerman and Sobel. J Am Coll Cardiol 2003;42:646

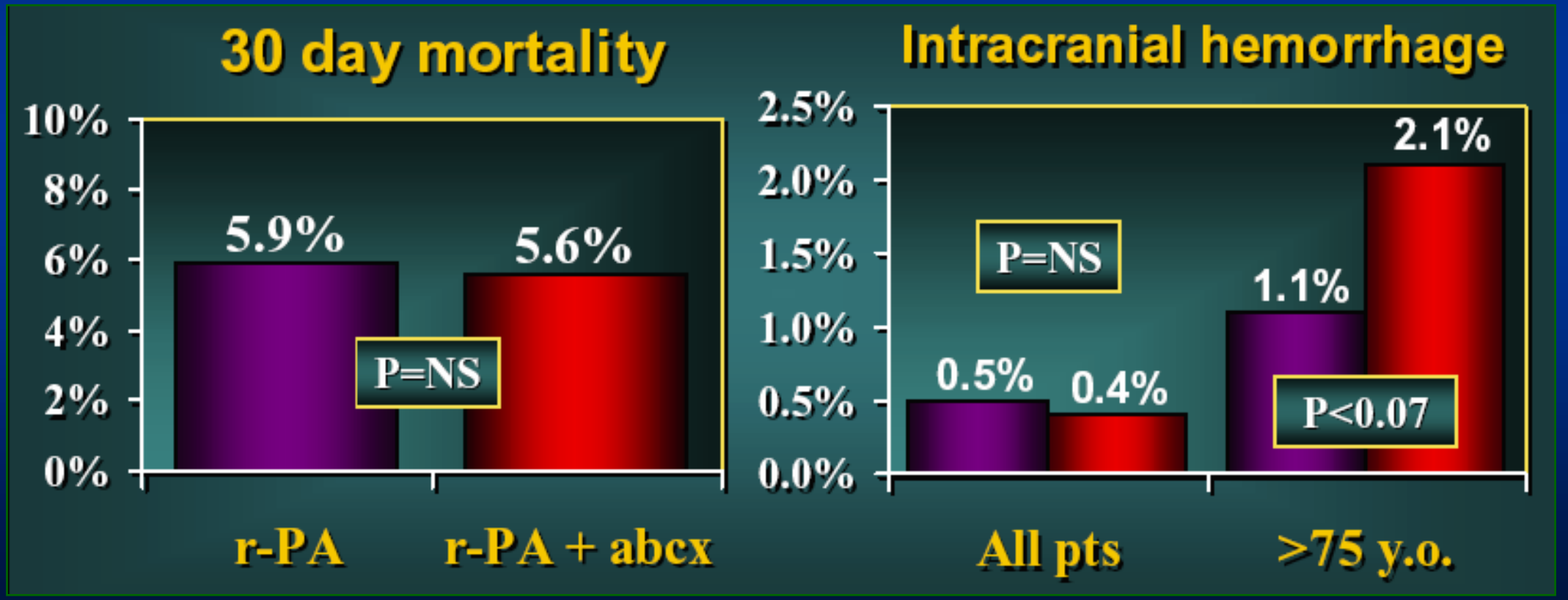
Potential benefit of facilitated PCI

	PACT	*SPEED*	*TIMI 10B/14B*
Publication	1999	2000	2001
Total (N)	606	528	1,938
Early PCI (N)	302	323	719
Rescue PCI (%)	39	34	41
Facilitated PCI (%)	61	64	59
Pre-PCI lytic	t-PA 50mg	Reteplase + Abciximab	TNK t-PA or t-PA t-PA ± abciximab
Benefit of early PCI	TIMI 3 flow 15% → 33%	Decrease in MACE (16% vs 5.6%)	54% reduction in death or MI
Major bleeding	Not increased	Not increased	Not increased

Dauerman and Sobel. J Am Coll Cardiol 2003;42:646

GUSTO-V
Reteplase + Abciximab

16,588 pts with AMI < 6h
Full dose r-PA vs half dose r-PA + abciximab

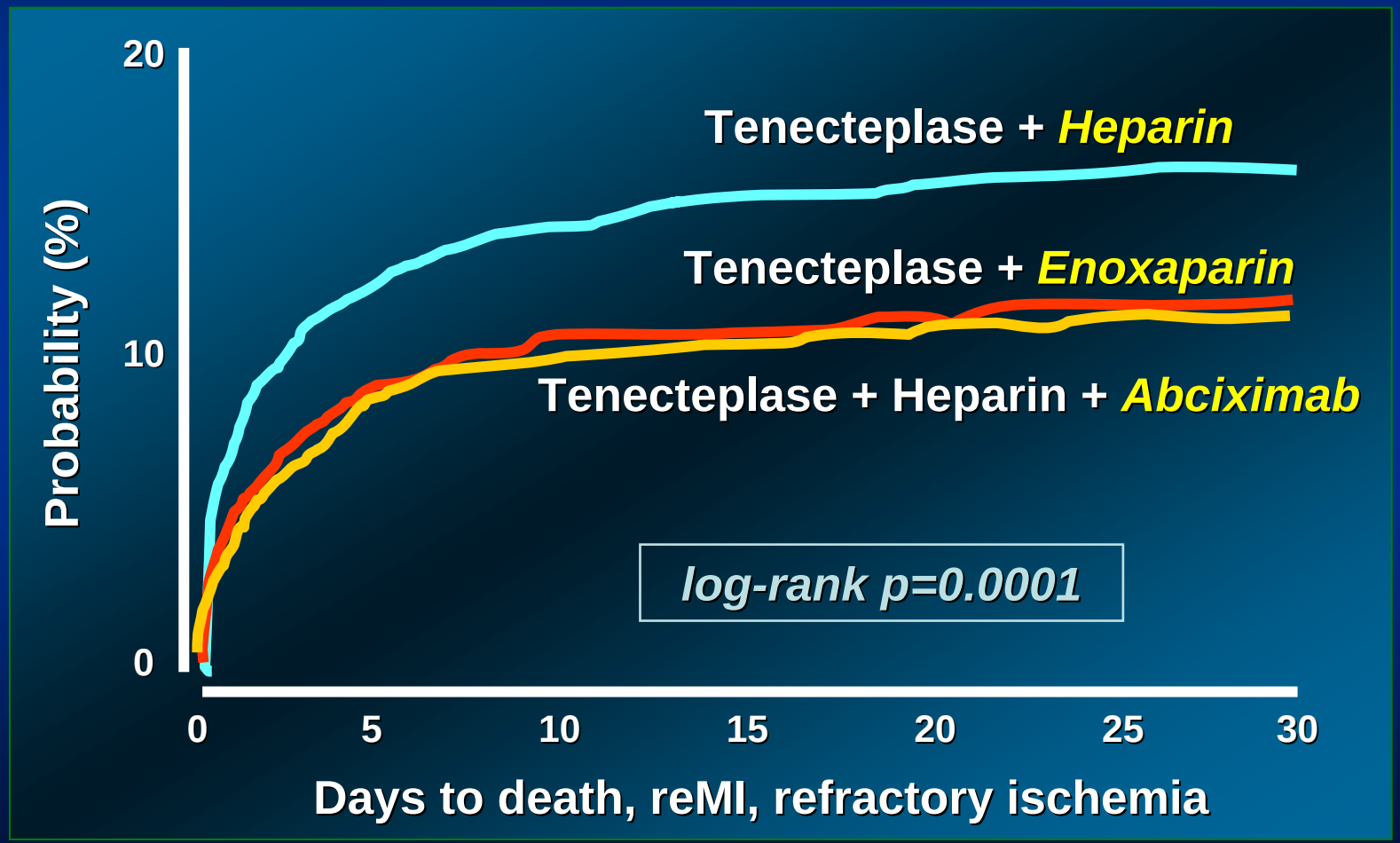


GUSTO-V investigators. Lancet 2001;357:1905

ASSENT-3

Tenecteplase + LMWH / Abciximab / Heparin

6,095 pts with AMI < 6h



Primary endpoints
- Death
- Recurrent MI
- Refractory ischemia

Bleeding (non-cerebral)
- Abciximab 39.7 %
- Enoxaparin 25.6 %
- Heparin 21.1 %

ASSENT-3 investigators. Lancet 2001;358:605

Case 4

M / 60

1874435

C.C : Chest pain at rest

D : for 2 hr

PHx : HiBP(-), DM (-), Smoking (-)

Hypercholesterolemia (+) => no med

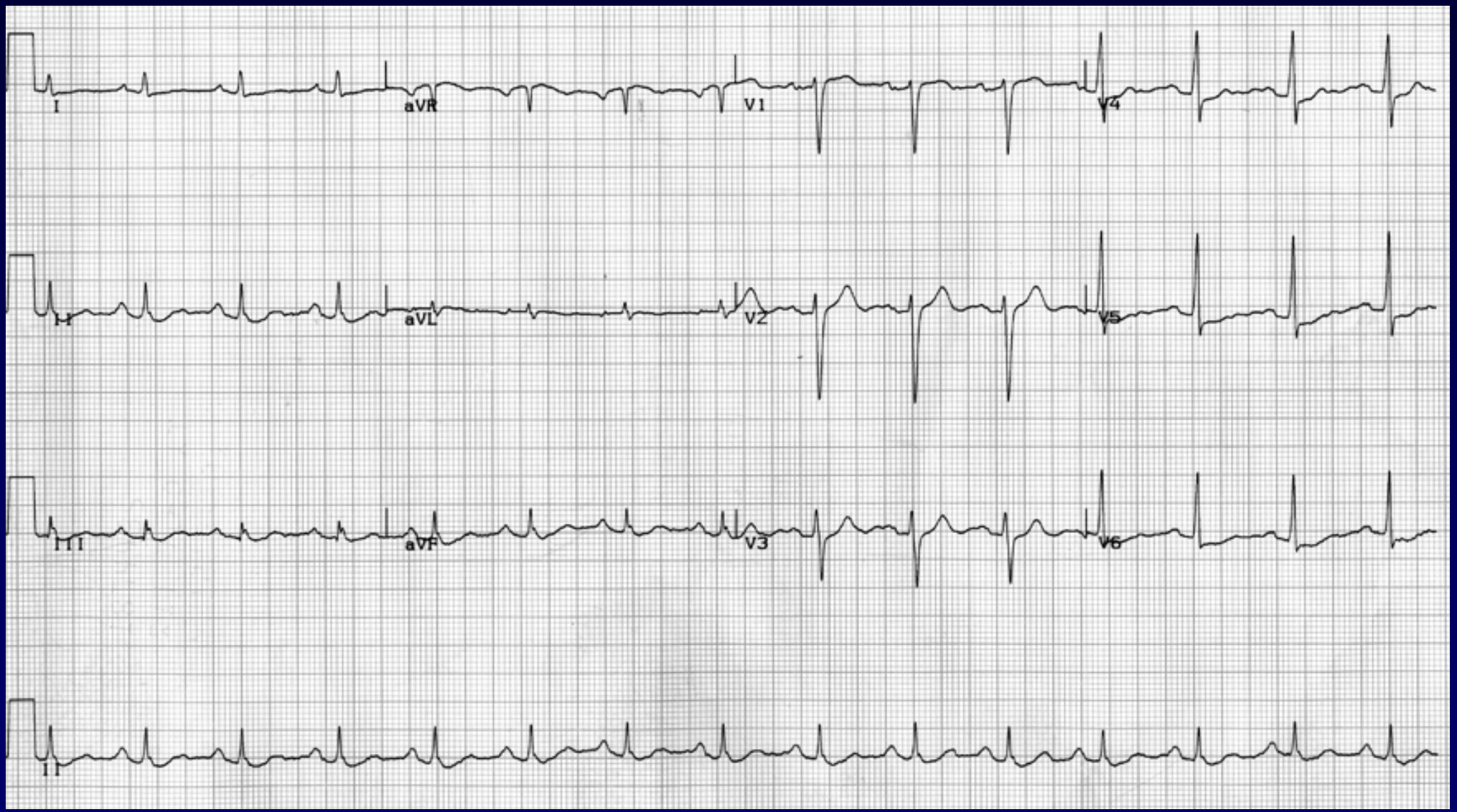
P/Ex : BP 150/100 mmHg PR 87/min

Lab : CKMB : initial 20.5 ng/mL=> peak 58.55 ng/mL

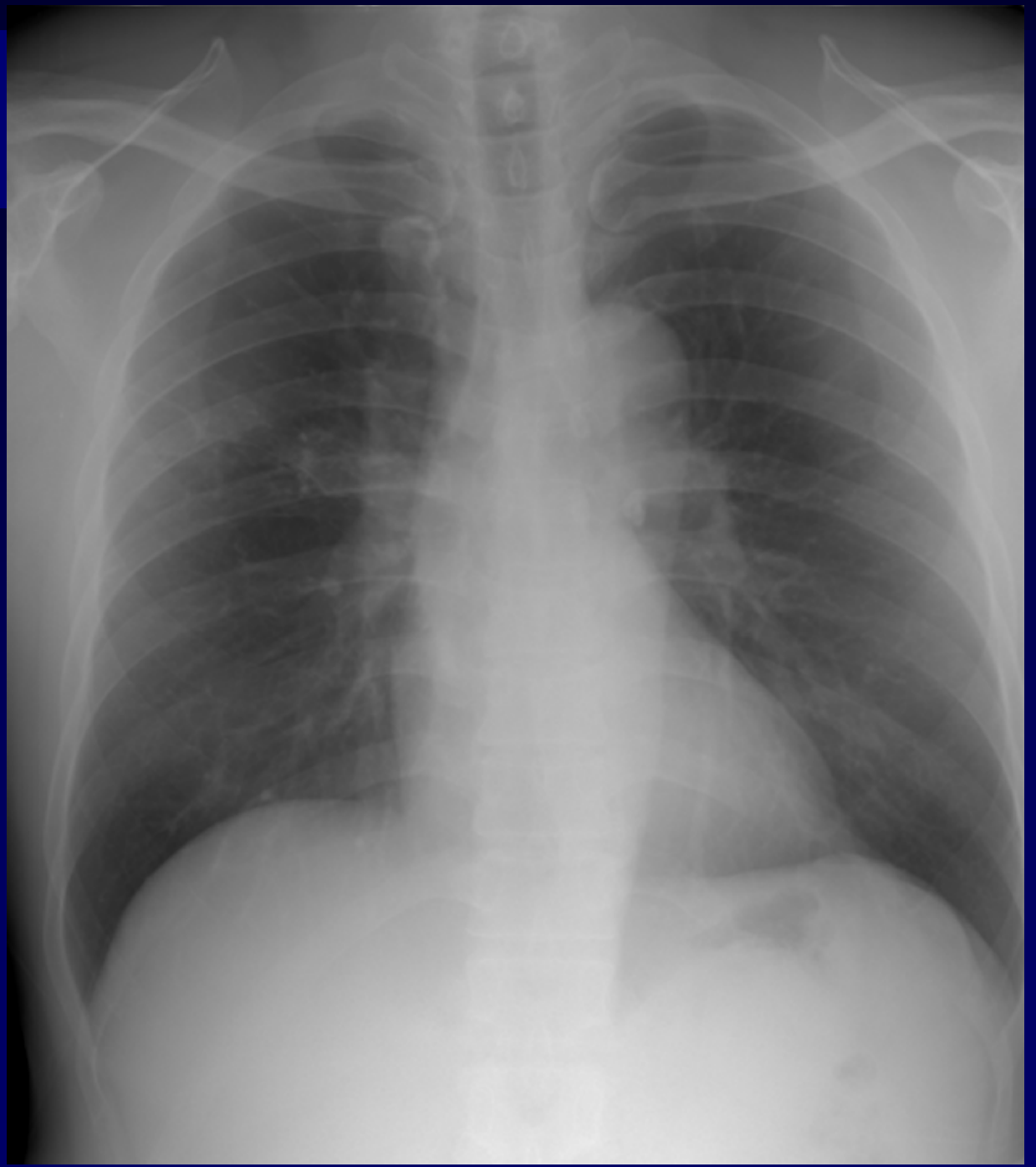
Tn-T 0.128 ng/mL, hsCRP 0.353 mg/L

T.chol/TG/HDL/LDL 153/219/32/101 mg/dL

EKG : Initial in ER



Chest PA

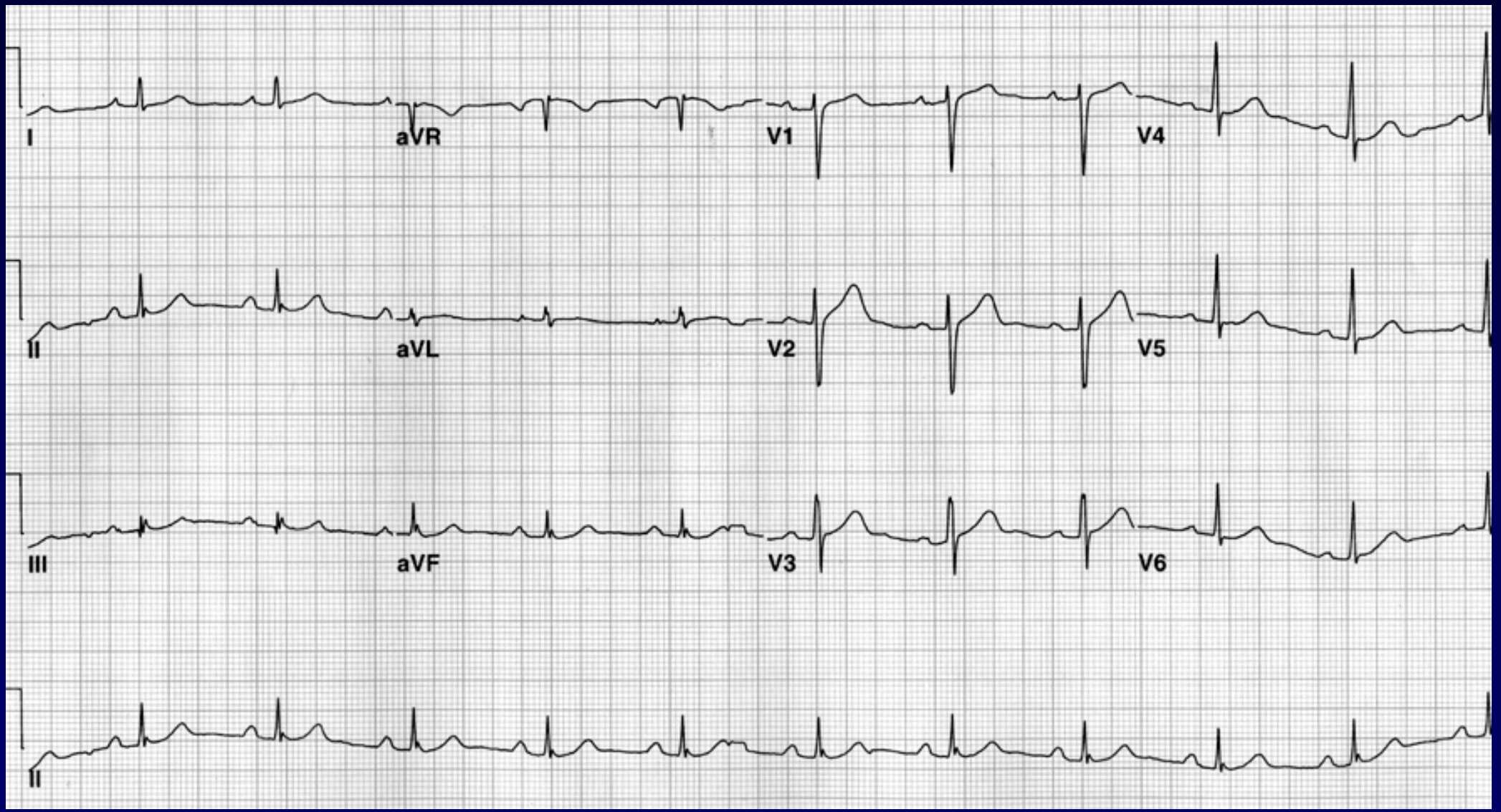


Management in ER

- Aspirin 250 mg
- Clopidogrel 300 mg
- Nasal O_2
- Enoxaparin 60 mg s.q. bid
- **Tirofiban (Agrastat) 0.4 μg/kg/min i.v. bolus**

  => 0.1 μg/kg/min i.v. for 48 hr

EKG : 8 hours later



Echocardiography

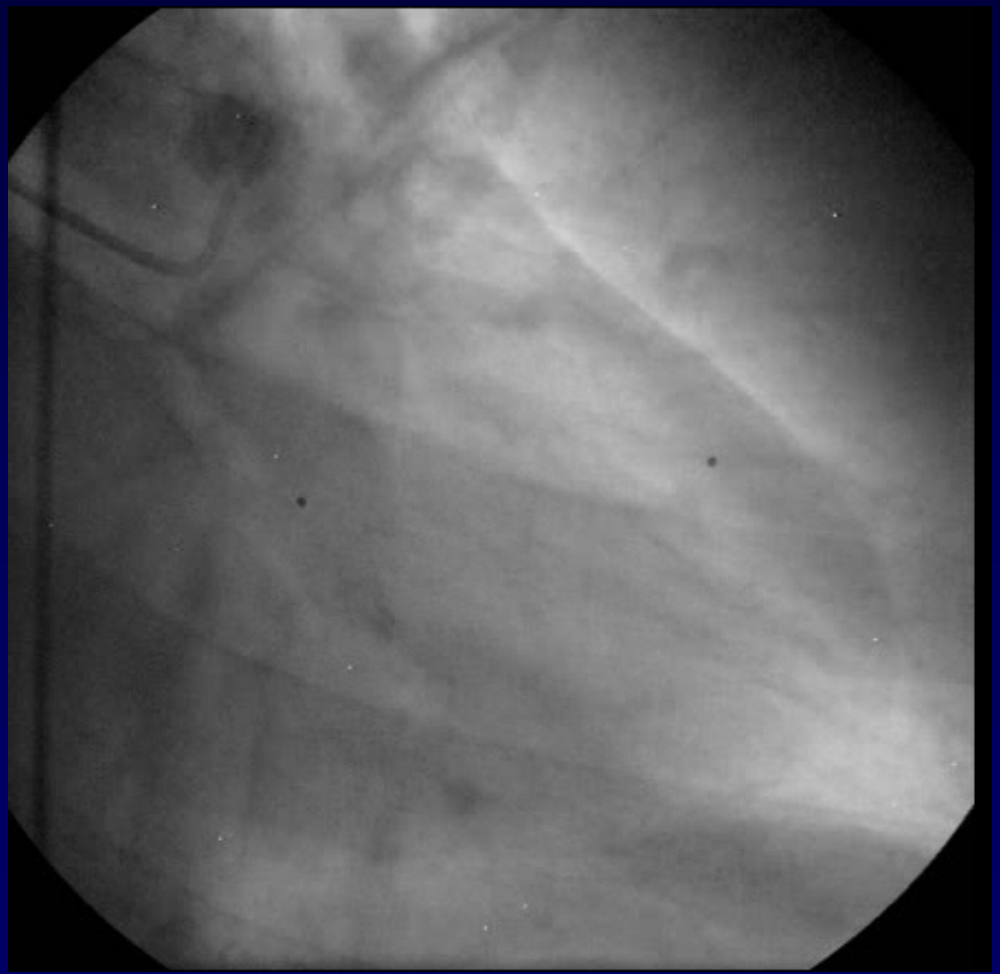
Normal sized cardiac chambers

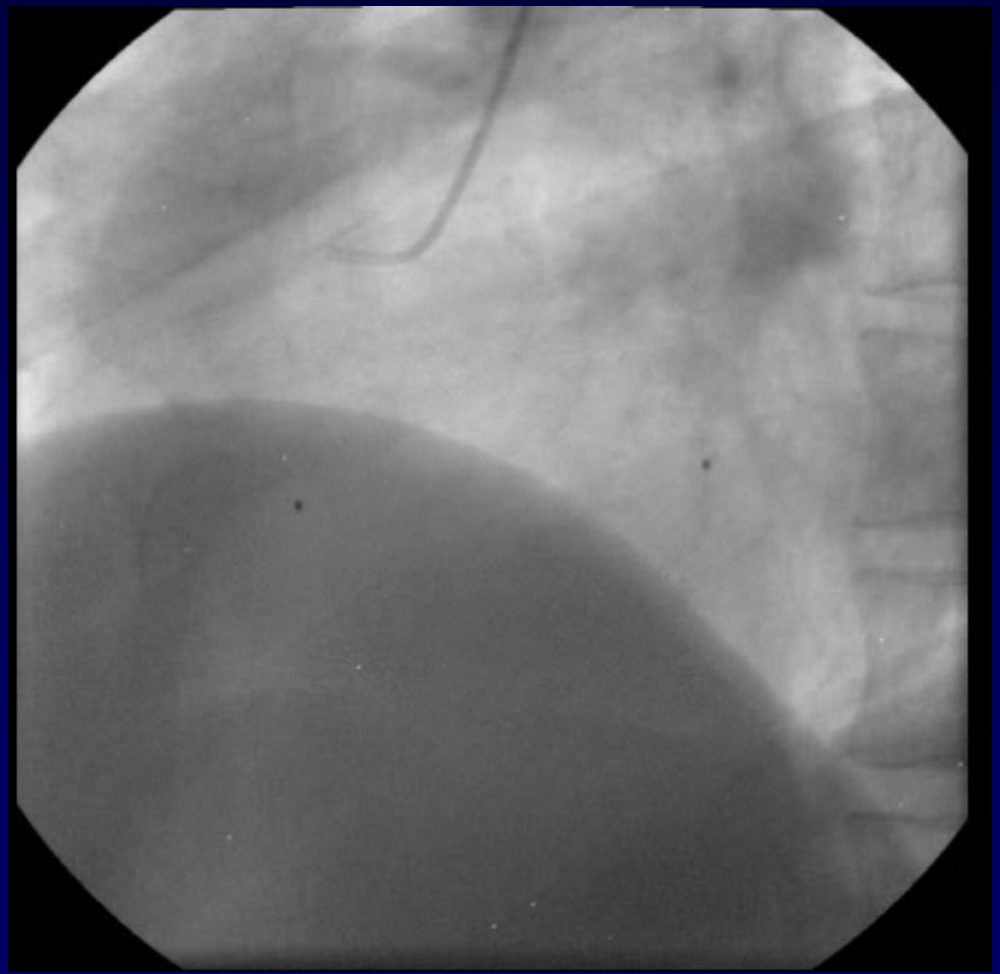
No regional wall motion abnormality

LVEF = 73%

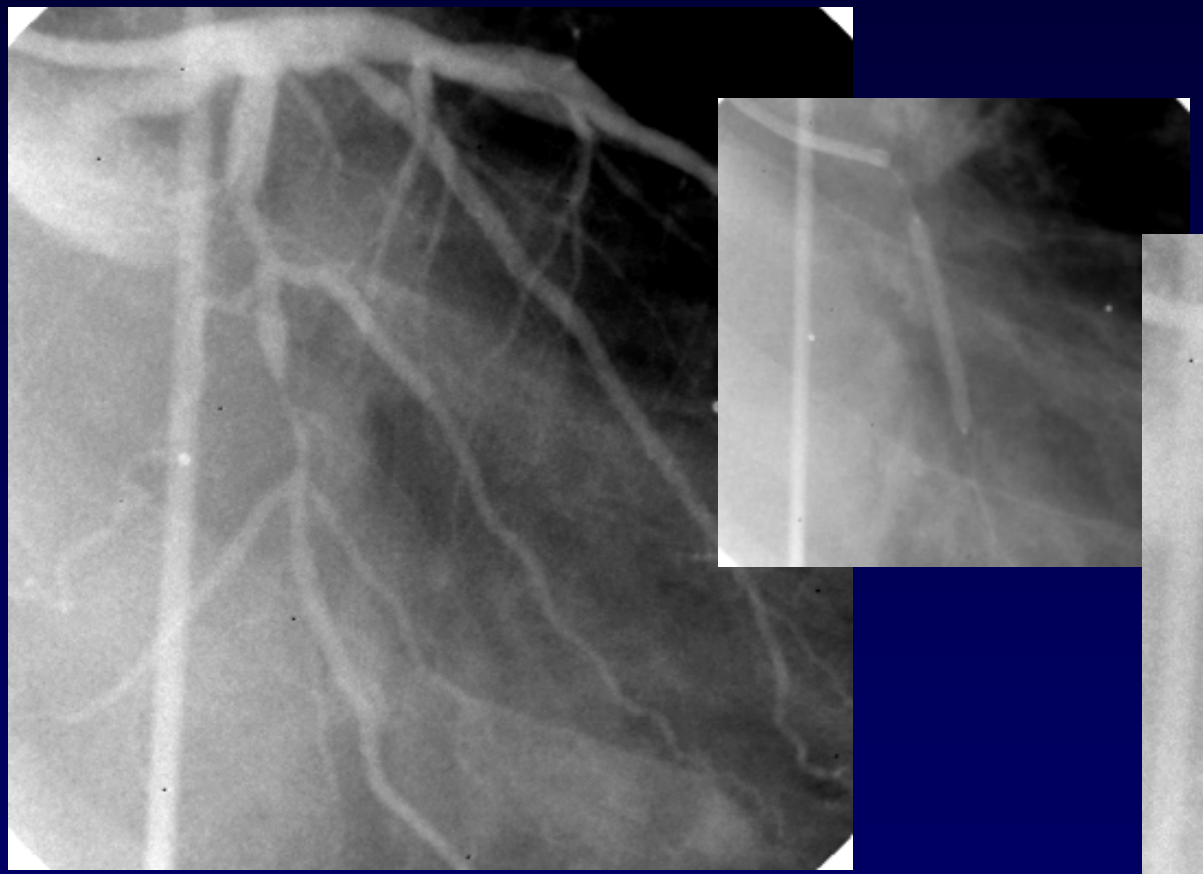
Coronary Angiography

HD #3

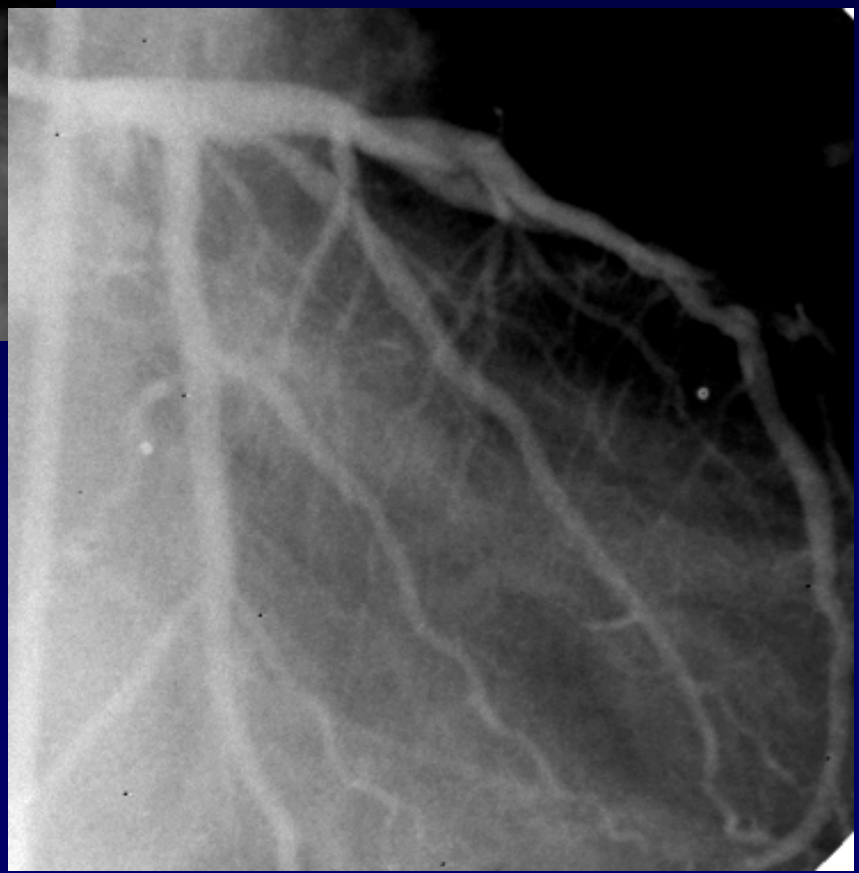




PTCA with Stenting

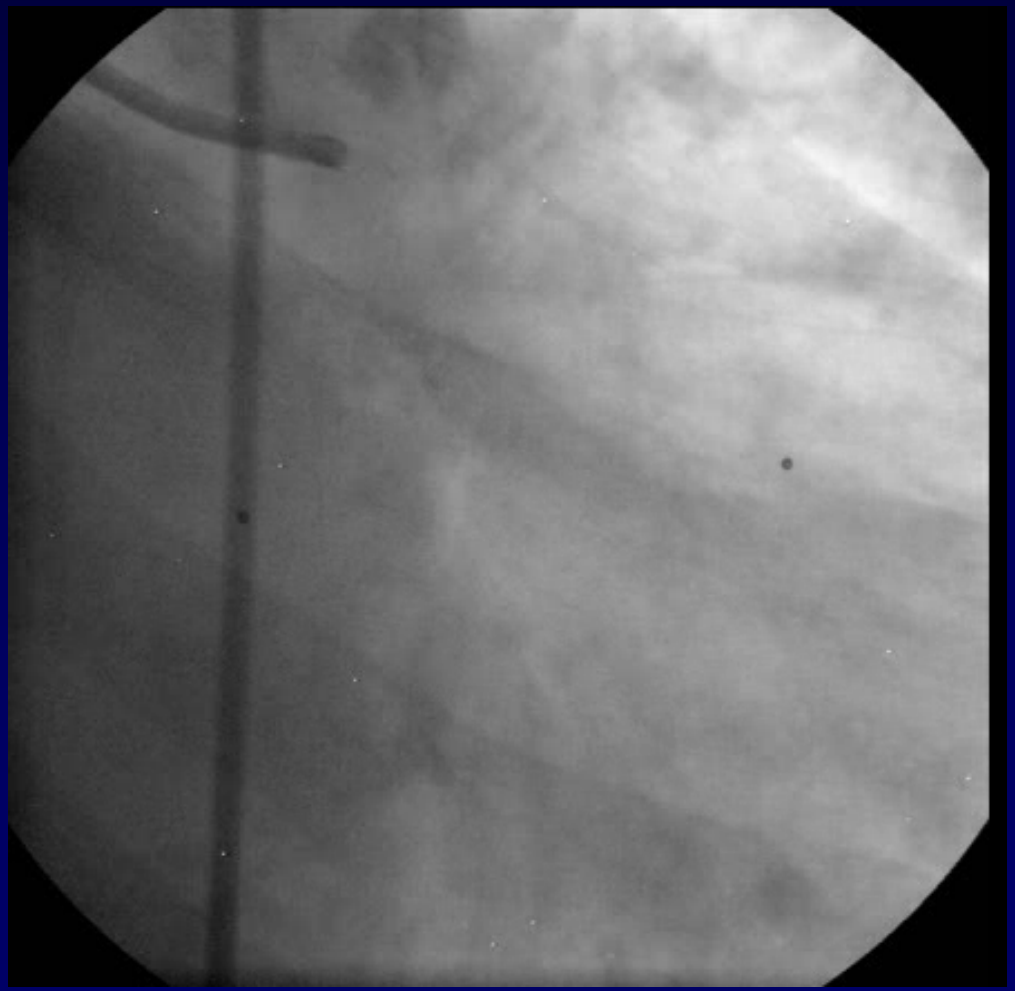


Cypher 2.75 x 33 mm

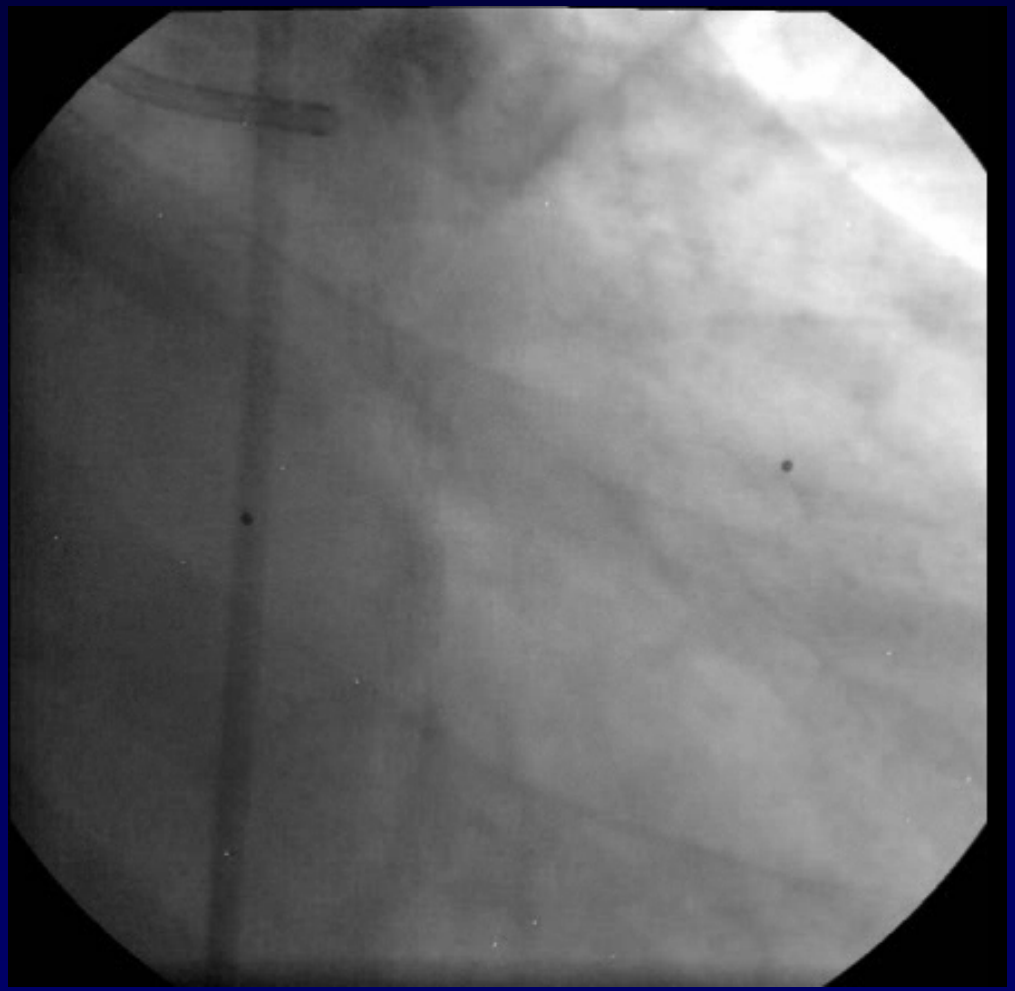


PTCA with Stenting

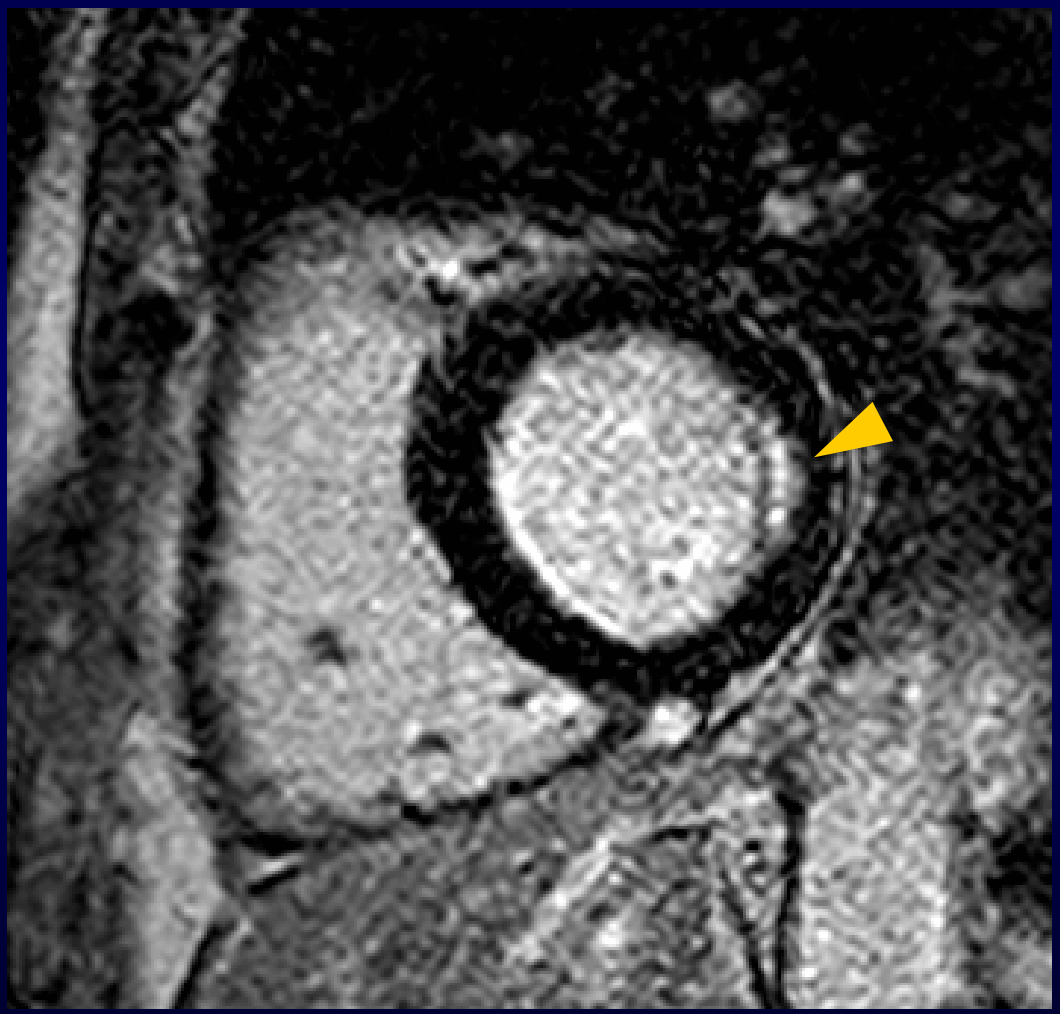
Pre

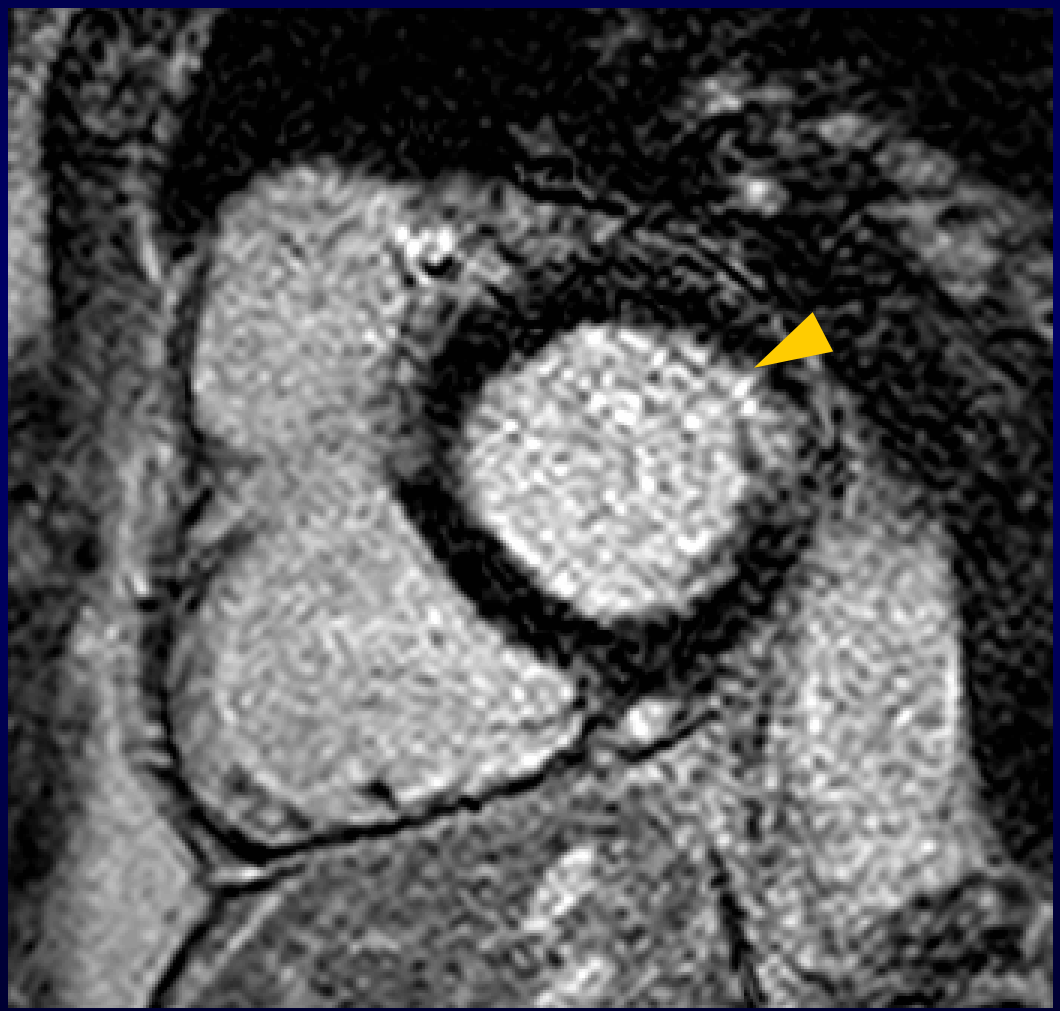


Post stenting



Heart MRI

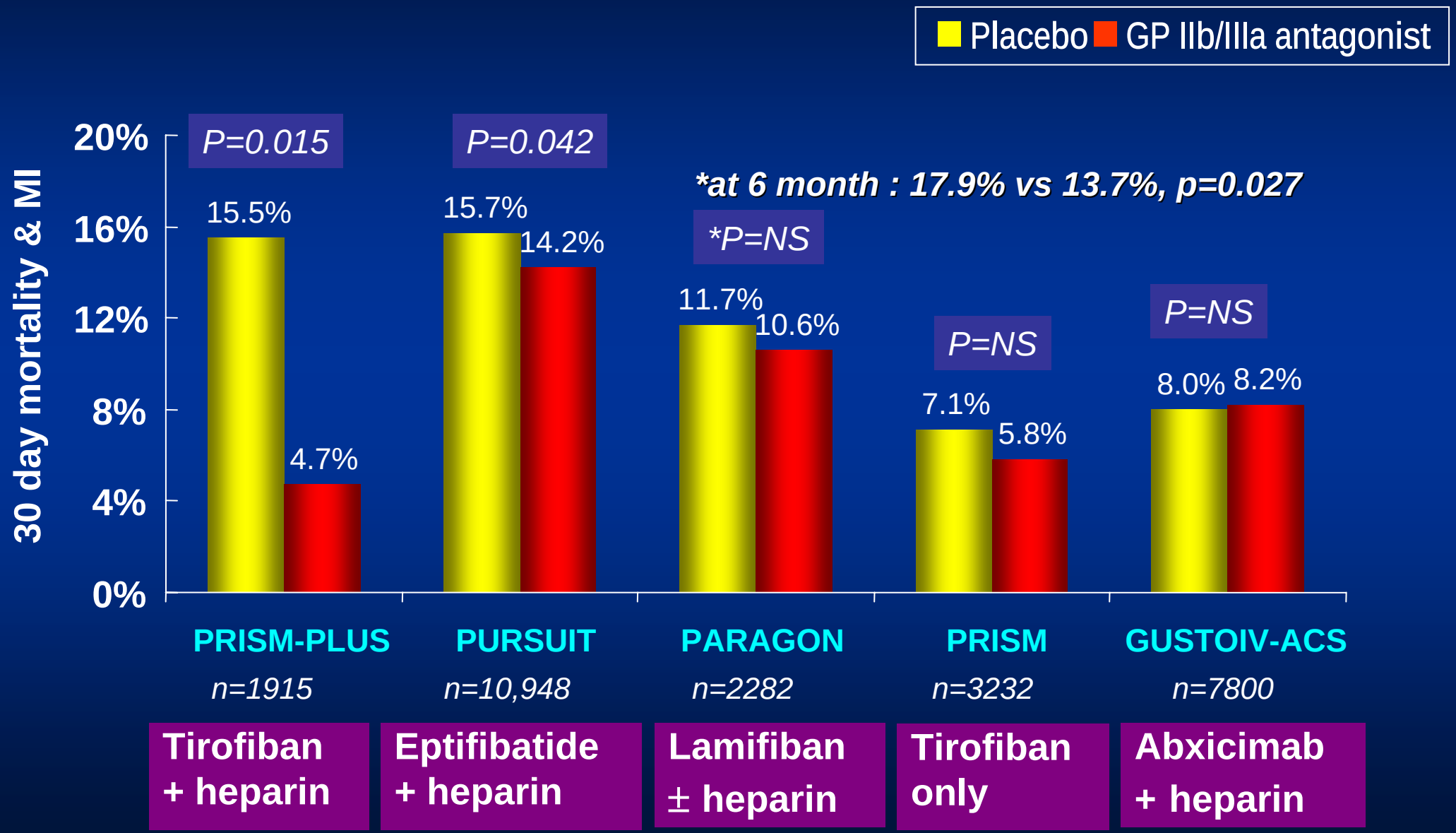




Medication

- Aspirin 100 mg # 1
- Clopidogrel 75 mg # 1
- Propanolol 60 mg # 3
- Captopril 150 mg # 3
- Atorvastatin 10 mg #1

GP IIb/IIIa antagonists in UA/NSTEMI

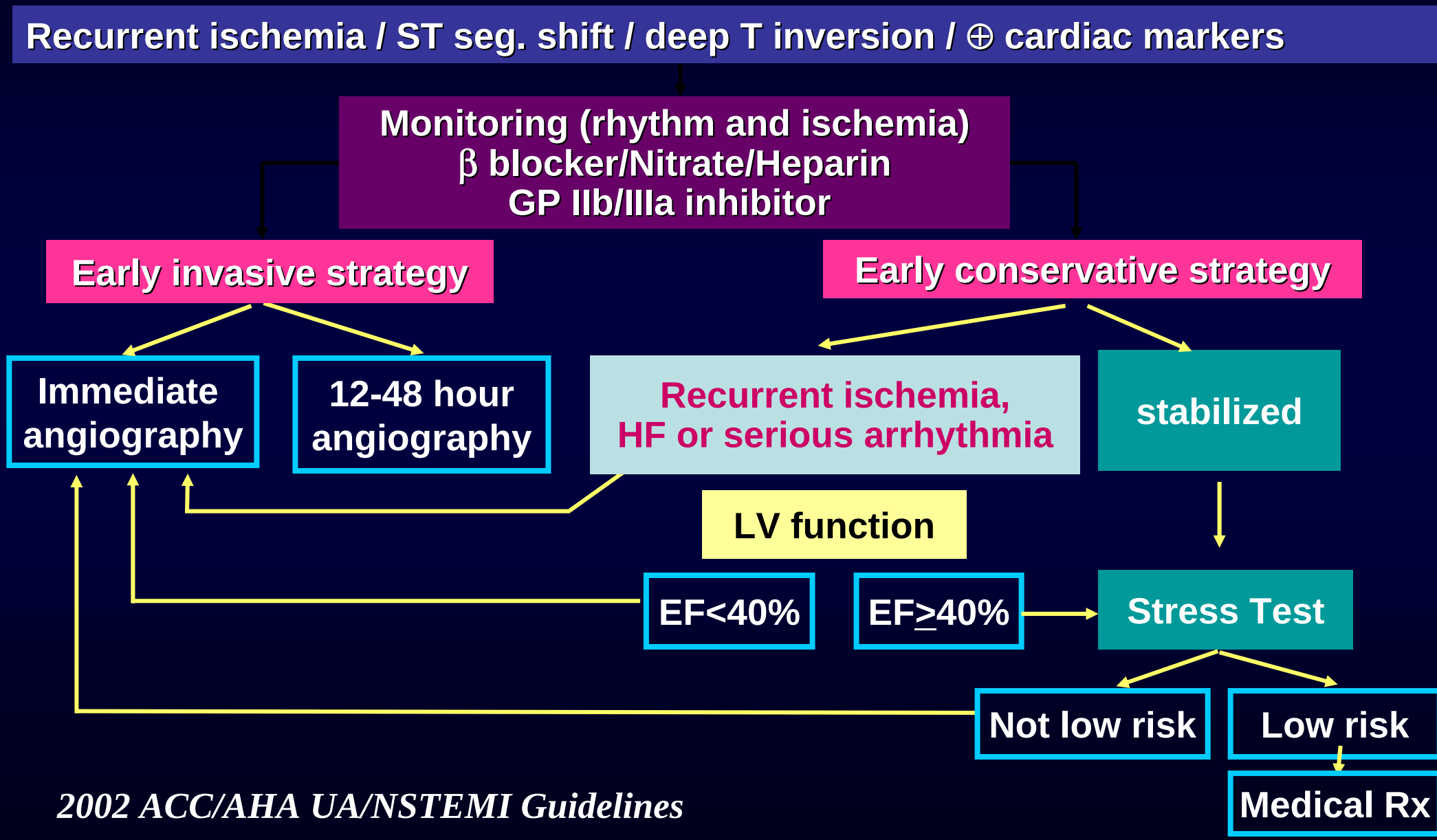


GP IIb/IIIa Trials: Pooled Analysis

30-Day Death or MI

Chew & Moliterno JACC 2000; 36:2028

Acute ischemia pathway



2002 ACC/AHA UA/NSTEMI Guidelines

Case 5

F / 77

#3256042

CC : Severe chest pain developed during sleep

D : 3 hours

Risk factors : HTN (+) for 10yrs, on med

DM (-)

PHx : Bronchial asthma for 5 yrs

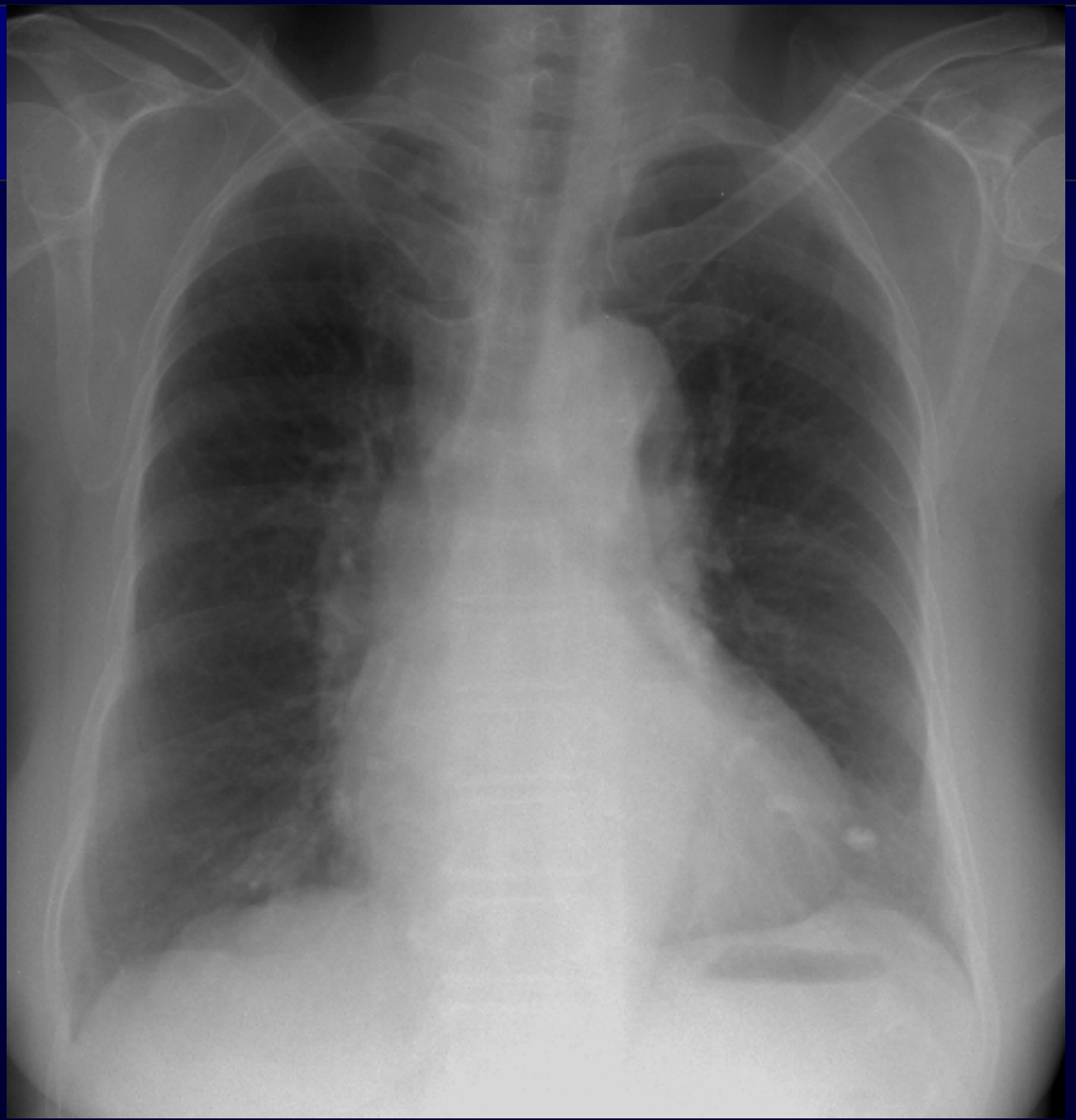
P/Ex : BP 145/77, PR 68/min

Lab : Initial CKMB 71.22 ng/mL, Troponin-T 0.448 ng/mL

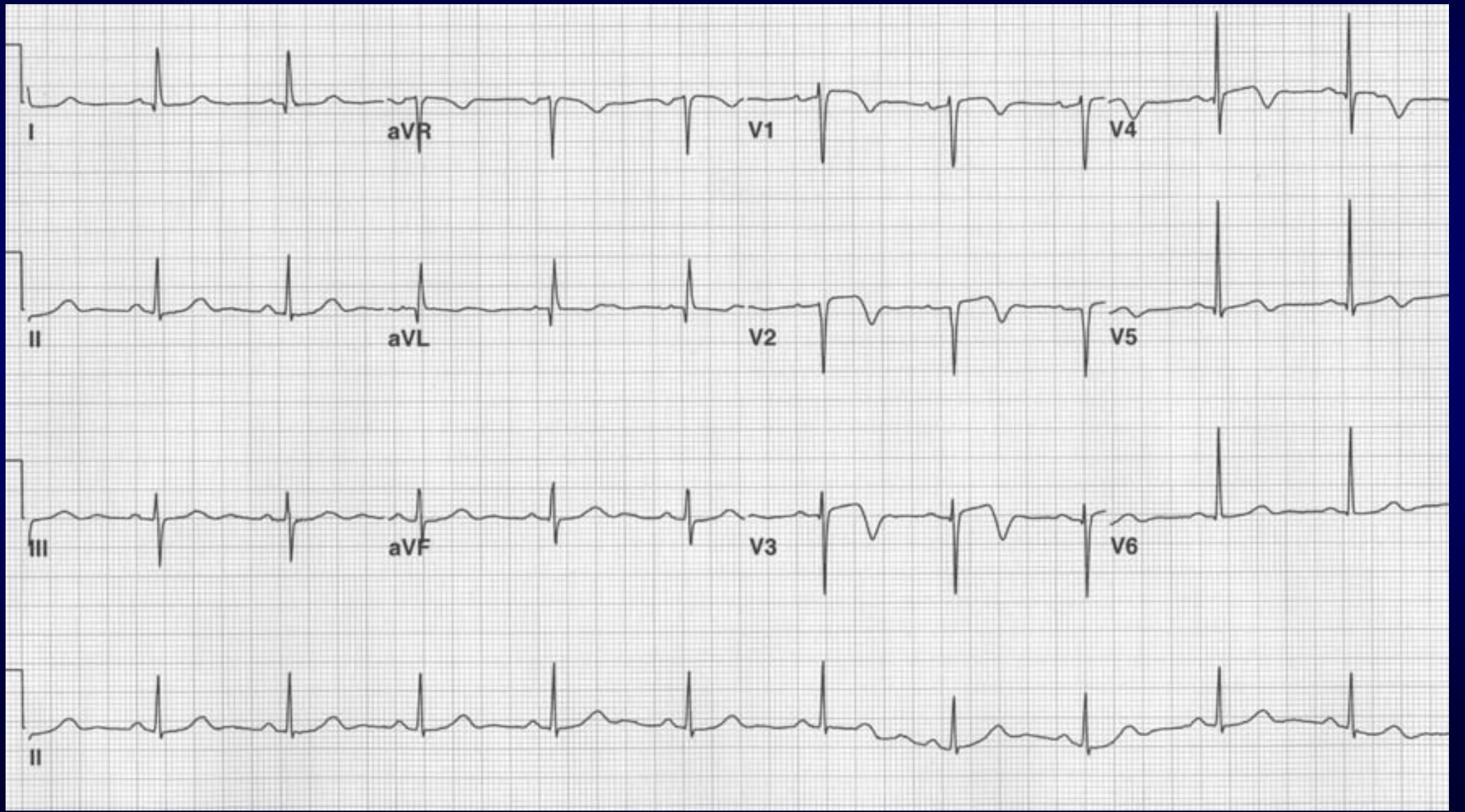
=> peak CKMB 79.81 ng/mL

T.chol/TG/HDL/LDL 169/83/63/129 mg/dL

Chest AP



EKG : Initial in ER

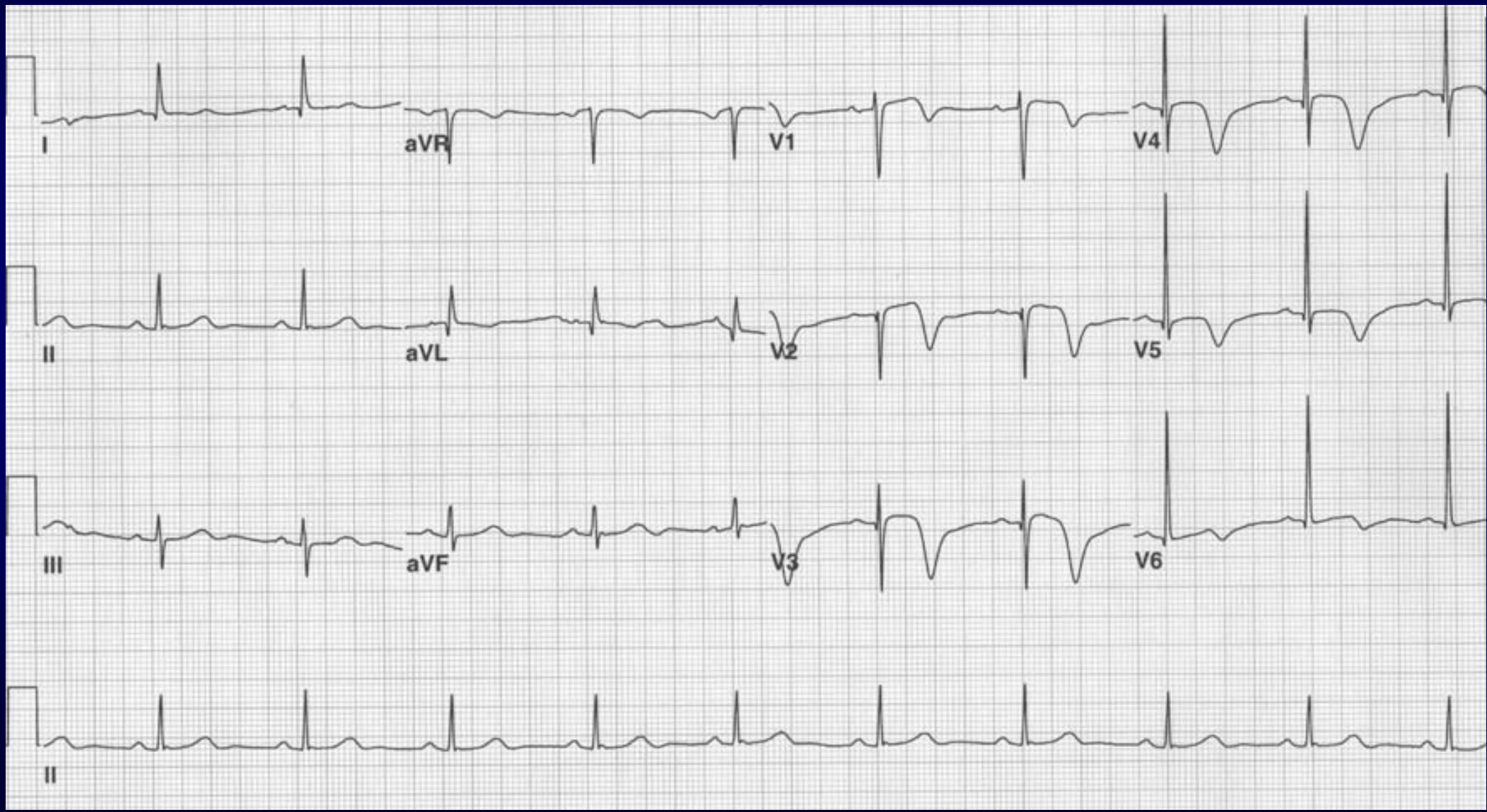


Management in ER

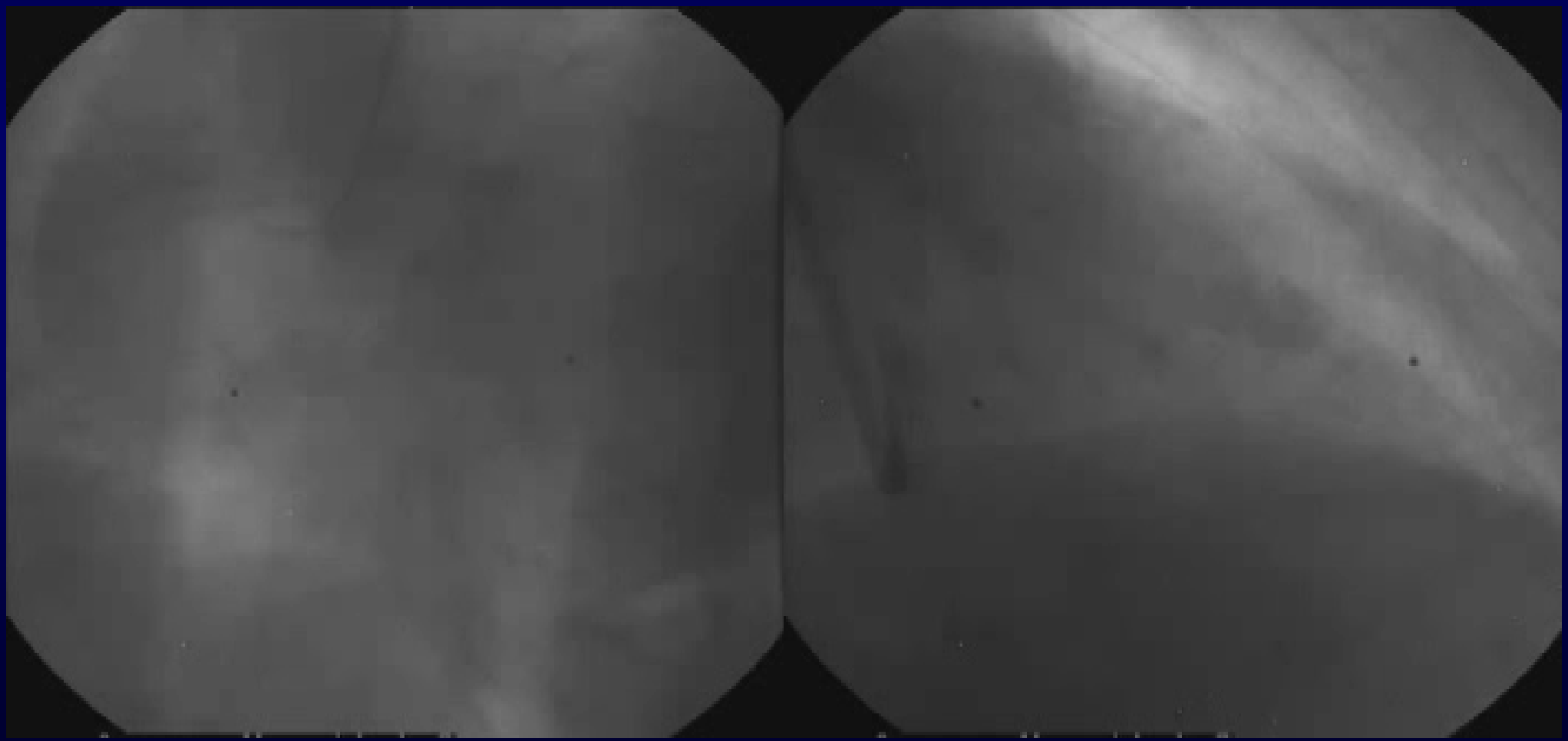
- Aspirin 250 mg p.o.
- Clopidogrel 300 mg p.o.
- Nasal O_2
- Heparin 5000 IU i.v.
- **Tirofiban (Agrastat®) 0.4ug/kg i.v. loading**

  => 0.1ug/kg/min for maintenance

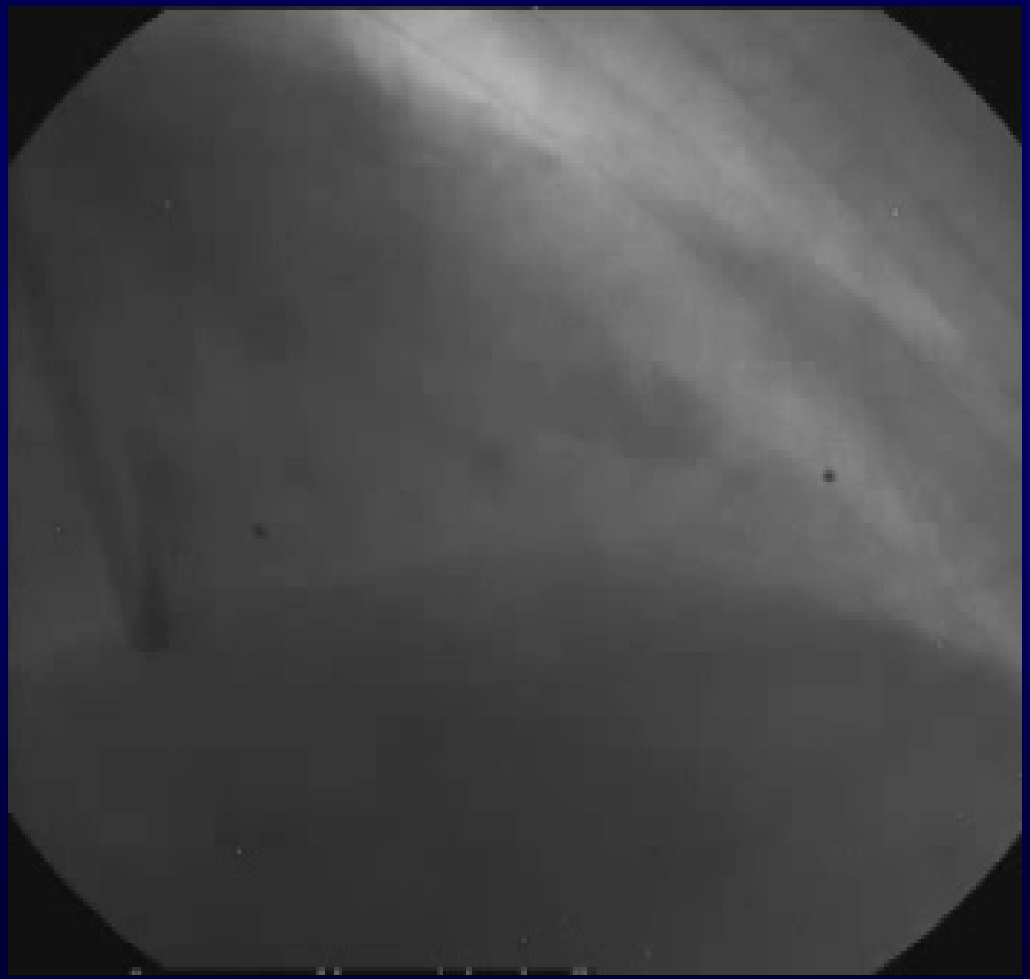
EKG : 12 hours later

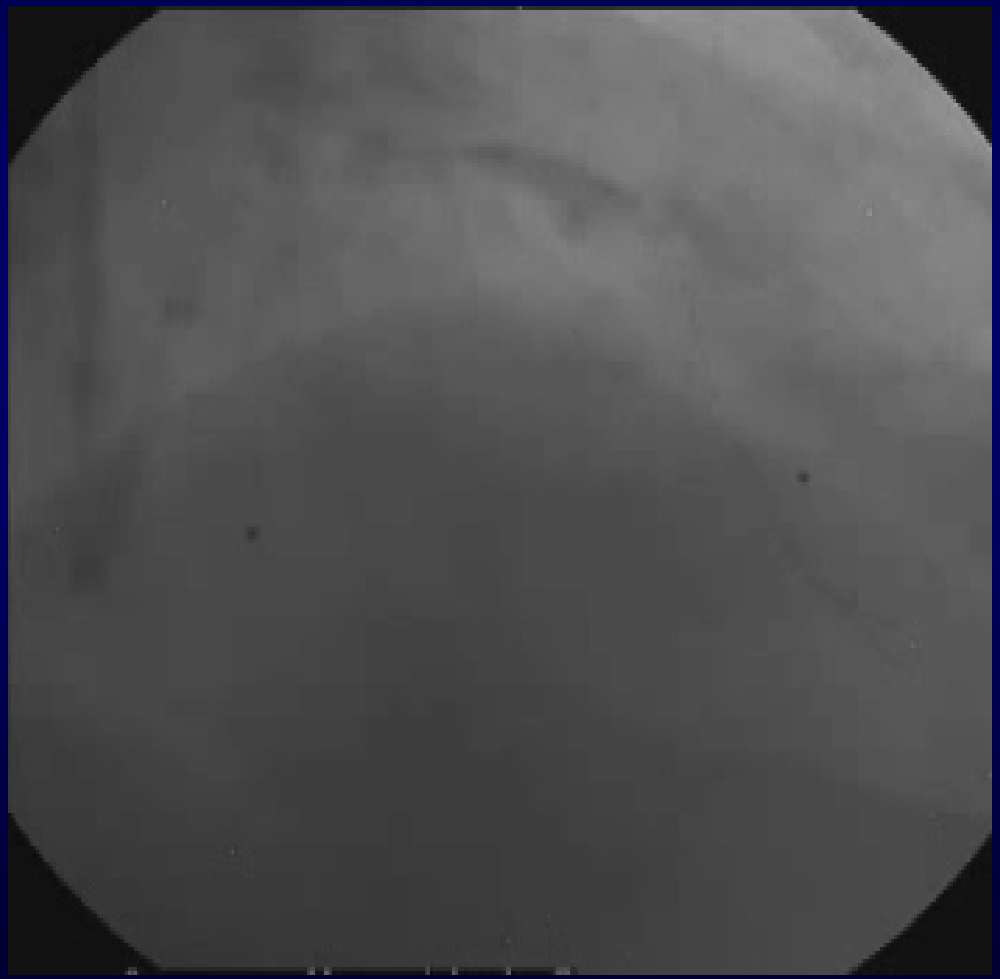


Coronary Angiography



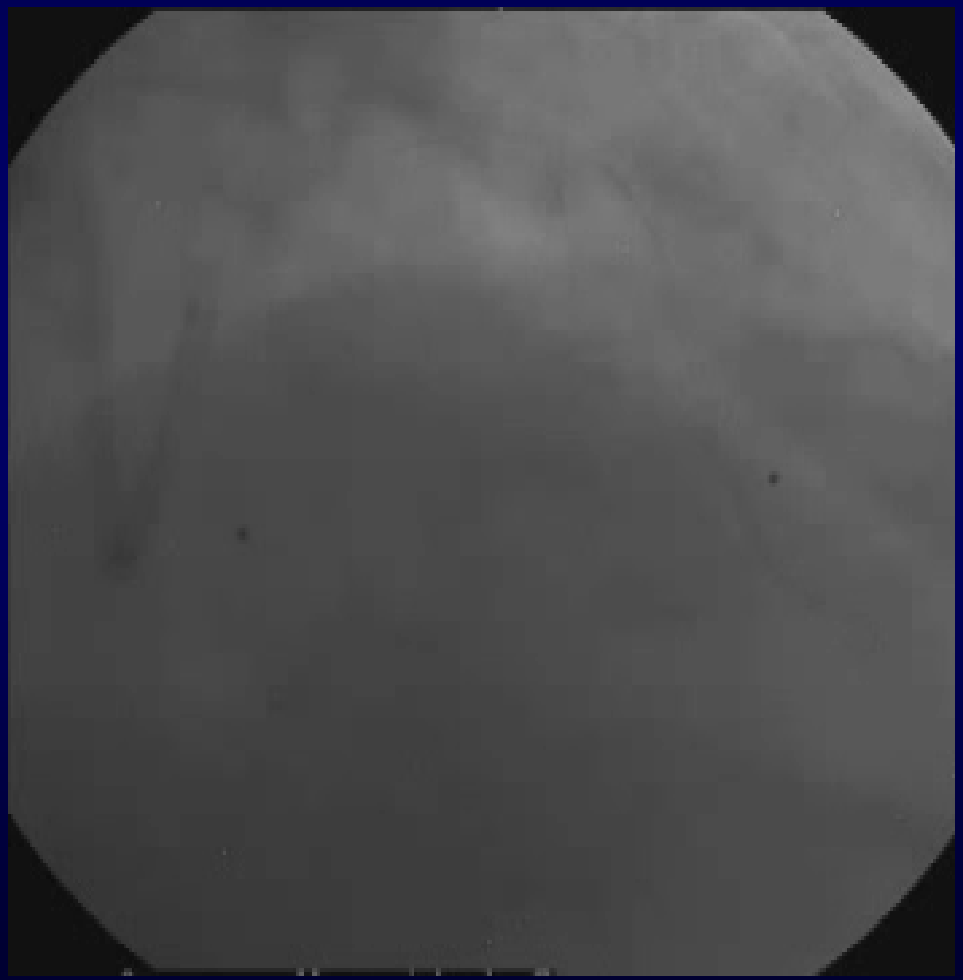
PTCA with Stenting

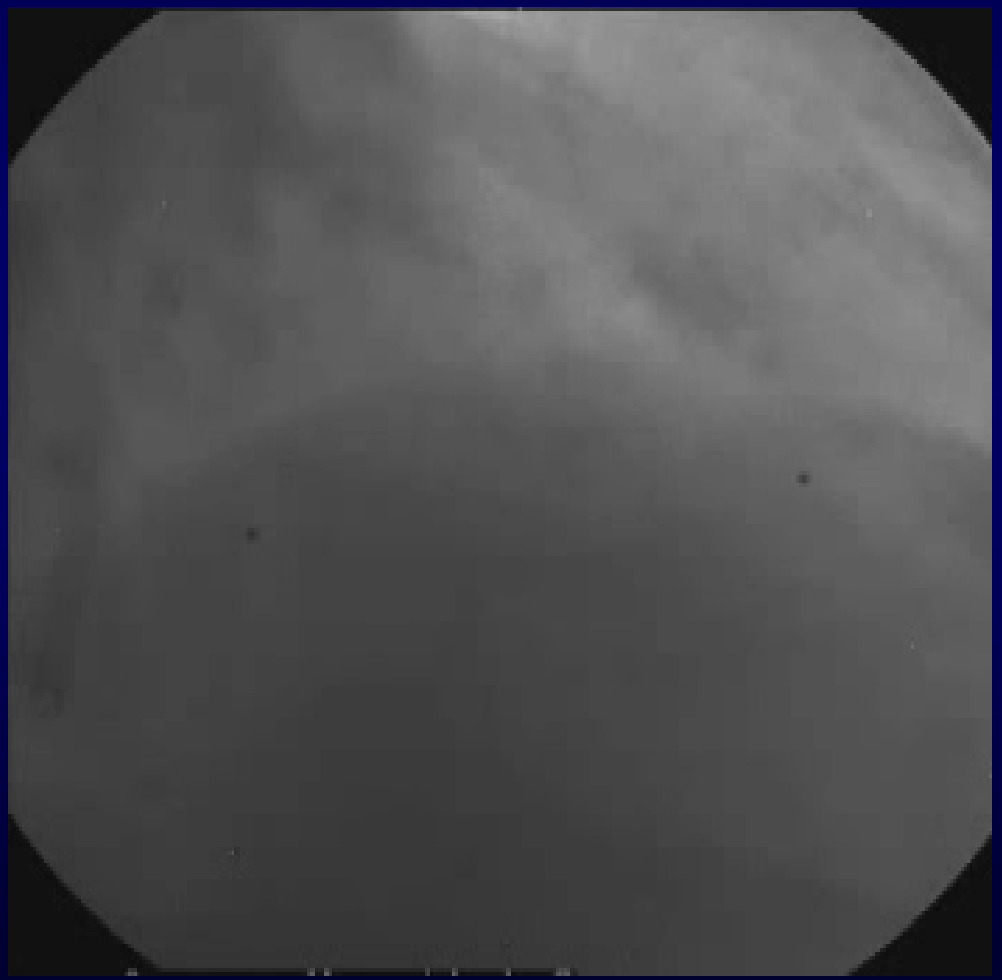




Vision 3.5 x 15 mm

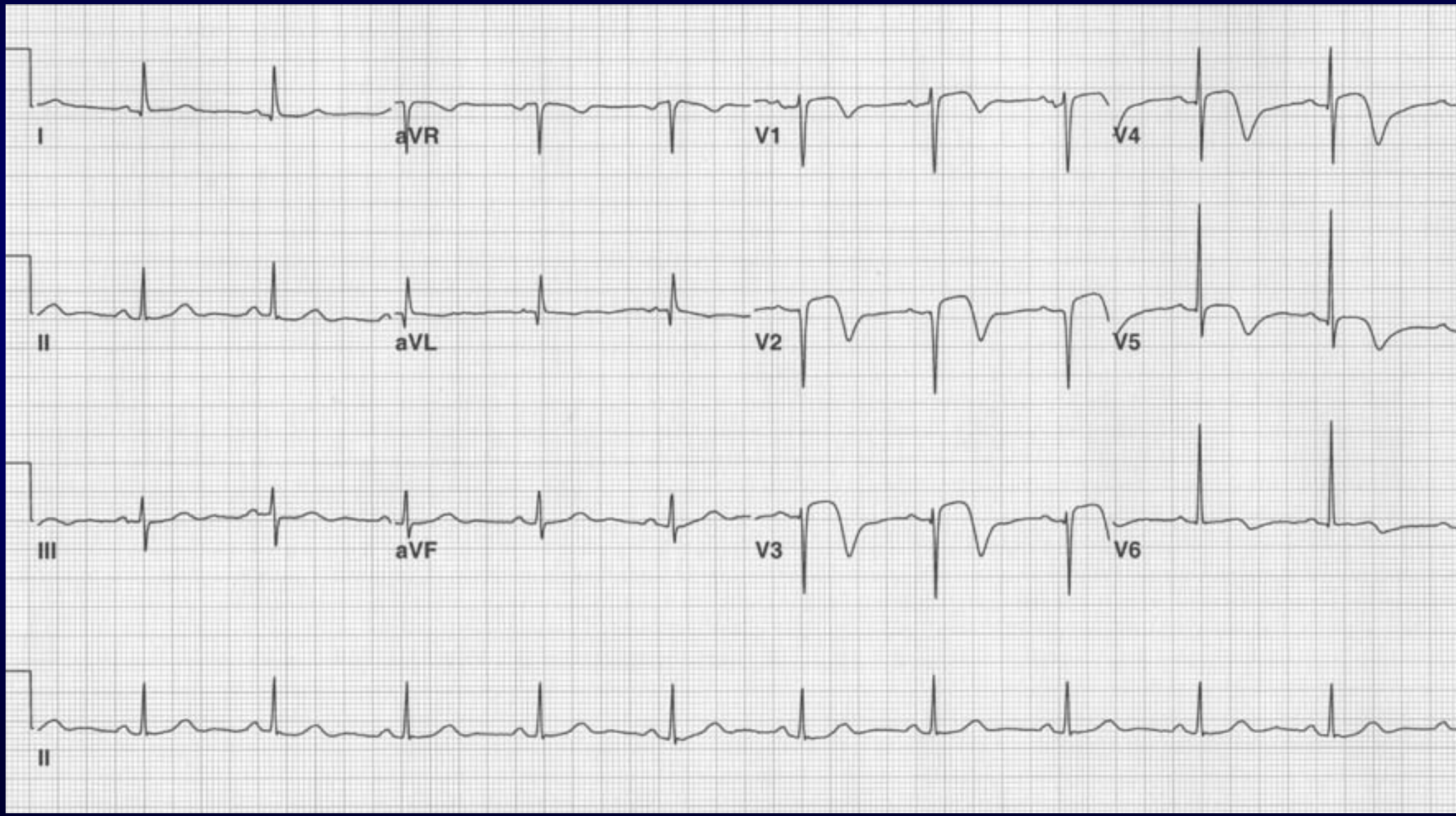
PTCA with Stenting



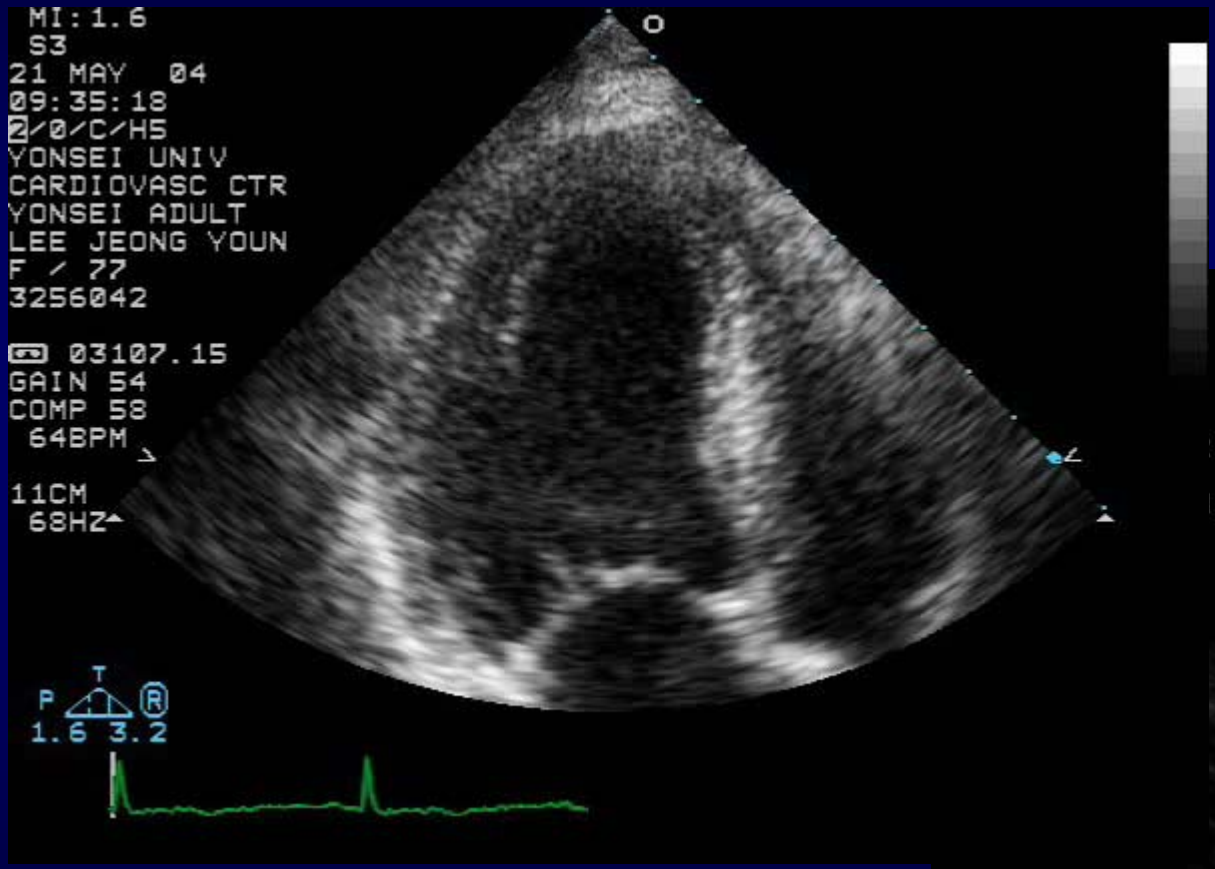


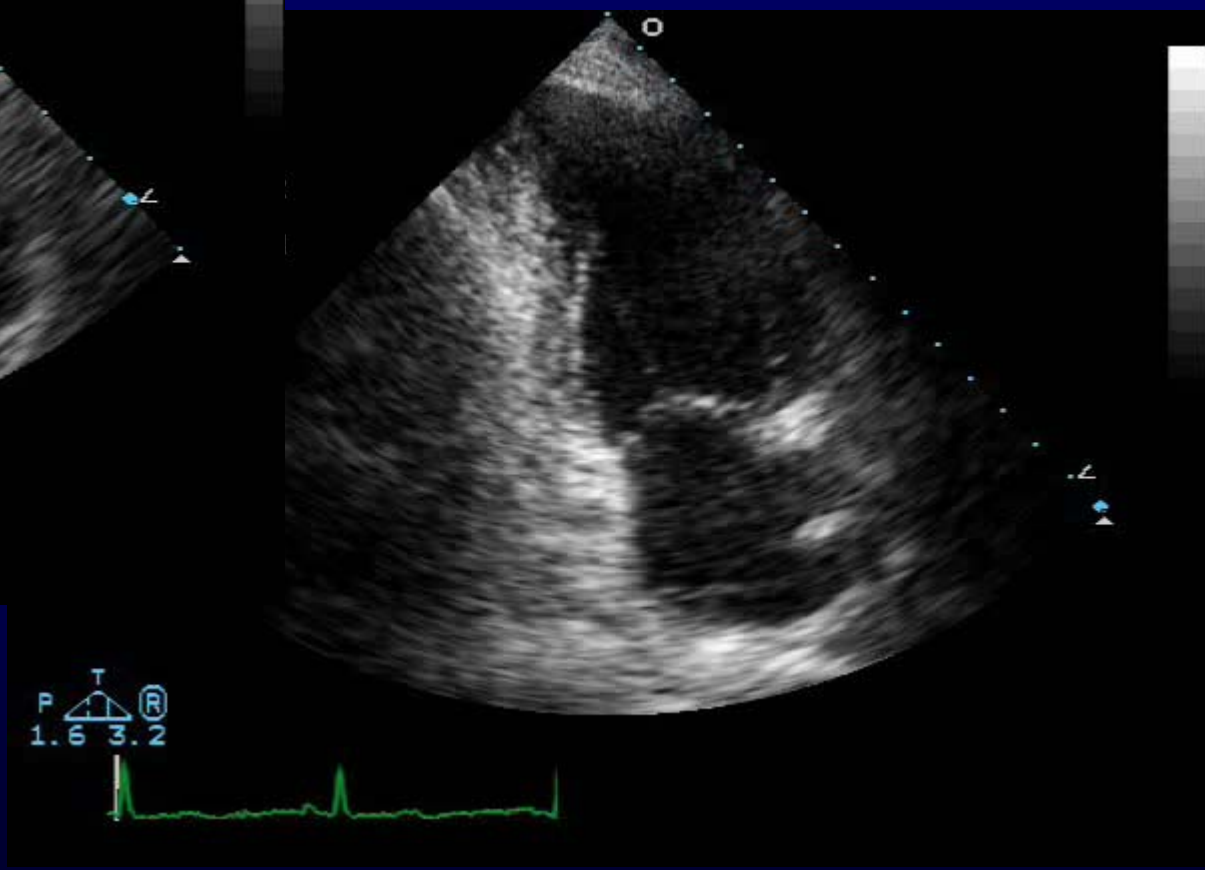
Aspirate from culprit coronary artery

EKG : after PCI



Echocardiography

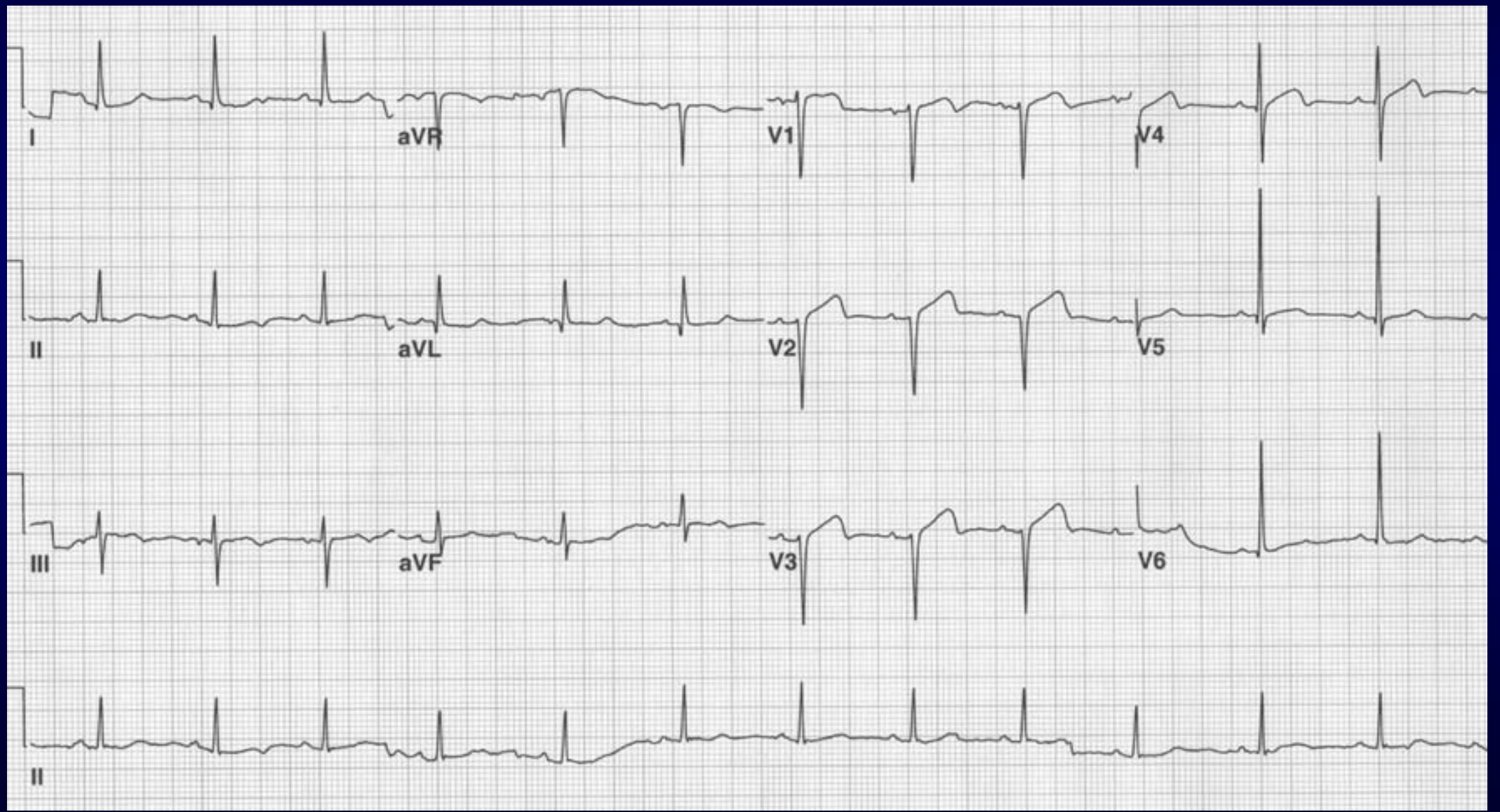




Medication

- Aspirin 100 mg # 1
- Clopidogrel 75 mg # 1
- Diltiazem 90 mg # 3
- Captopril 150 mg # 3
- Atorvastatin 10 mg #1

EKG : at discharge



EKG : 4 months later