Management of patients with NSTEMI and unstable angina: an overview
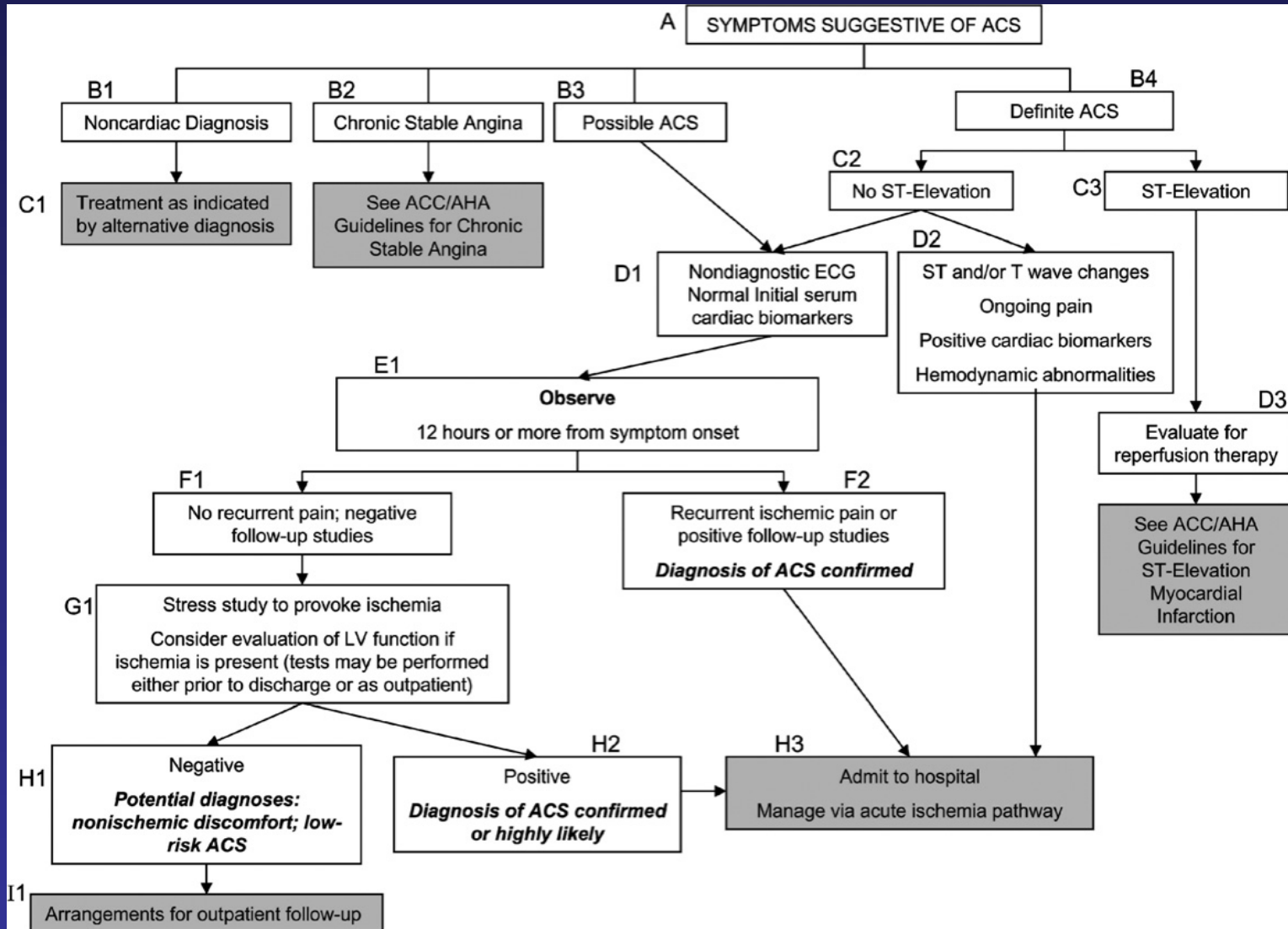
Professor Jennifer Adgey

Colum Owens

Conflicts of interest

- Conflict of Interest - Professor Adgey
- Speaker's Forum
- Sanofi-Aventis, Schering-Plough, Glaxo Smyth Kline, Eli Lilly
- Conflicts of interest- Dr Colum Owens: None

Algorithm for Evaluation and Management of Patients Suspected of Having ACS

Acute ischaemia management

TIMI risk score

|	RISK FACTOR	POINTS
HISTORICAL	Age ≥65	1
	≥3 CAD risk factors	1
	Family history, hypertension, elevated cholesterol, DM, active smoker	
	Known CAD (stenosis ≥50%)	1
	Aspirin use in past 7 days	1
PRESENTATION	Severe angina within 24h	1
	Elevated cardiac markers	1
	ST deviation ≥0.5mm	1
	TOTAL SCORE	0-7

Case 1

- 69 year old male
- Increasing frequency of anginal pain: 2 episodes last 24 hrs
- Past history: MI 1998
- ↑BP, ↑cholesterol, current smoker
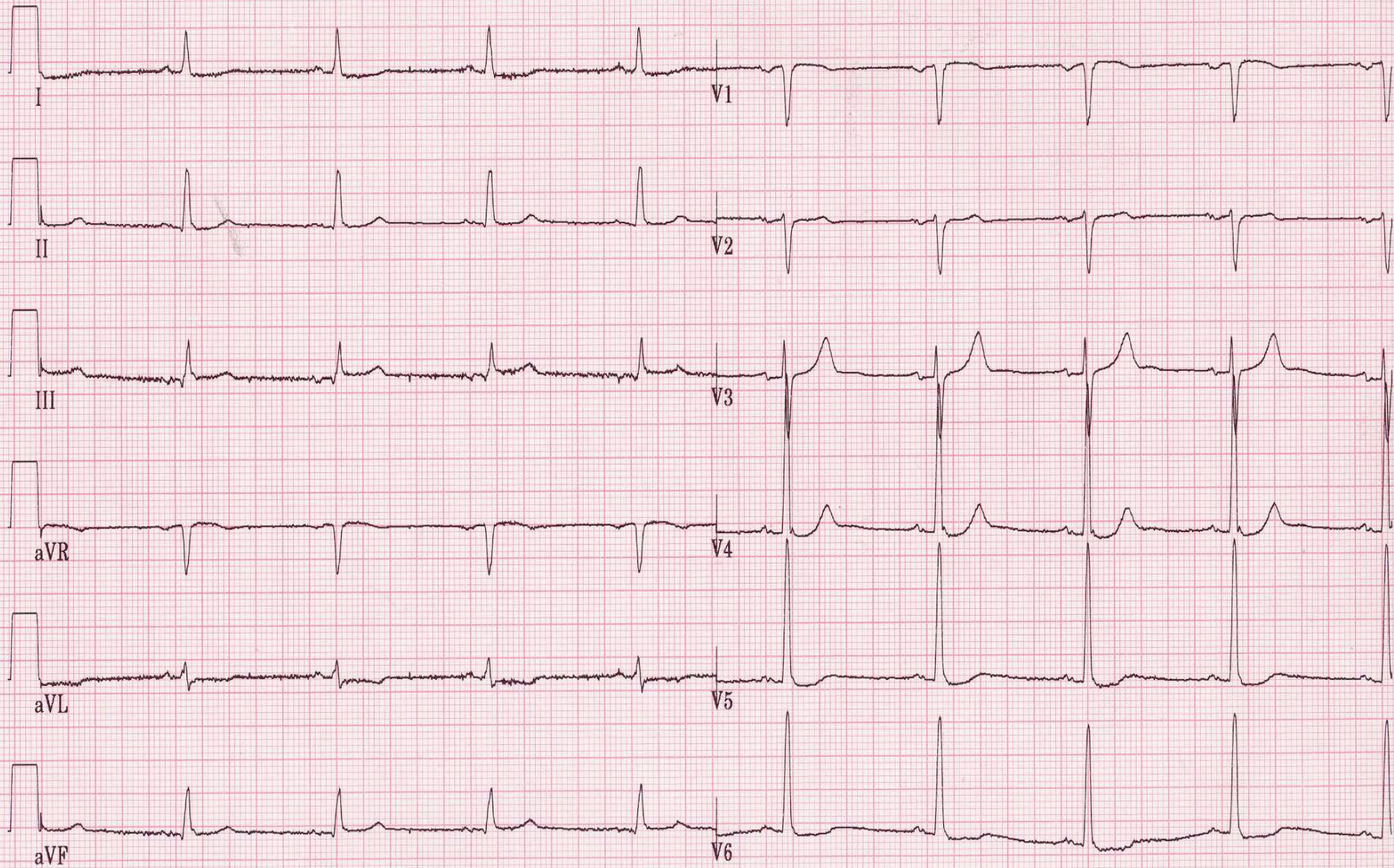- On aspirin, betablocker, statin

ECG on admission
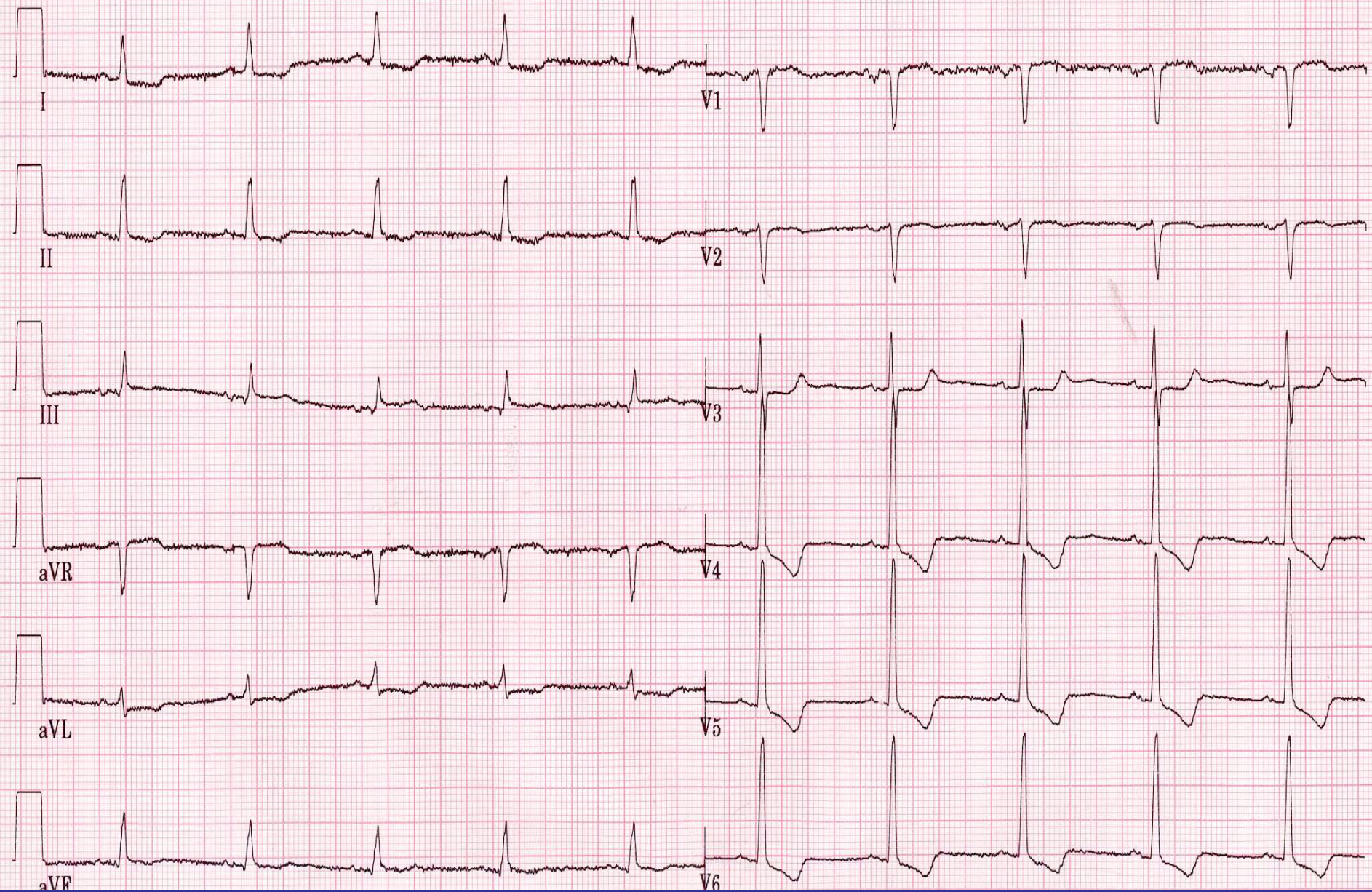
Second ECG: 30 mins, pain free

Risk Assessment

What is the risk assessment at this point?

Current summary

- 69 year old male
- Increasing frequency of anginal pain: 2 episodes last 24 hrs
- Past history: MI 1998
- ↑BP, ↑Cholesterol, current smoker
- On aspirin, betablocker, statin
- ECG changes?

Current TIMI risk score

RISK FACTOR	POINTS
Age ≥65	1
≥3 CAD risk factors	1
Family history, hypertension, ↑cholesterol, DM, smoker	
Known CAD (stenosis ≥50%)	0
Aspirin use in past 7 days	1
Severe angina within 24h	1
Elevated cardiac markers	?
ST deviation ≥0.5mm	1
CURRENT TOTAL	5

12 hour cardiac troponin 2.8 ng/ml

Treatment

What treatment options should be considered?

- Aspirin

- Clopidogrel

- ß-blockers

- UFH / LMWH

- GP IIb/IIIa inhibitors

- Other: Fondaparinux/Bivalirudin/other

Antiplatelet agents i.e. Prasugrel
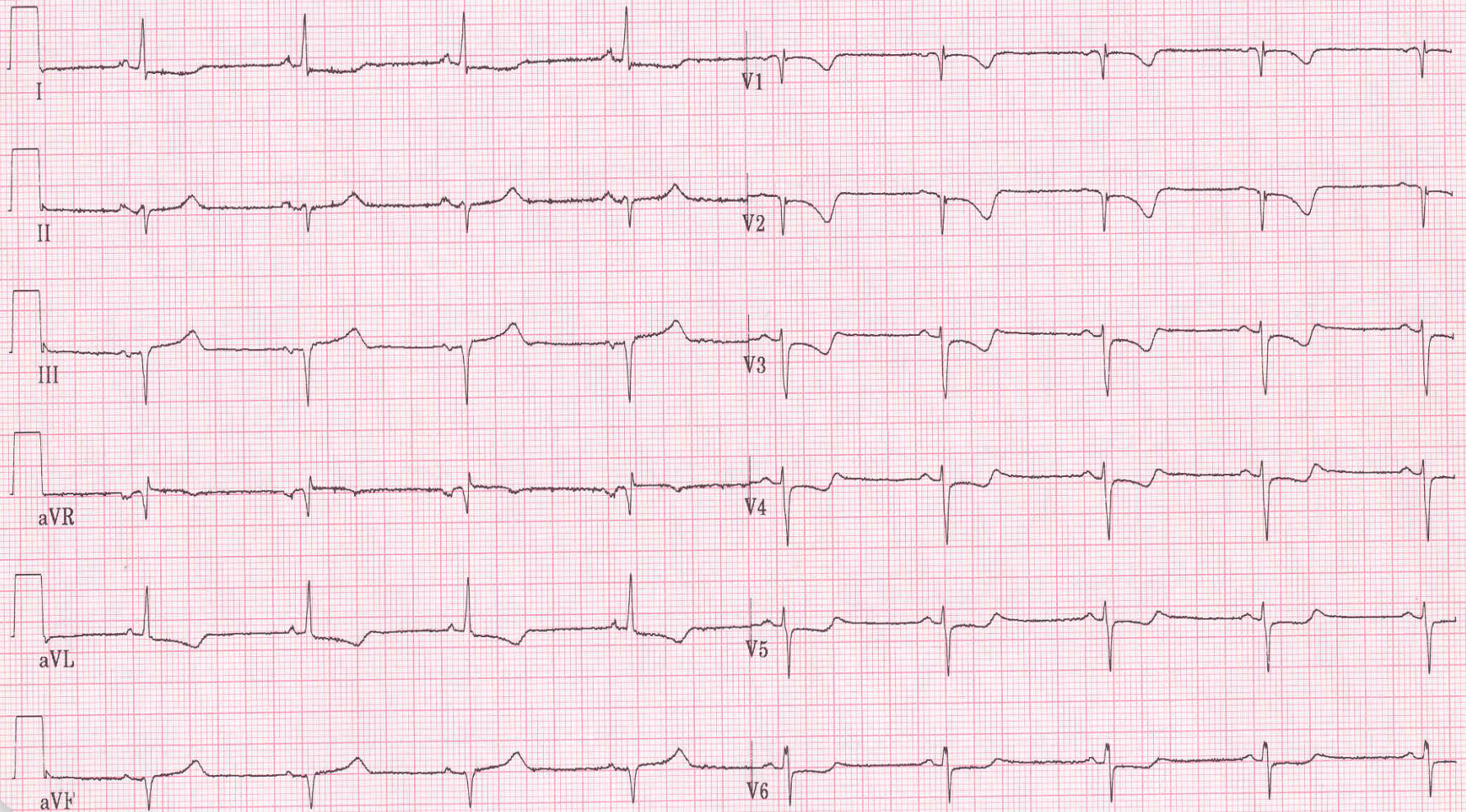
Next steps?

Urgent coronary angiography

Case 2

- 83 year old female

- Chest pain 4 hours

- Previous NSTEMI 2002

ECG on admission

Risk Assessment

What is the risk assessment at this point?

Current summary

- 83 year old female

- Chest pain 4 hours

- Previous NSTEMI 2002

- ECG changes?

TIMI risk score

RISK FACTOR	POINTS
Age ≥65	1
≥3 CAD risk factors	0
Family history, hypertension, ↑cholesterol, DM, smoker	
Known CAD (stenosis ≥50%)	0
Aspirin use in past 7 days	1
Severe angina within 24h	1
Elevated cardiac markers	?
ST deviation ≥0.5mm	1
TOTAL KNOWN FACTORS	4

12 hr cardiac troponin: 22ng/ml

Treatment

What treatment options should be considered?

- Aspirin

- Clopidogrel

- ß-blockers

- UFH / LMWH

- GP IIb/IIIa inhibitors

- Other: Fondaparinux/Bivalirudin/other

Antiplatelet agents i.e. Prasugrel
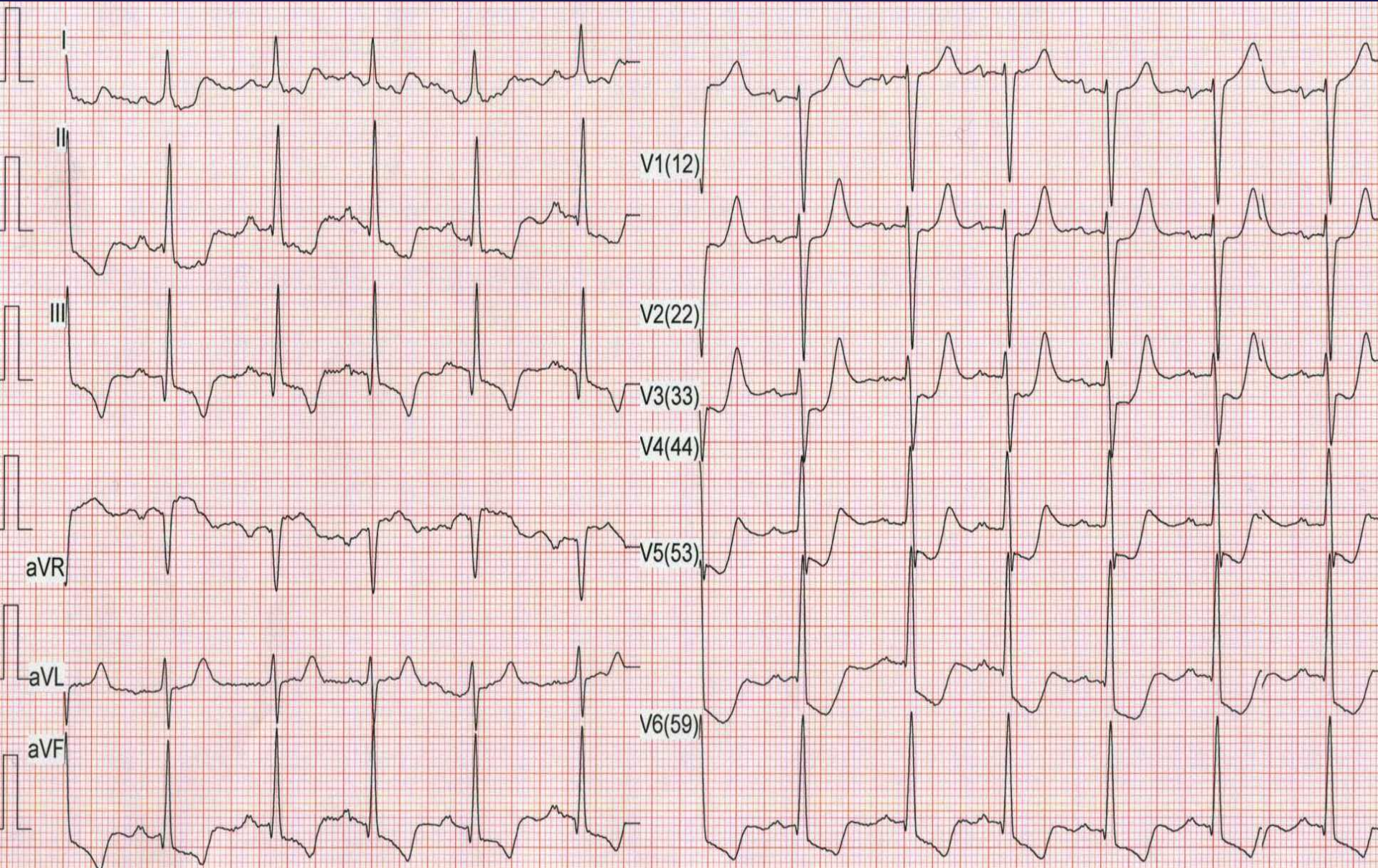
Next steps?

Urgent coronary angiography

Case 3

- 52 year old male

- Chest pain for 6 hours

- First presentation IHD

Initial ECG

Risk Assessment

What is the risk assessment at this point?

Current summary

- 52 year old male

- Chest pain for 6 hours

- First presentation IHD

- ECG changes?

TIMI risk score

RISK FACTOR	POINTS
Age ≥65	0
≥3 CAD risk factors	0
Family history, hypertension, ↑cholesterol, DM, smoker	
Known CAD (stenosis ≥50%)	0
Aspirin use in past 7 days	0
Severe angina within 24h	1
Elevated cardiac markers	?
ST deviation ≥0.5mm	1
TOTAL KNOWN FACTORS	2

12 hr cardiac troponin: 12.4 ng/ml

Treatment

What treatment options should be considered?

- Aspirin

- Clopidogrel

- ß-blockers

- UFH / LMWH

- GP IIb/IIIa inhibitors

- Other: Fondaparinux/Bivalirudin/other

Antiplatelet agents i.e. Prasugrel

Next steps?

Urgent coronary angiography

Case 4

- 55 year old female
- No history of IHD
- 4 hour history of jaw/left arm pain
- Breathless ++
- SpO2 88% room air
- RR 28
- BP 110/60

ECG on admission
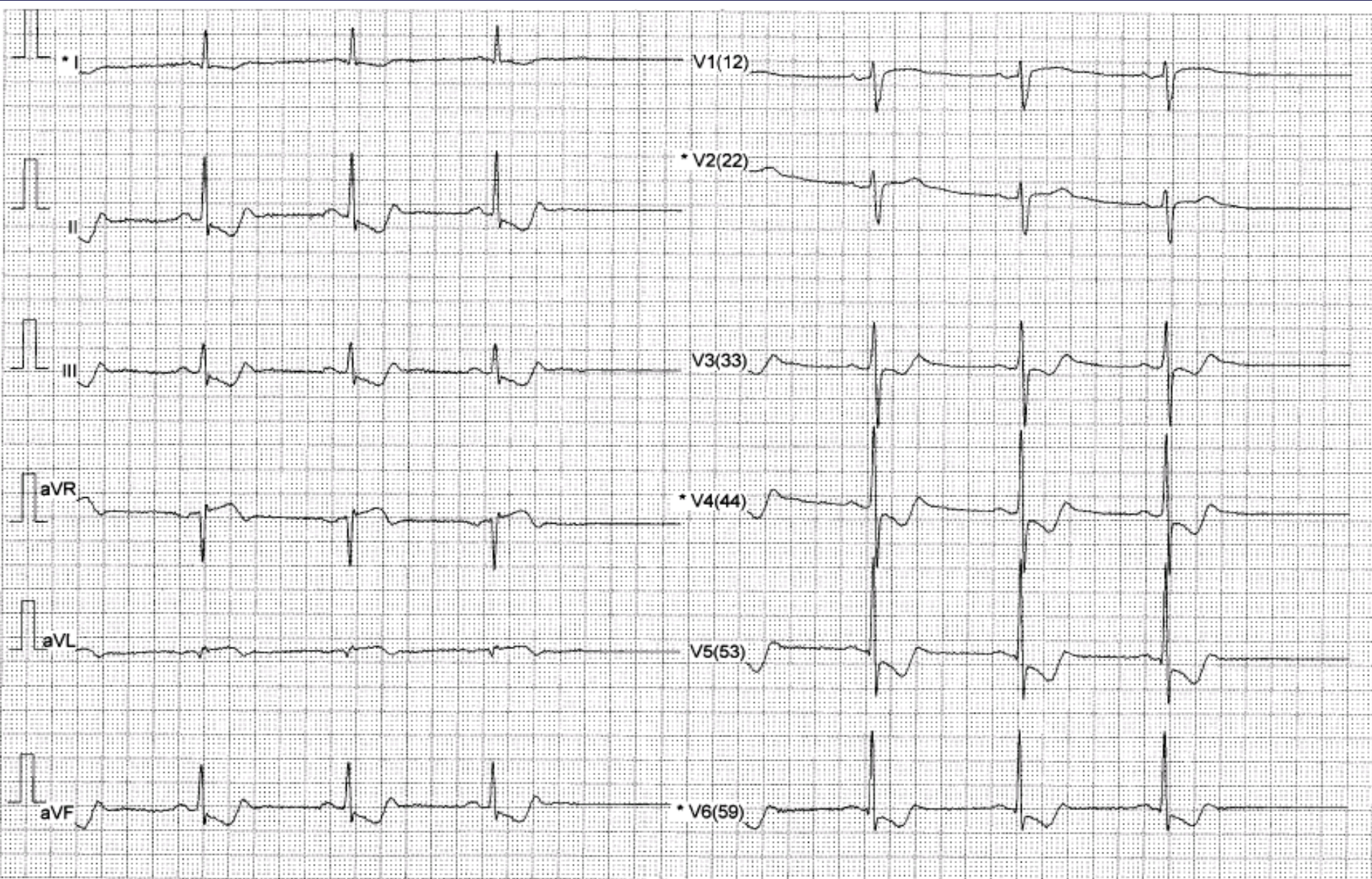
Risk Assessment

What is the risk assessment at this point?

Current summary

- 55 year old female
- No history of IHD
- 4 hour history of jaw/ Left arm pain
- Breathless ++
- SpO2 88% room air
- RR 28
- BP 110/60
- ECG changes?

TIMI risk score

RISK FACTOR	POINTS
Age ≥65	0
≥3 CAD risk factors	0
Family history, hypertension, cholesterol, DM, smoker	
Known CAD (stenosis ≥50%)	0
Aspirin use in past 7 days	0
Severe angina within 24h	1
Elevated cardiac markers	?
ST deviation ≥0.5mm	1
TOTAL KNOWN FACTORS	2

12 hr cardiac troponin: 22 ng/ml

Treatment

What treatment options should be considered?

- Aspirin

- Clopidogrel

- ß-blockers

- UFH / LMWH

- GP IIb/IIIa inhibitors

- Other: Fondaparinux/Bivalirudin/other

Antiplatelet agents i.e. Prasugrel

Next steps?

Urgent coronary angiography

12-lead ECG and acute ischaemia

- Currently, the 12-lead ECG remains key in the initial assessment of patients presenting with ischaemic type chest pain as:

  - The current markers of myocardial necrosis, though sensitive and specific do not reliably increase until 12-hours post symptom onset

  - Other diagnostic tools such as CT, MRI and radionuclide SPECT are not available pre-hospital.

Problems with the 12-lead ECG

- The standard 12-lead ECG has only a 50-60% sensitivity at diagnosing AMI as
  - The commonest mode of presentation of AMI is NSTEMI i.e. ST-depression, T-inversion, LBBB, LVH or normal ECG
  - Absence of leads facing the posterior, high right anterior, lateral wall of the left ventricle and the anterior portion of the right ventricle

Body surface Mapping

- To improve the diagnostic capability of the 12-lead ECG, additional non-standard leads are applied directly over the right ventricle, high right anterior, high left lateral and posterior regions i.e. body surface potential mapping
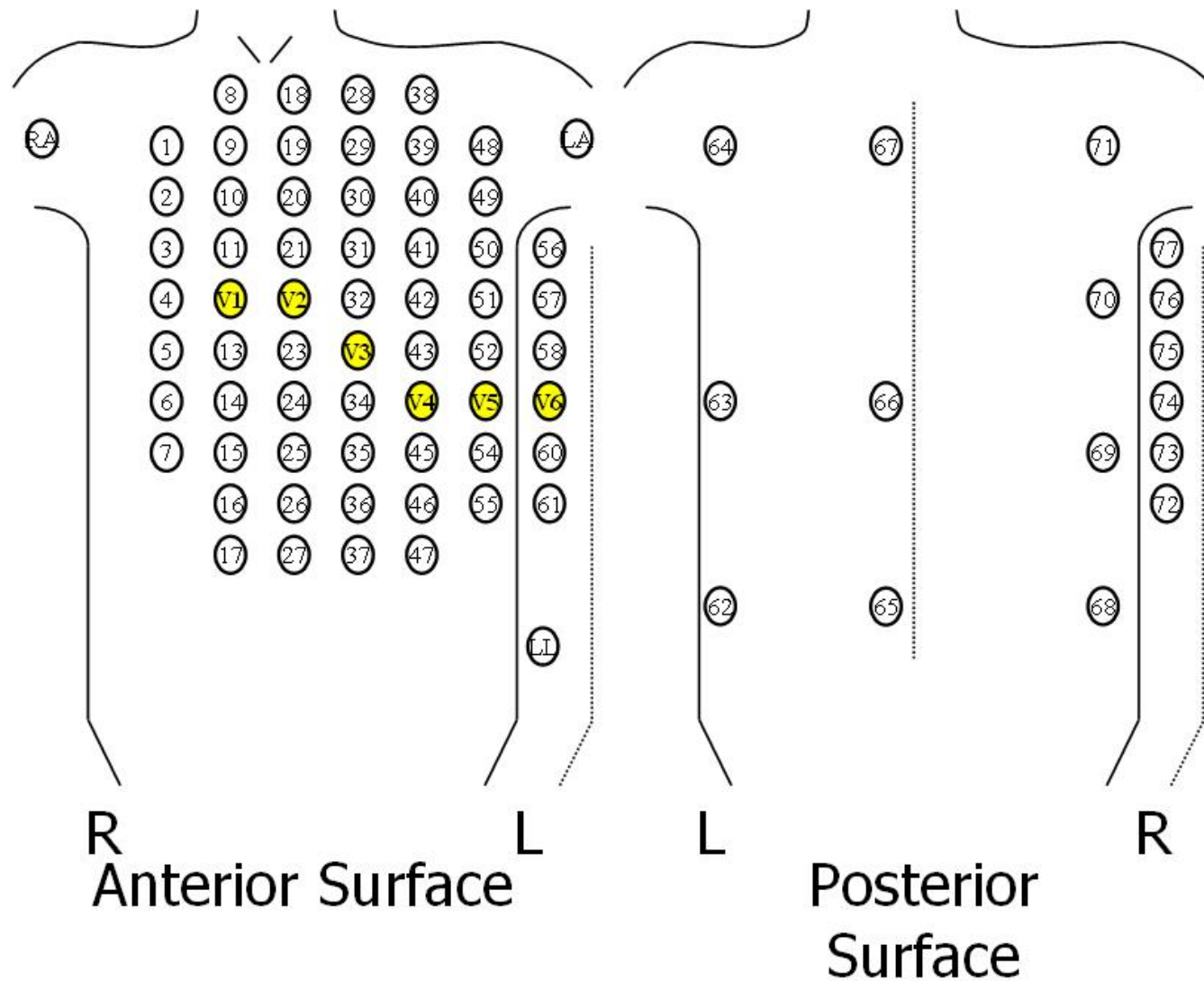
Electrode positions sampled by the body surface map, including 3 proximal limb leads (Mason-Likar) (RA=right arm, LA=left arm, LL=left leg) Yellow: standard precordial leads

Definition of abnormal 80-lead ECG features for AMI detection

80-lead ECG feature	Definition
ST0 (J point) maxima using ST0 isopotential map	ST elevation measured at the J point
	Anterior territory: ≥ 2mm
	Lateral territory: ≥ 1mm
	Inferior territory: ≥ 1mm
	Right ventricular: ≥ 1mm
	High right anterior: ≥ 1mm
	Posterior territory: ≥ 0.5mm
LBBB MI criteria	Change of angle from QRS isointegral to STT isointegral vectors outside $180 \pm 15°$

Normal ST0 isopotential map from anterior and posterior surface of chest

ST0 Isopotential (mm)

Anterior

Lateral

Posterior

Inferior

R   L   L   R

Anterior surface   Posterior surface
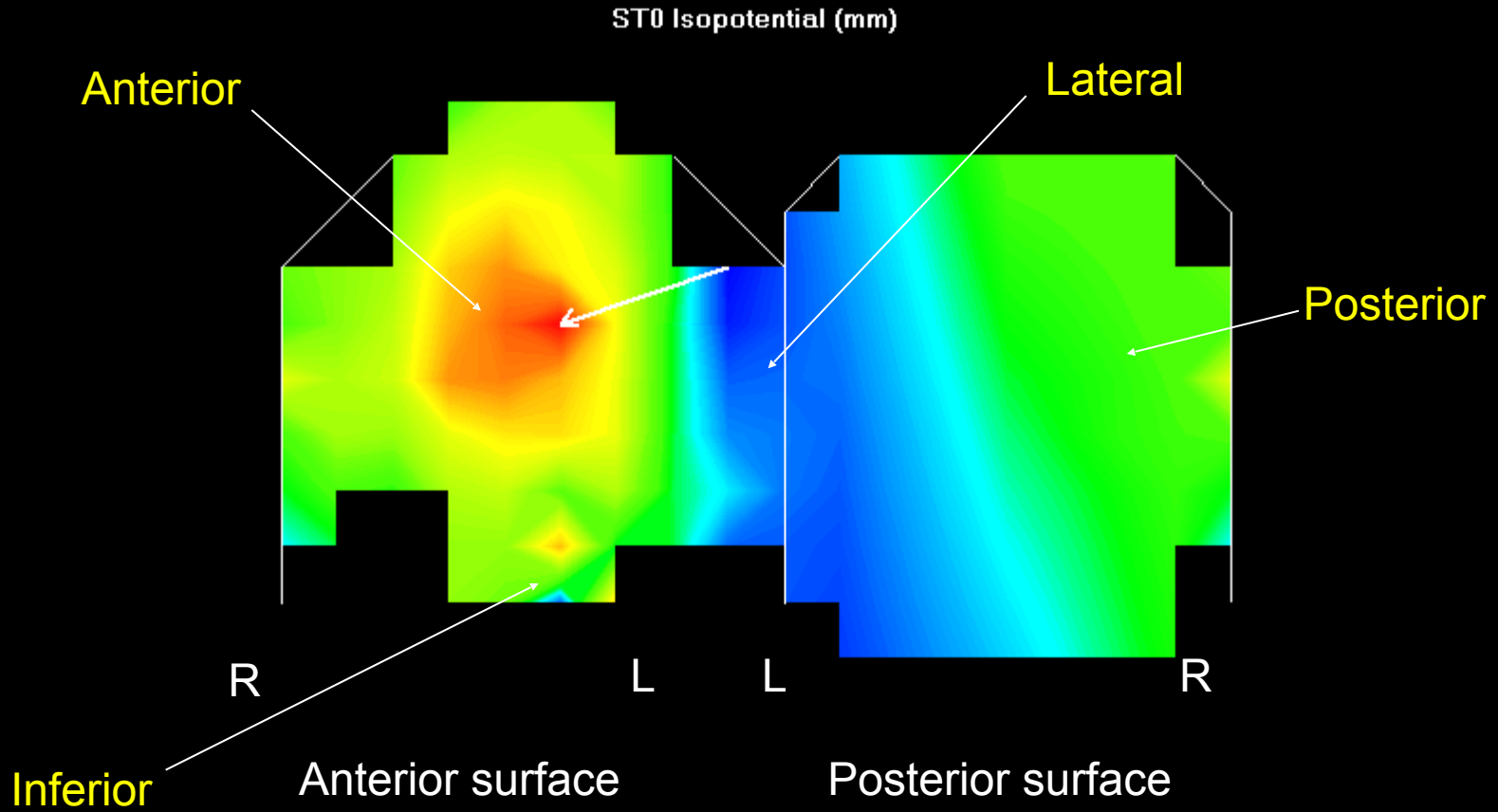
1.11   0.00   -0.52

Normal ST0 isopotential map from anterior and posterior surface of chest- torso view

STO Isopotential (mm)

High right anterior
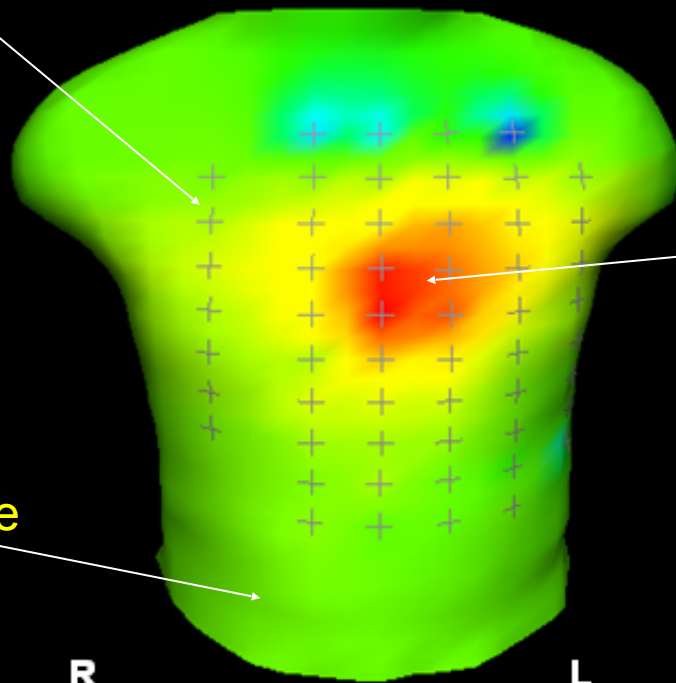
Anterior surface

Inferior surface
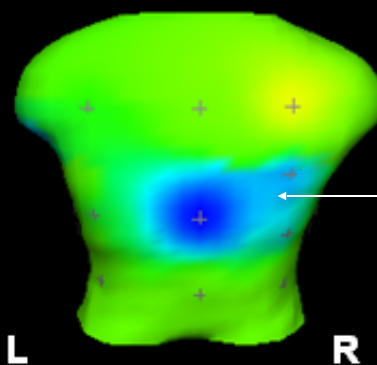
Posterior

R   L

L   R

Anterior Surface

Posterior Surface

1.41   0.00   -0.27

Case examples

12-lead ECG
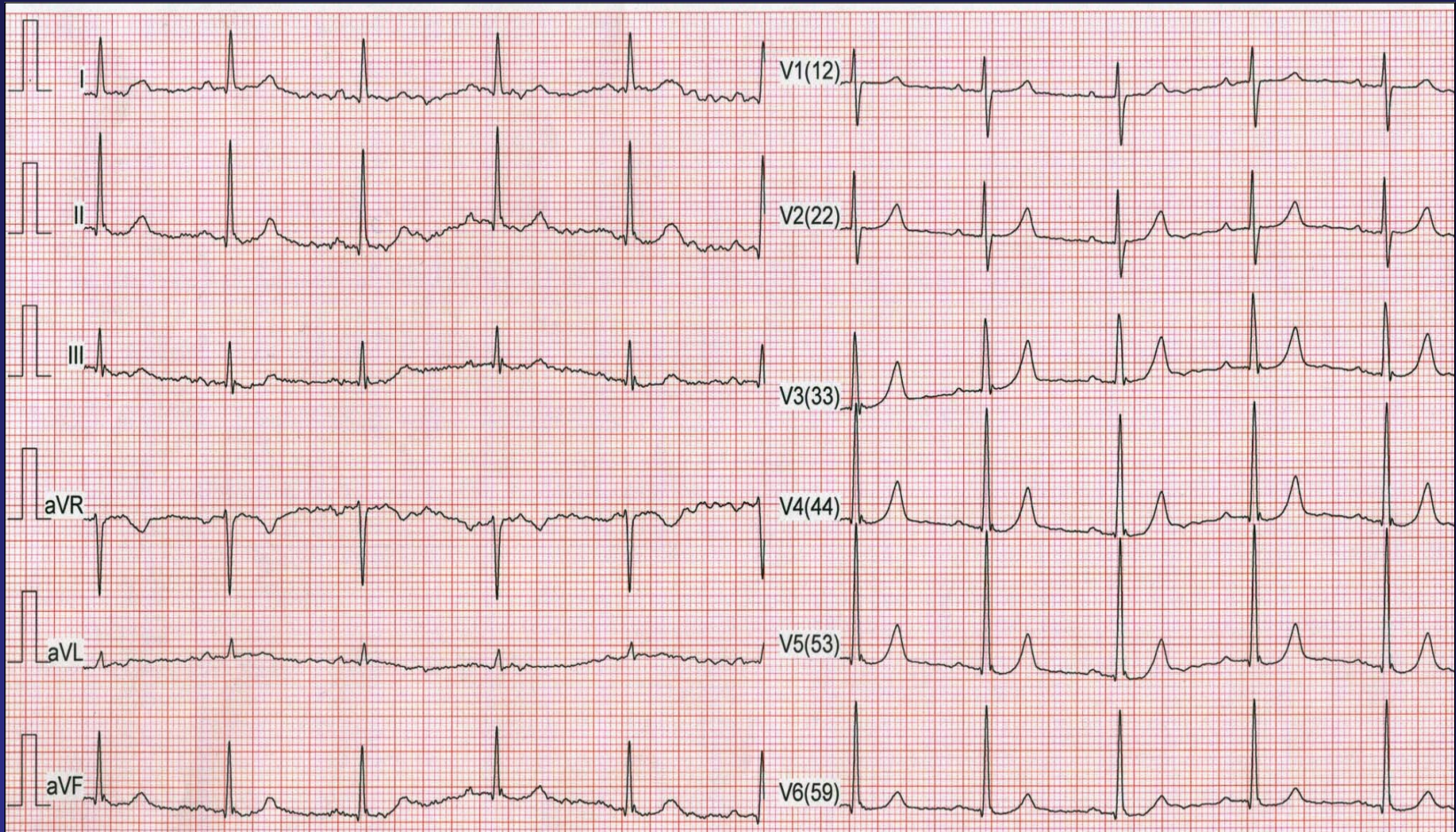
66 year old female. Chest pain for 3 hours. Unstable angina for 2 months. First presentation with prolonged chest pain

BSM
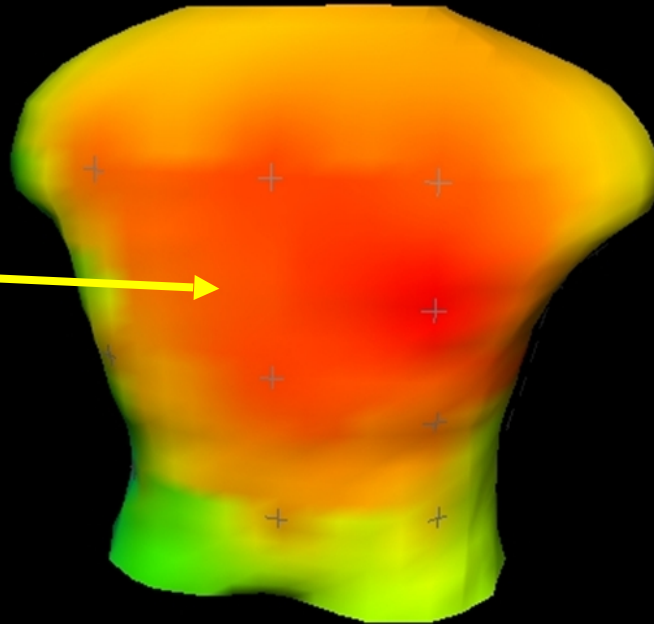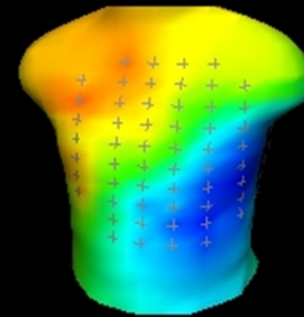
cTnT 2.2 ng/mL. Echo showed posterior wall hypokinesis. Cardiac Catheterisation: culprit marginal circumflex: PCI x 1

ECG
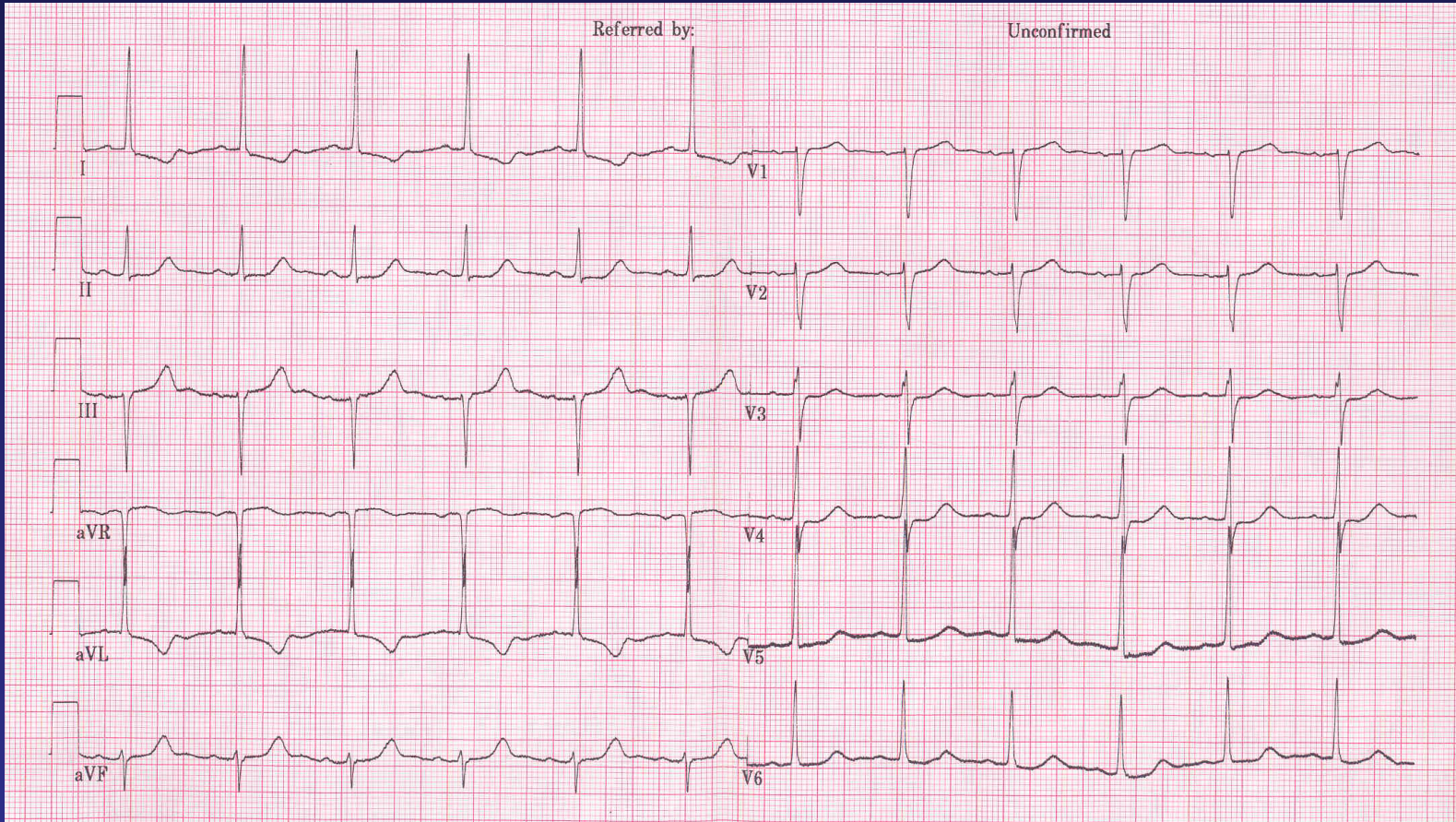
67 year old female. Hypertension, +ve family history IHD. Unstable angina 2 months and rest pain for 45 minutes
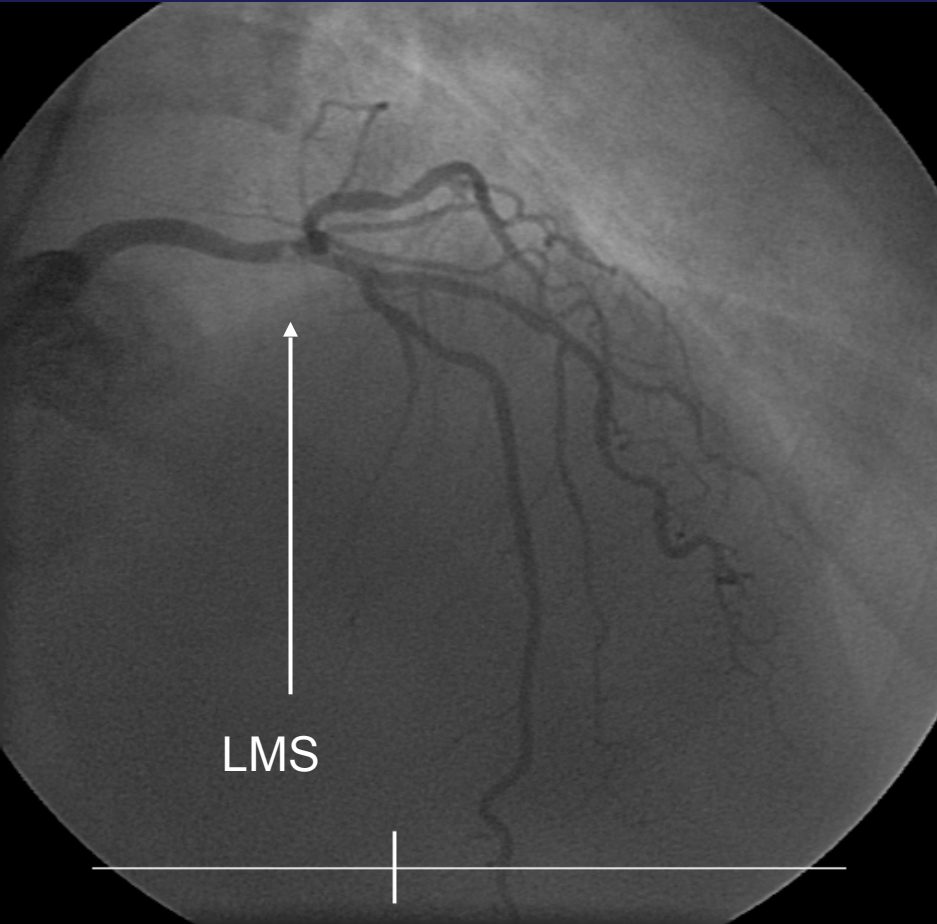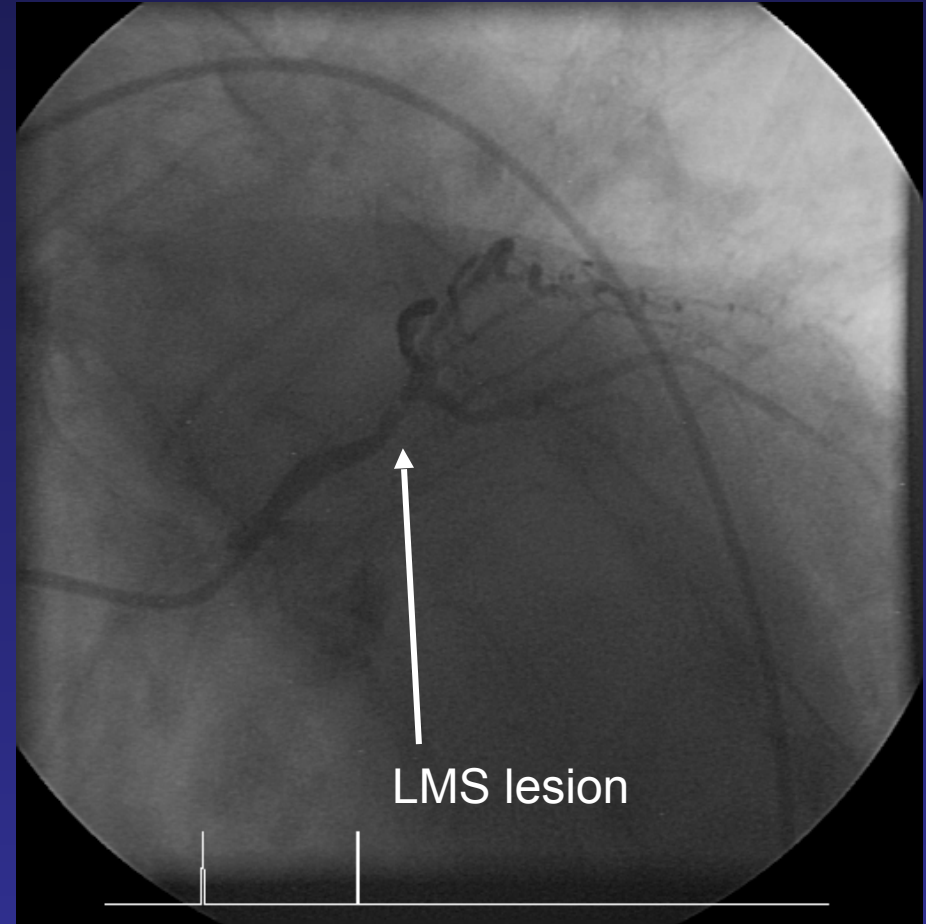
BSM
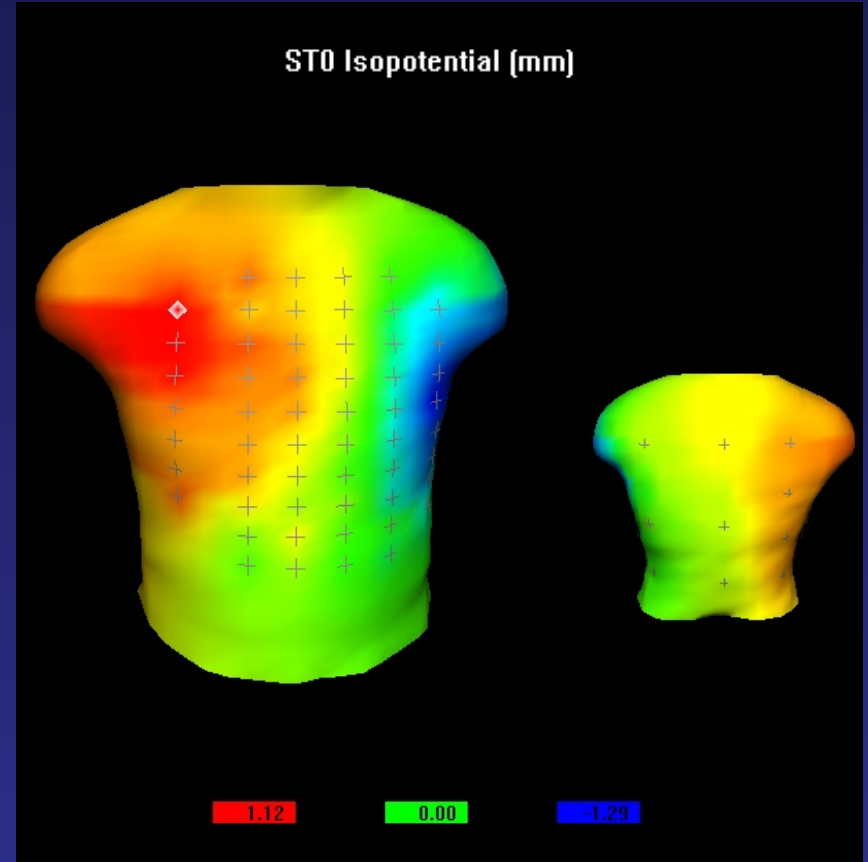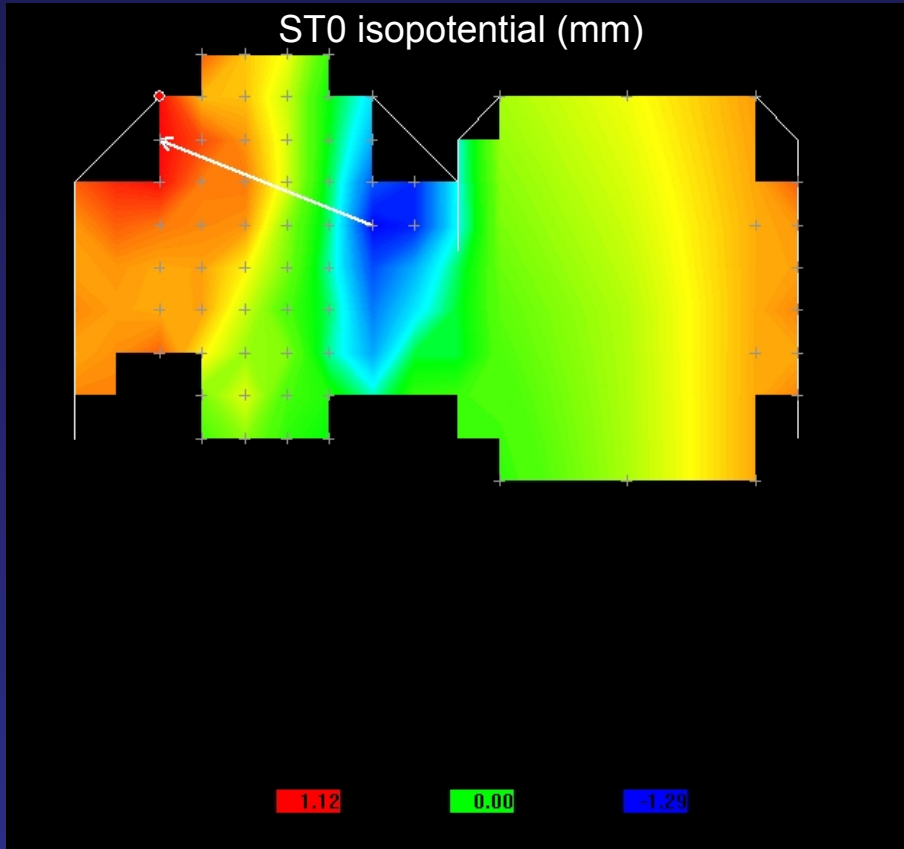
cTnT 0.22 ng/mL. Body surface map shows high right anterior MI.
Cath revealed 99% distal LMS, moderate RCA disease. Preserved LV function.
IABP inserted and proceeded to emergency CABG on GpIIb/IIIa infusion
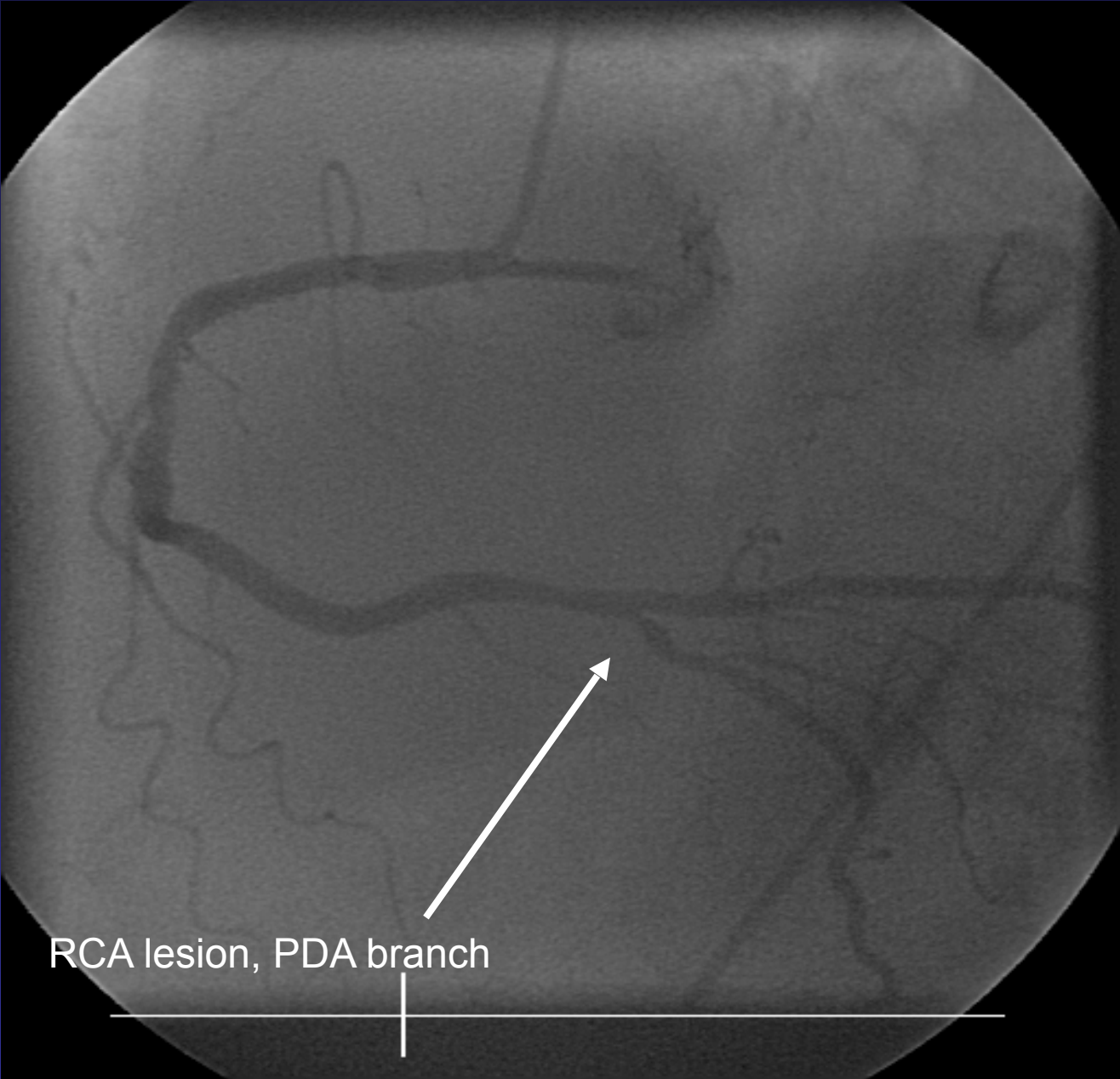
Catheterisation

LMS

PA Caudal angulation
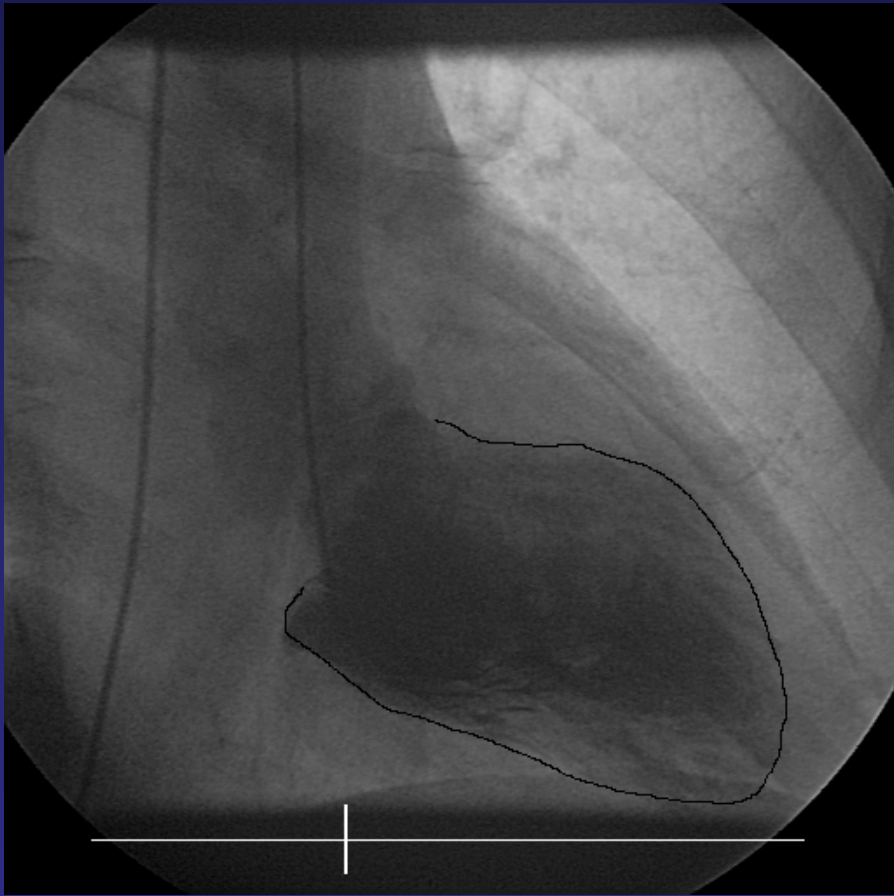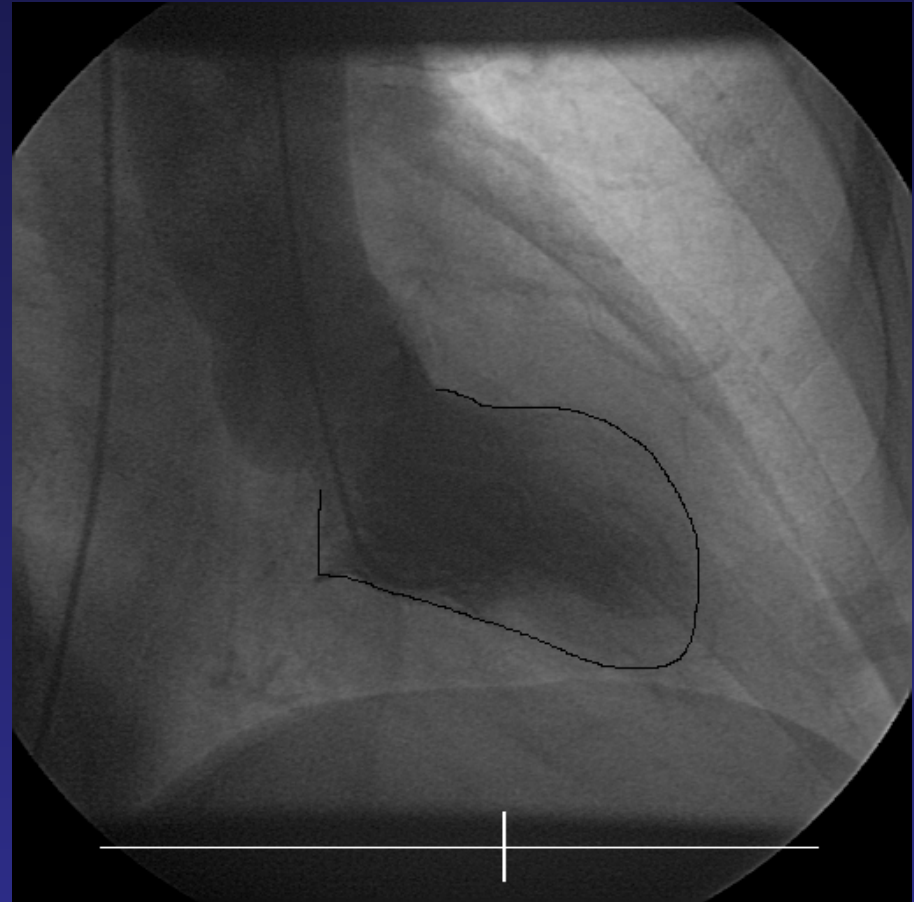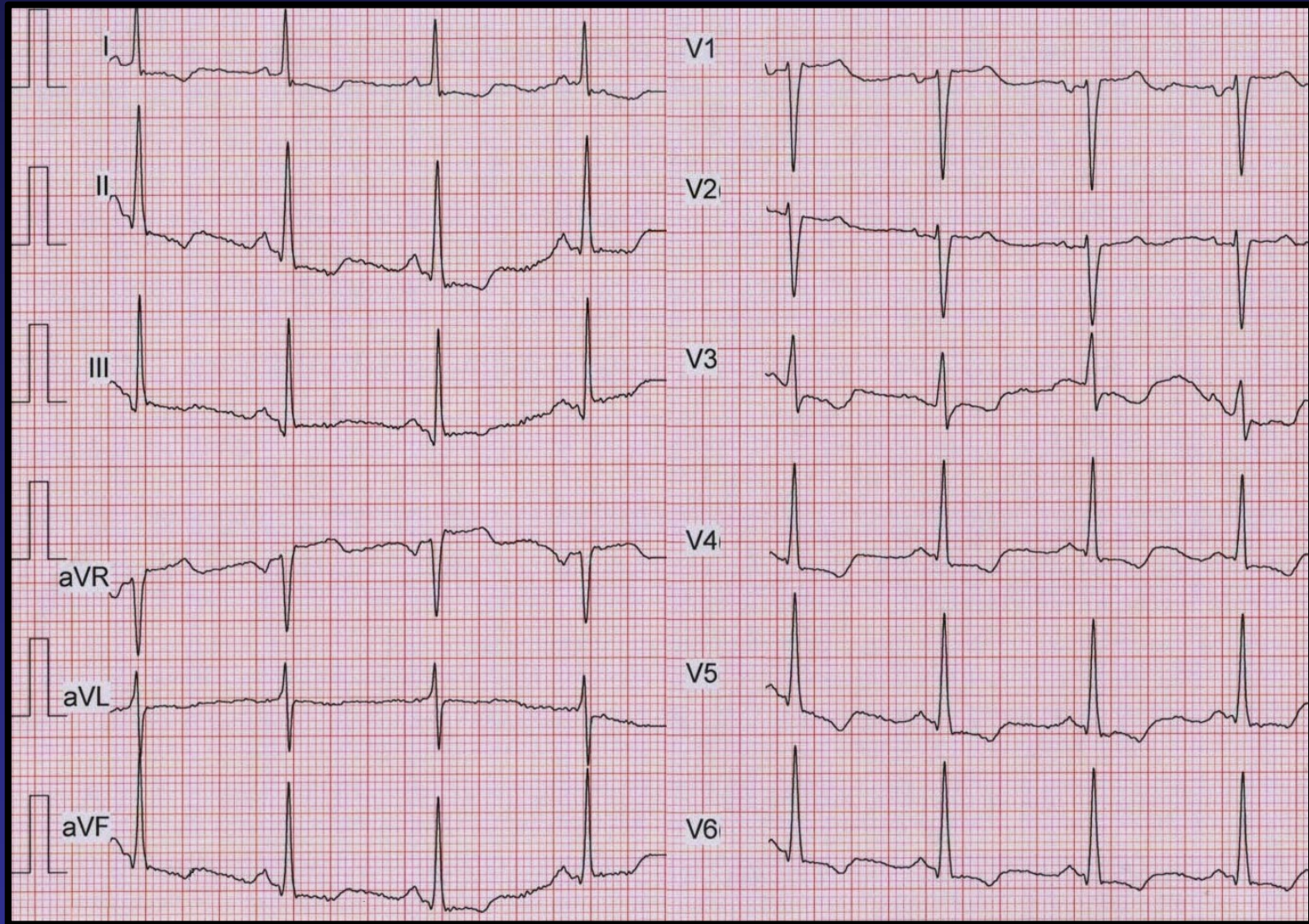
LMS lesion

Spider view

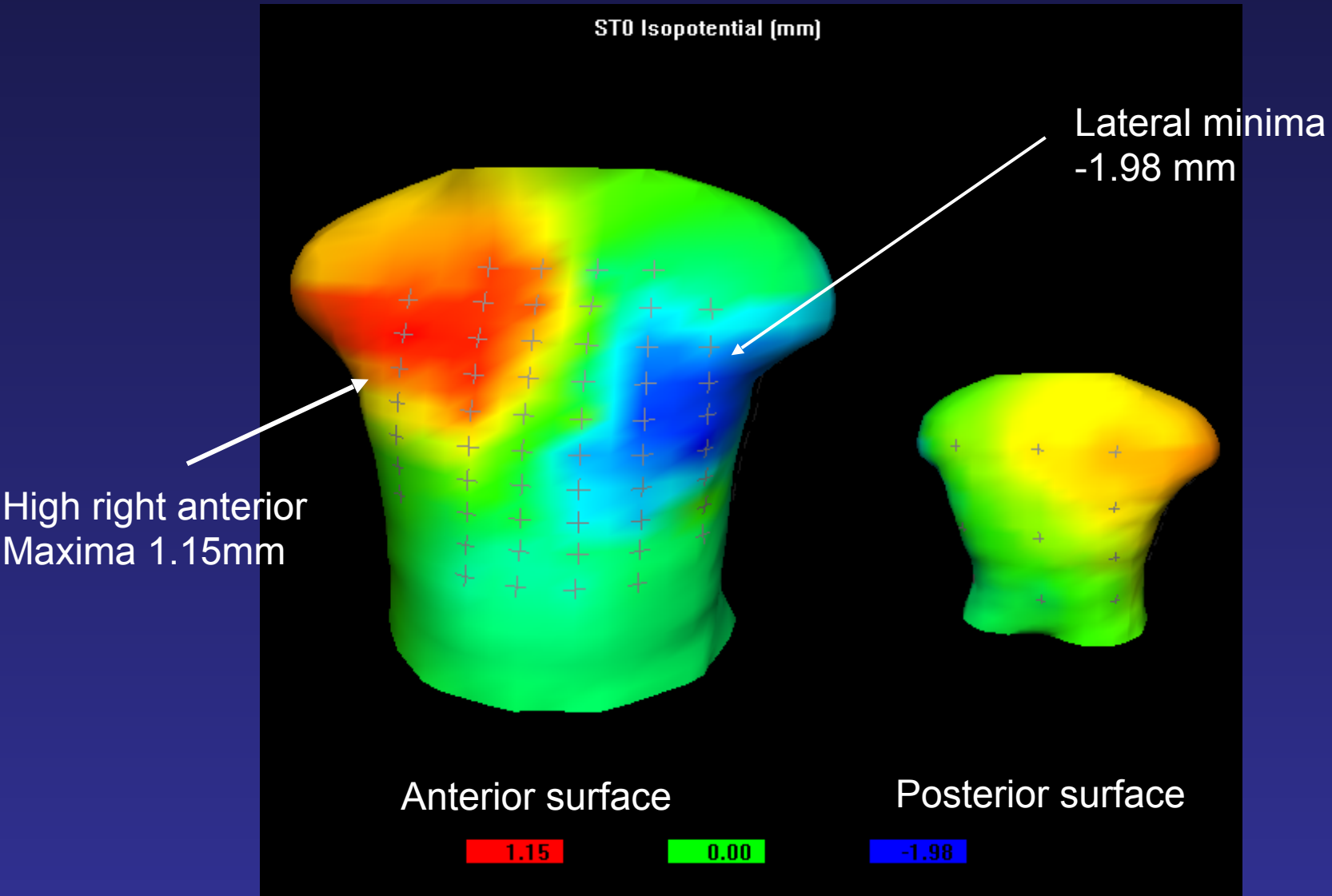RCA lesion, PDA branch

LV diastole   LV systole

12-lead ECG

64 year old male. First presentation of ACS.
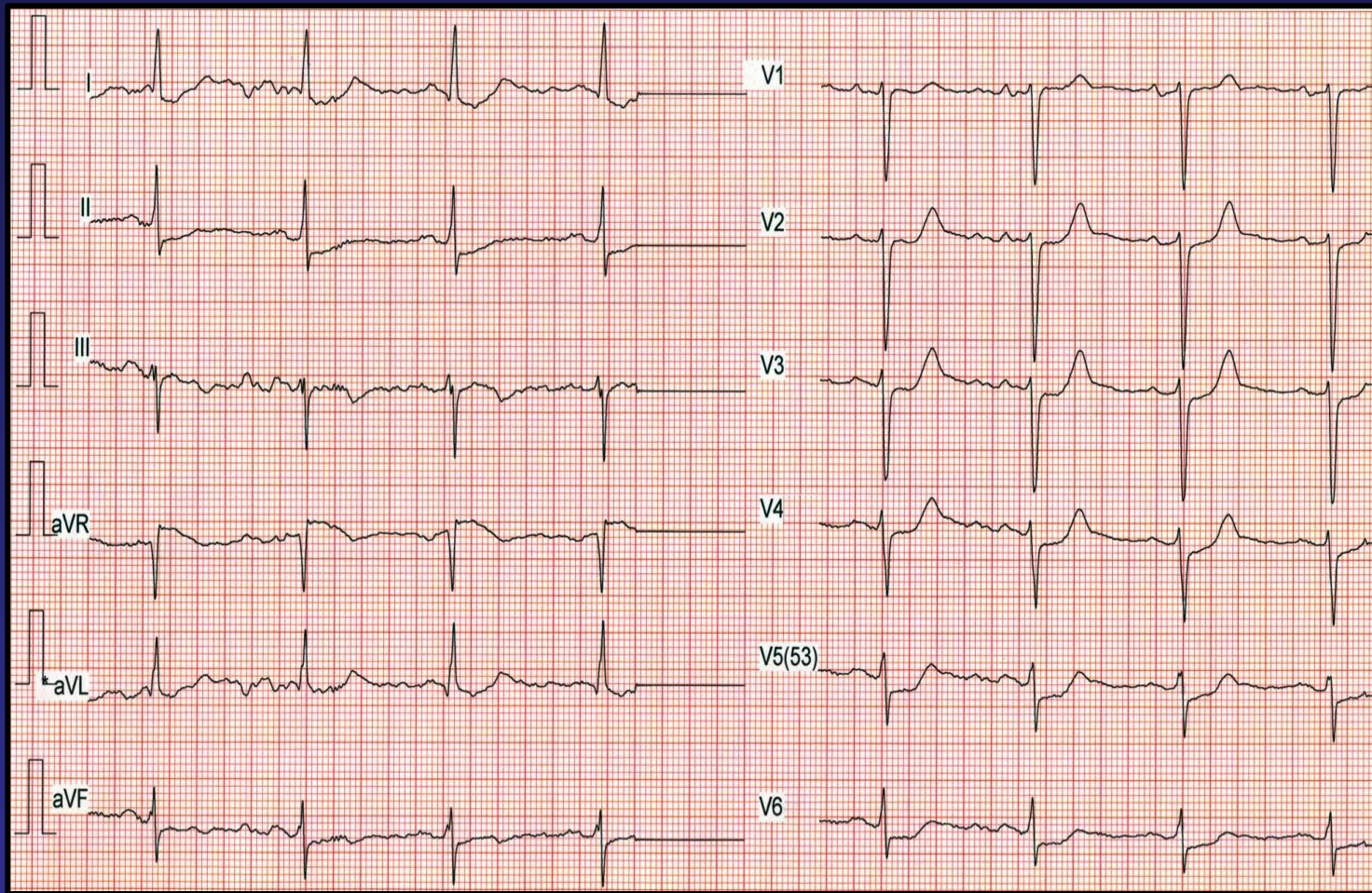Rest pain for 4 hours, angina for 6 weeks

BSM

STO Isopotential (mm)

Lateral minima
-1.98 mm

High right anterior
Maxima 1.15mm

Anterior surface   Posterior surface

| 1.15 | 0.00 | -1.98 |

cTnT 12.98 ng/mL. Cardiac Catheterisation 90% LMS
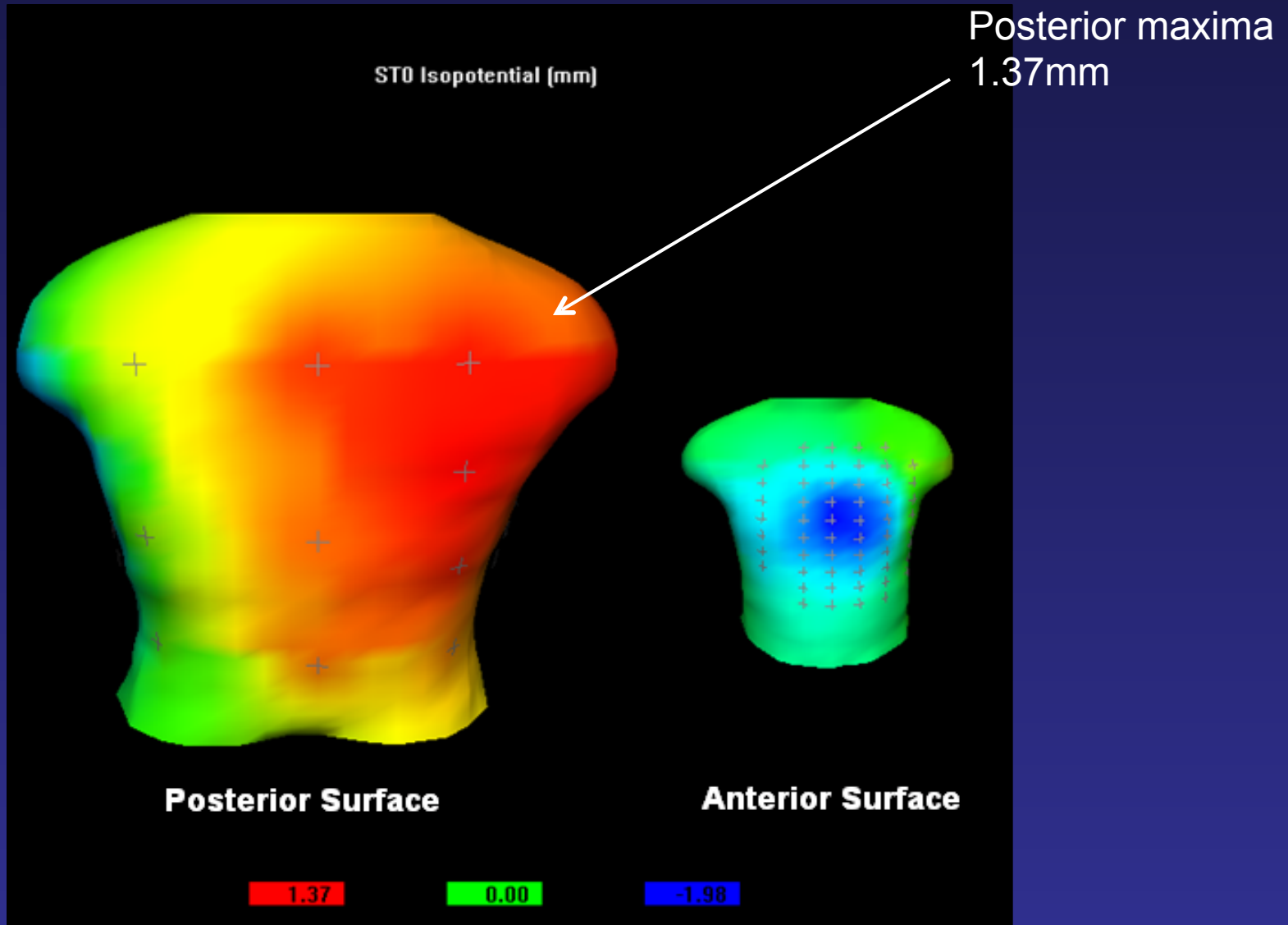With thrombus in LMS extending to LAD

12-lead ECG

70 year old female, first presentation of ACS. Rest chest pain for 3 hours

BSM

cTnT 4.98 ng/mL. Cardiac catheterisation 3-vessel disease.
Thrombus in LCX

Summary

- Early triage:
  - history (e.g. rest pain etc)
  - 12-lead ECG, 80-lead BSM
  - TIMI risk assessment
  - Cardiac markers (12 hrs for troponin)

- Early pharmacotherapy (Pre-hospital if possible)

- Urgent investigations (coronary angiography, echocardiogram)