Syncope – Beyond the Basics



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THANK GOODNESS YOU'RE HOME...
... THE CHRISTMAS TREE FAINTED.

Outline

- What causes syncope?
- What are the “can’t miss” causes?
- How do I evaluate and manage a syncopal patient?
- What are key EKG findings?



Syncope - defined

Syncope is a ***transient loss of consciousness*** with a spontaneous return to a normal, baseline mental status.

Pre-syncope: same thing without LOC

The you need to ask…

- Is this a benign physiological response?
- Is this a potentially life threatening condition?



Syncope vs Pre-syncope

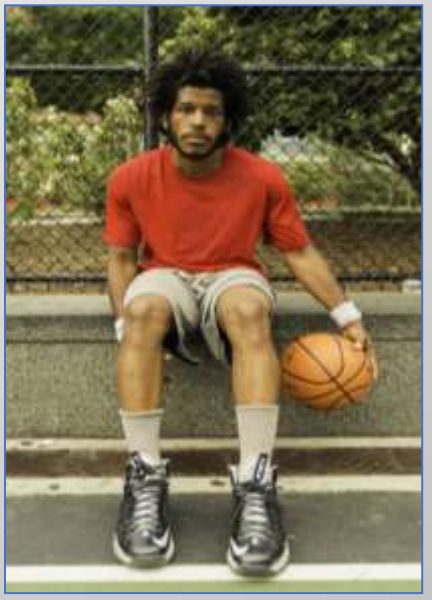
- Actual history of loss of consciousness (LOC) is not critical
- Pre-syncope can be just as concerning and caused by a “can’t miss diagnosis”
- Difference: Patients with syncope may need ***workup for trauma*** due to injuries related to falling

Case 1

Dispatched to a syncope call.

On arrival, the crew finds a 27-year old male who is confused and has urinated on himself. Bystanders say that he was standing when he suddenly slumped over and had tonic-clonic jerking.

On assessment, he is confused and very diaphoretic, with normal vitals



Case 1

Medications: insulin, lisinopril, prozac

PMH/PSH: Diabetes, hypertension, cholecystectomy

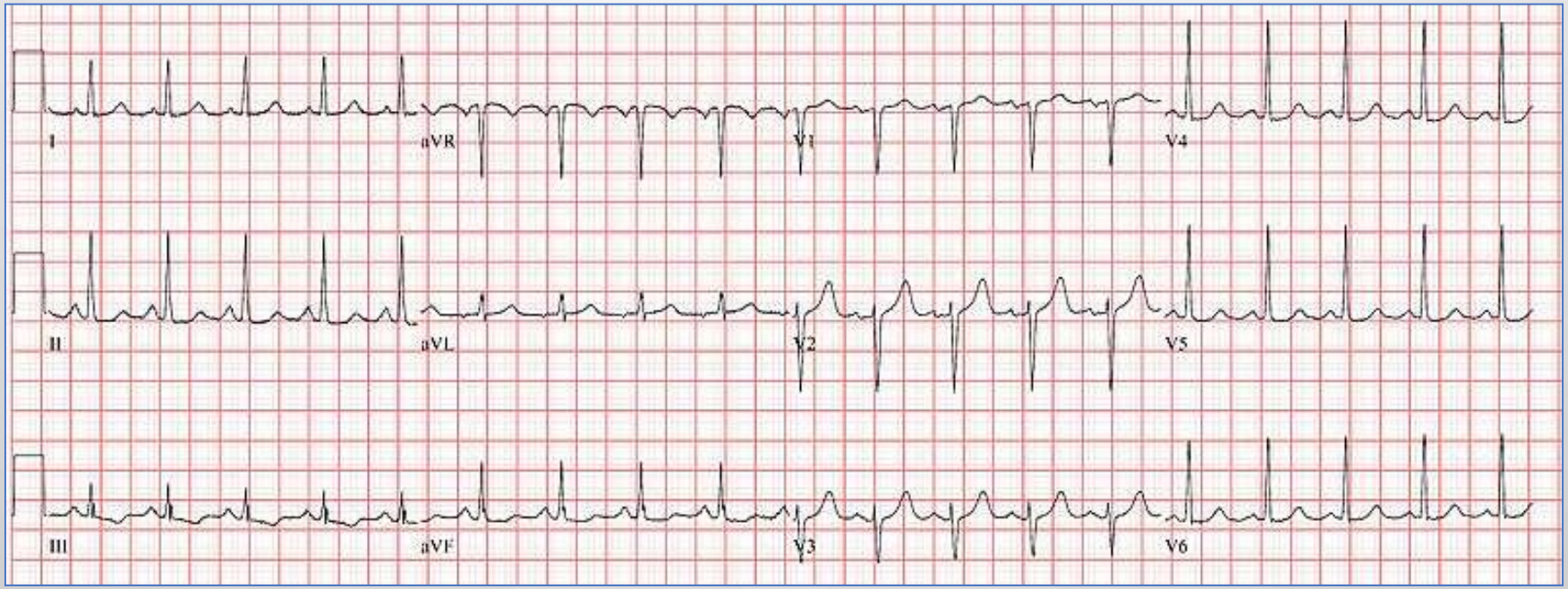
SH: No drugs, minimal alcohol

Evaluation and Management

- What was he doing prior to the syncopal event?
- How does he look now?
- Are there any new medications?
- Are there any “red flags”?

- Glucose 44
- EKG

Case 1 - EKG



Case 1

After receiving one ampule of dextrose 50%, the patient becomes more alert.

He states that he is an insulin-dependent diabetic who had been playing pickup basketball all after- noon and missed lunch.

He refuses transport and goes home with family.

Causes of Syncope

- You need to distinguish life-threatening causes (i.e. usually cardiovascular) from benign causes
- Focus on excluding serious pathology (usually cardiac)
- History and physical are KEY to identifying life-threatening causes

Syncope – what's the big deal?

- Common ED Presentation
  - 750,000 ED visits in U.S. annually (3.5%)
  - Accounts for 1-6% of hospital admissions

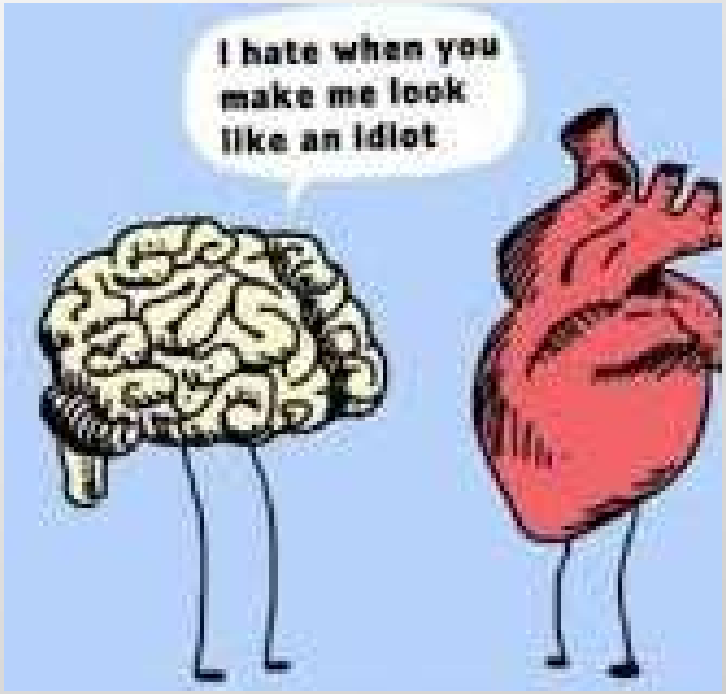


Causes of Syncope

Cardiac ~10-20%	**Neurologic ~10%**	**Reflex-mediated ~20-30%**	**Idiopathic ~35%**
Dysrhythmia	Migraine	Vasovagal	
Vfib	Suclavian steal	Orthostatic	
Vtach	TIA	Hyperventilation	
Afib/RVR	SAH	Carotid sinus syndrome	
Outlfow obstruction	Psychogenic		
Aortic stenosis			
HOCM			
Restrictive cardiomyopathy			
Percardial tamponade			
ACS			
PE			
Aortic dissection			
Congenial heart disease			
Prolonged QTc			

Pathophysiology of Syncope

- Acute hypoperfusion of the brain = loss of consciousness
- Neuroprotective:
  - prone body = better brain perfusion (no gravity)
- Hypoperfusion resulting in 35% or more reduction of cerebral blood flow produces unconsciousness



Case 2

EMS is dispatched to a call for syncope. On arrival, the crew finds a 73-year-old male who was sitting at dinner when he became pale and passed out. He is complaining of chest pain.

Current vital signs include a blood presure of 180/100 mm Hg.

Examination is otherwise unremarkable.



Case 2

Medications: metformin, metoprolol, simvastatin, aspirin 81mg,

PMH/PSH: Diabetes, hypertension, hypercholesterolemia, AAA repair

SH: No drugs, minimal alcohol, lives with wife, occasional smoker

Evaluation and management

- What was he doing prior to the syncopal event?
- How does he look now?
- Are there any new medications?
- Are there any “red flags”?

- Glucose 180
- EKG

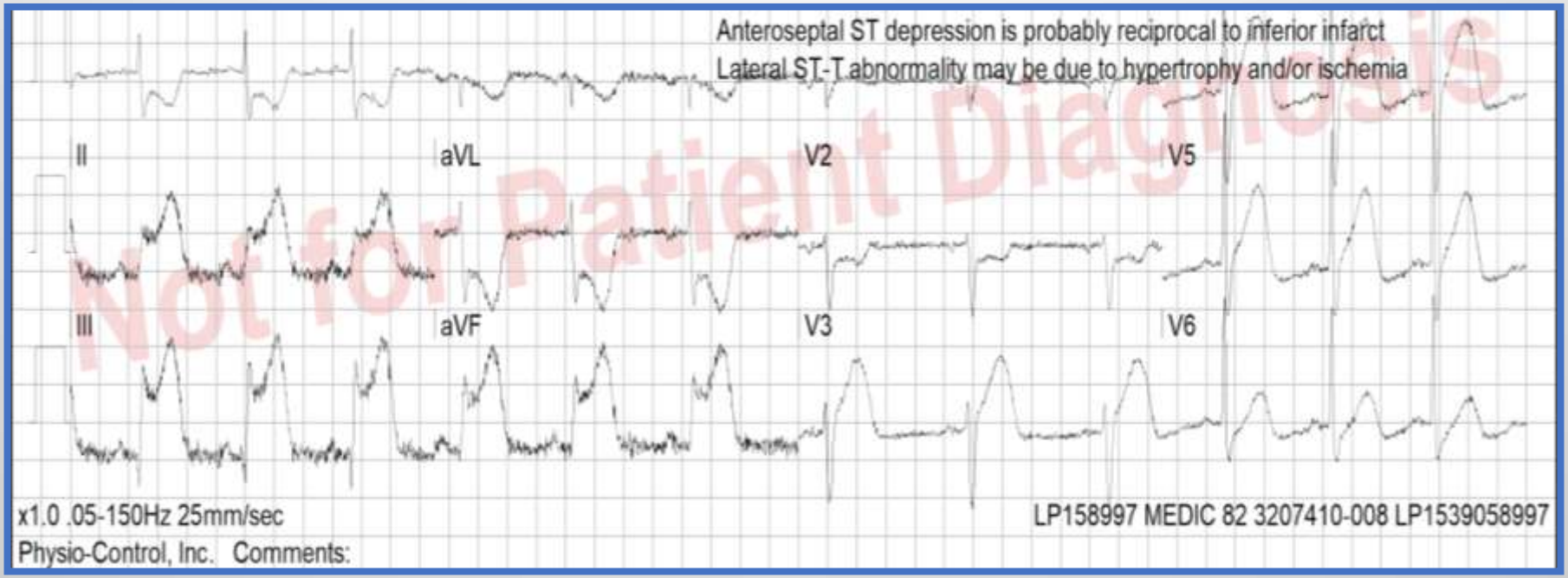
Differential Diagnosis for Case 2?

- Vasovagal
  - Emotional/pain response
  - Situational (micturition, defecation, coughing)
- Orthostatic
  - Volume depletion, anemia, acute blood loss
- Cardiac Disease
  - MI
- Cardiac Arrhythmia
  - Tachyarrhythmia (SVT, Vtach/Vfib)
  - Bradyarrhythmia, pacemaker malfunction
- Cardiac outflow obstruction
  - Valve dysfunction
  - Aortic stenosis
  - Tamponade
  - Cardiomyopathy

Differential Diagnosis for Case 2?

- Neuological
  - Seizure, SAH, CVA, TIA
- Hypoglycemia
- Toxic
  - Drugs, OD, poisoning
- Psychogenic
  - Anxiety, panic
- Aortic dissection
- Carotid sinus sensitivity
- Medications
- Pulmonary
  - PE, pulmonary hypertension

Case 2 - EKG

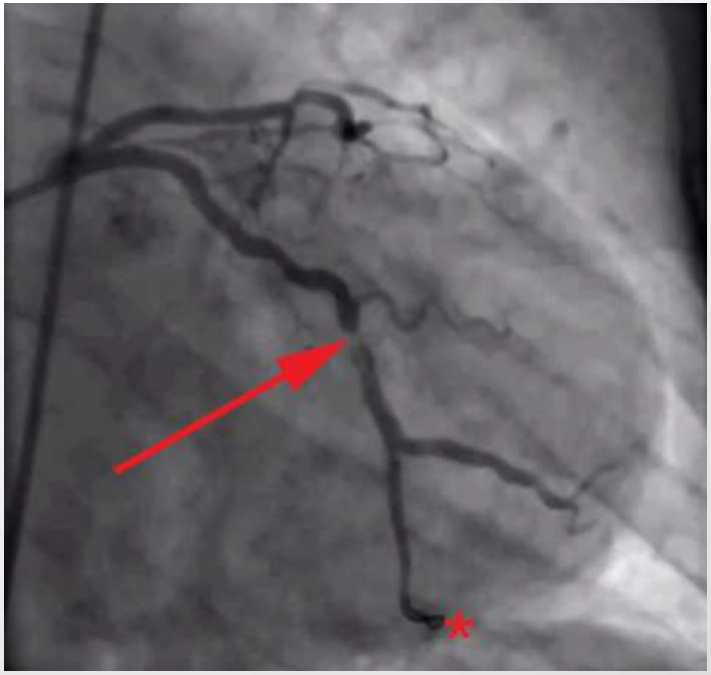

Anteroseptal ST depression is probably reciprocal to inferior infarct
Lateral ST-T abnormality may be due to hypertrophy and/or ischemia
II
aVL
V2
V5
III
aVF
V3
V6
Not for Patient Diagnosis
x1.0 .05-150Hz 25mm/sec
LP158997 MEDIC 82 3207410-008 LP1539058997
Physio-Control, Inc. Comments:

Case 2

IV placed

Patient is given ASA 324mg and transported to hospital as a STEMI alert.

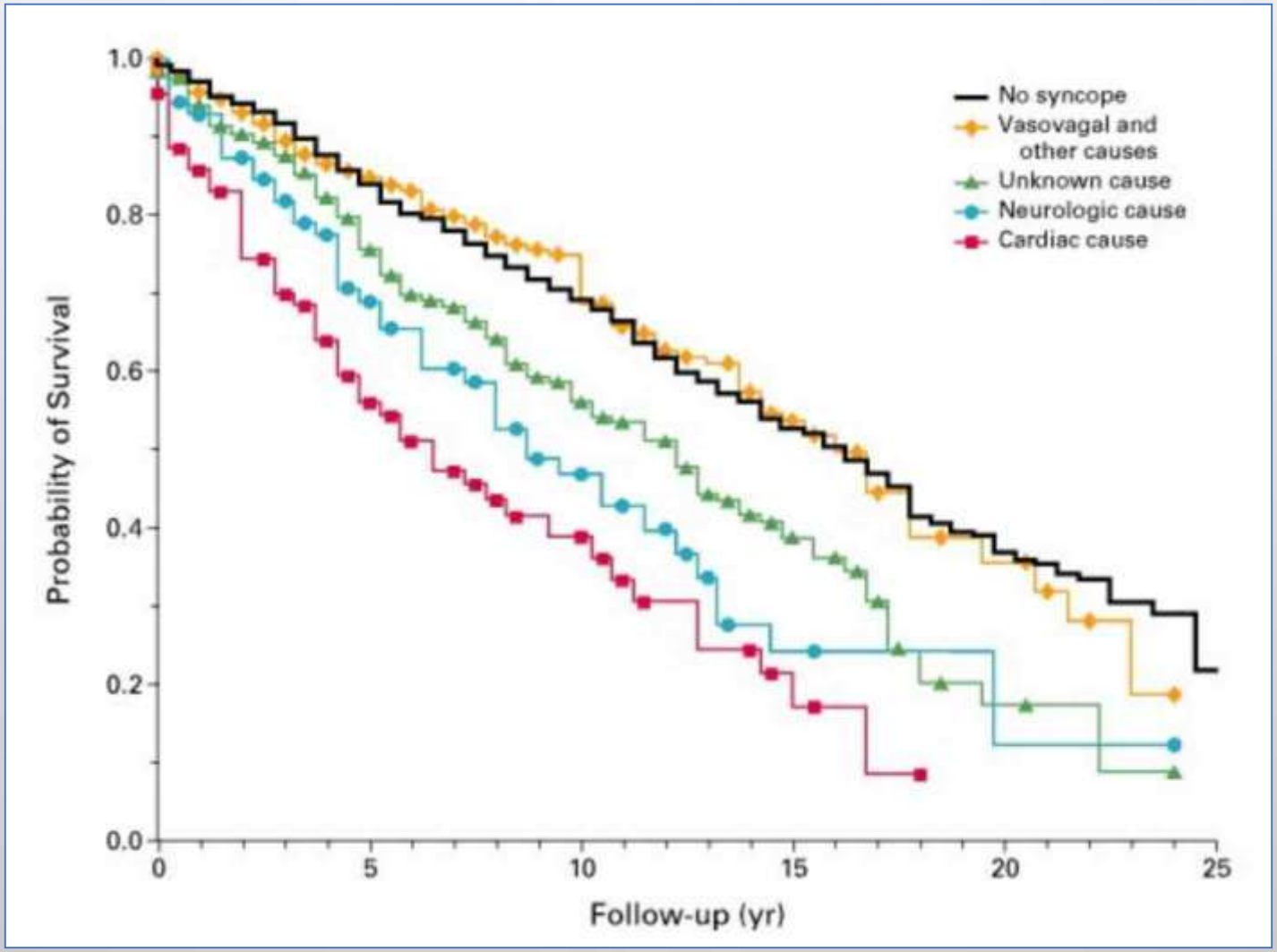
ACS and Syncope



ACS is a RARE cause of syncope.

It is a ***"don't miss"*** diagnosis.

Syncope from Cardiac Cause



Recap – Can't Miss Diagnoses!!!



<u>Cardiopulmonary</u>

Myocardial infaction

Aortic stenosis

Hypertrophic Cardiomyopathy

Pulmonary embolism

Thoracic aortic dissection

Lethal cardiac arrhythmia

Recap – Can't Miss Diagnoses!!!

Neurovascular

Subarachnoid hemorrhage

TIA/Stroke

Bleeding

Ruptured abdominal aortic aneurysm (AAA)

Ruptured ectopic pregnancy

Major GI bleeding

Case 3

EMS is dispatched to a call for fall. On arrival, the crew finds an 88-year-old female who reports tripping and falling several times today. She cannot recall details or why she fell. Patient is complaining of right hip pain, and is able to bear some weight. She lives alone at home.



Case 3

Medications: Ditropan, metoprolol, lisinopril, Bactrim, donepezil

PMH/PSH: mild dementia, urinary incontinence, hypertension

SH: No drugs, alcohol, tobacco. Lives alone

Evaluation and management

- What was she doing prior to the syncopal event?
- How does she look now?
- Are there any new medications?
- Are there any “red flags”?

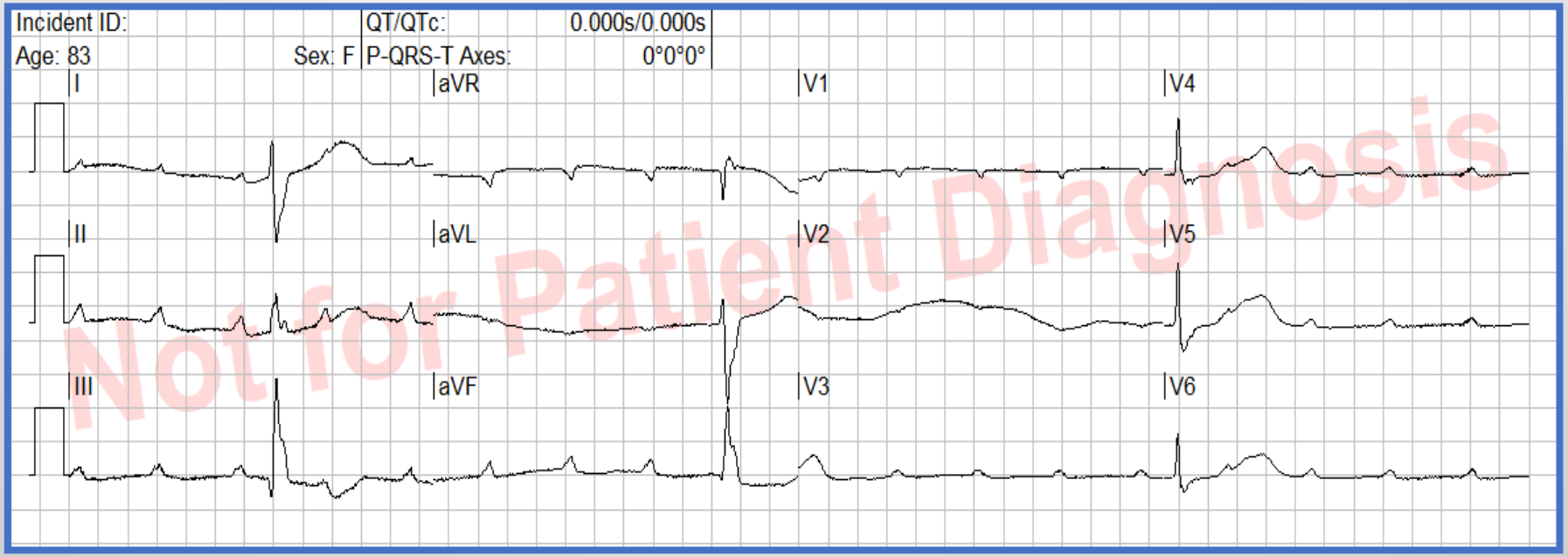
Differential diagnosis?

Case 3

P 22, BP 120/50, RR 16, Sats 95% RA
Alert and talking to you

Glucose 140
EKG

Case 3 - EKG


Incident ID:
QT/QTc:
0.000s/0.000s
Age: 83
Sex: F
P-QRS-T Axes:
0°0°0°
I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
Not for Patient Diagnosis

I don't trip.



I do random gravity checks.

Patient assessment

- Most patients are symptoms on EMS evaluation, so ***pay attention to red flags on history and physical***
  - Recurrent syncope
  - Chest pain
  - Shock

- History and physical exam will guide you!!!

Patient Assessment

- History is KEY!!!!
- What was the patient doing at the time of the syncopal event
  - Position (supine, sitting, standing)
  - Activity (rest, change in posture, exercise/exertion, urination/defectaion, prolonged standing, coughing)
  - Precipitating events (pain, fear/emotion)



Patient Assessment

- History is KEY!!!!
- Symptoms associated with syncope
  - Nausea/vomiting
  - Abdominal pain
  - Headache
  - Chest pain/palpitations
  - Aura
- Nature of syncope
  - Complete loss of postural tone
  - Seizure activity/posturing
  - Duration of loss of consciousness

Patient Assessment

- History is KEY!!!!
- Medical history
  - Family history of sudden death, congential heart disease, arrhythmia
  - Pacemakers, sternal scar = previous cardiac disease
  - Neurological disease: seizures, stroke
  - Metabolic disease: diabetes
  - Medications

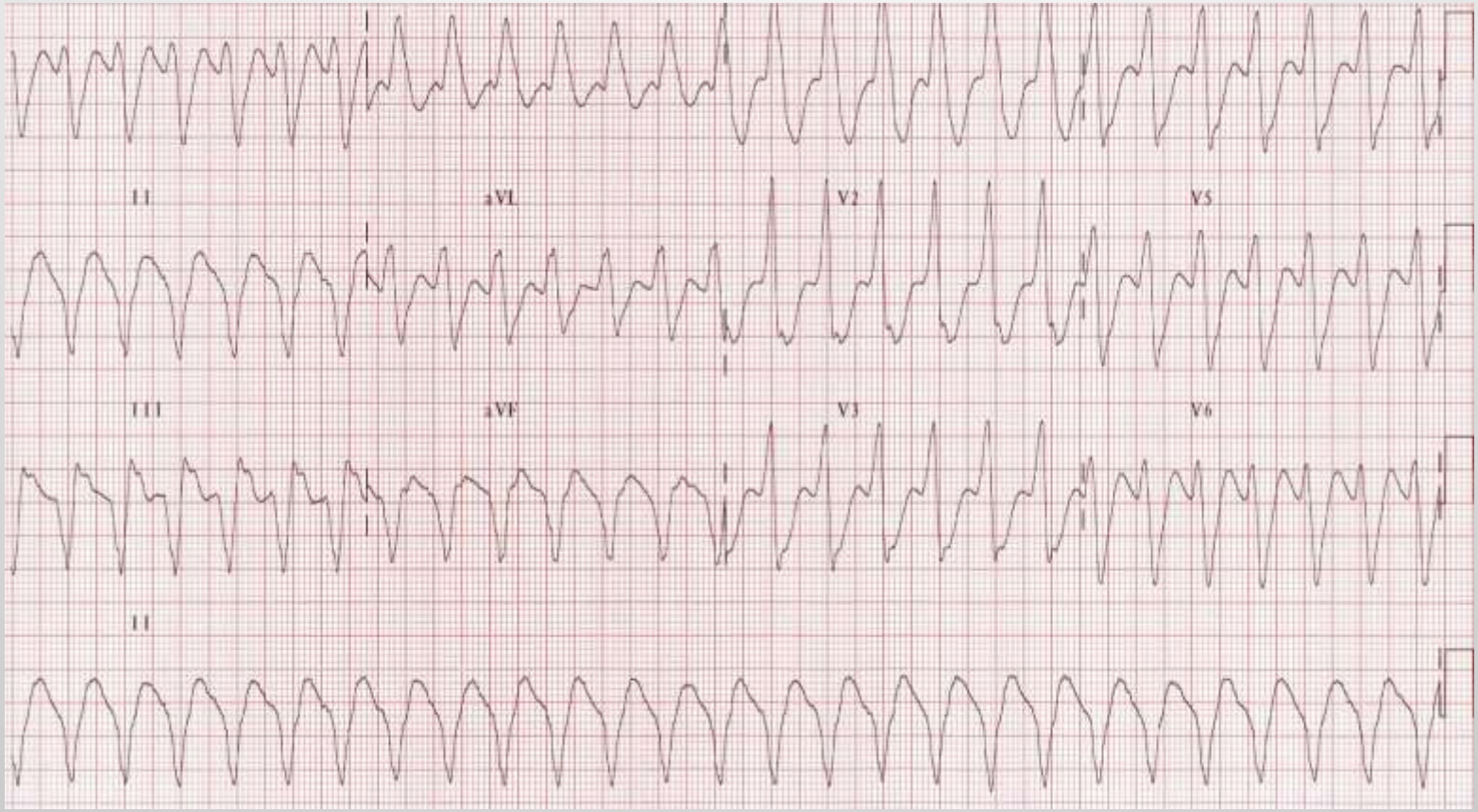
Things you should look for on EKG

- Ischemic Changes
  - ST changes, T-wave changes, new Q waves
- Dysrhythmia
  - Ventricular tachycardia
  - Bradycardia
- Prolonged QT – risk of Torsades de Pointes

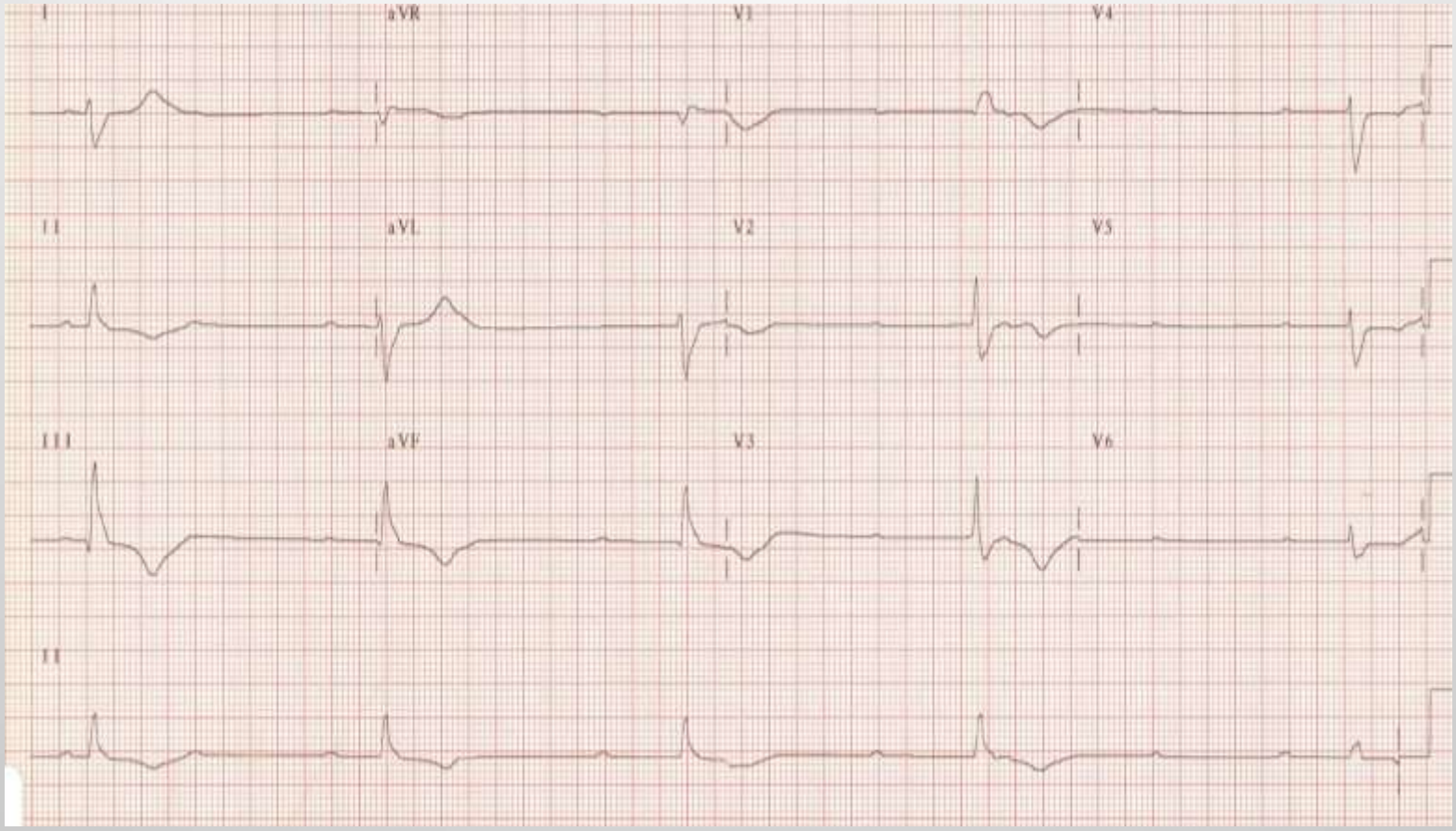
Things you should look for on EKG

- Delta Wave – WPW
- Brugada pattern
- Signs of Right Heart Strain
  - RBBB, T-wave inversion in V1-V4, RAD, S1Q3T3
- Signs of Left Ventricular Hypertrophy
  - High voltages, dagger-like q-waves, deep s-waves/t-wave inversions laterally

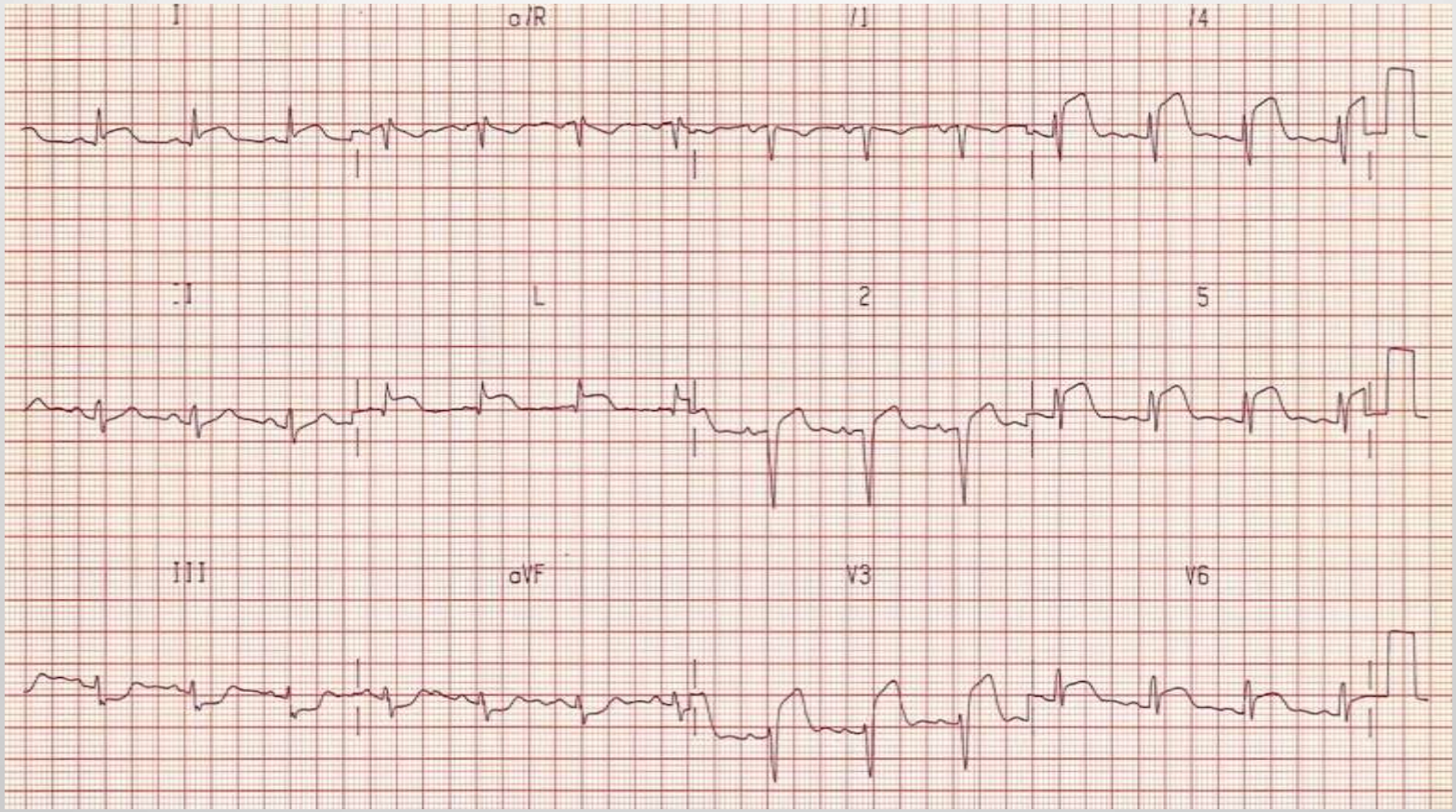
Dysrhythmias



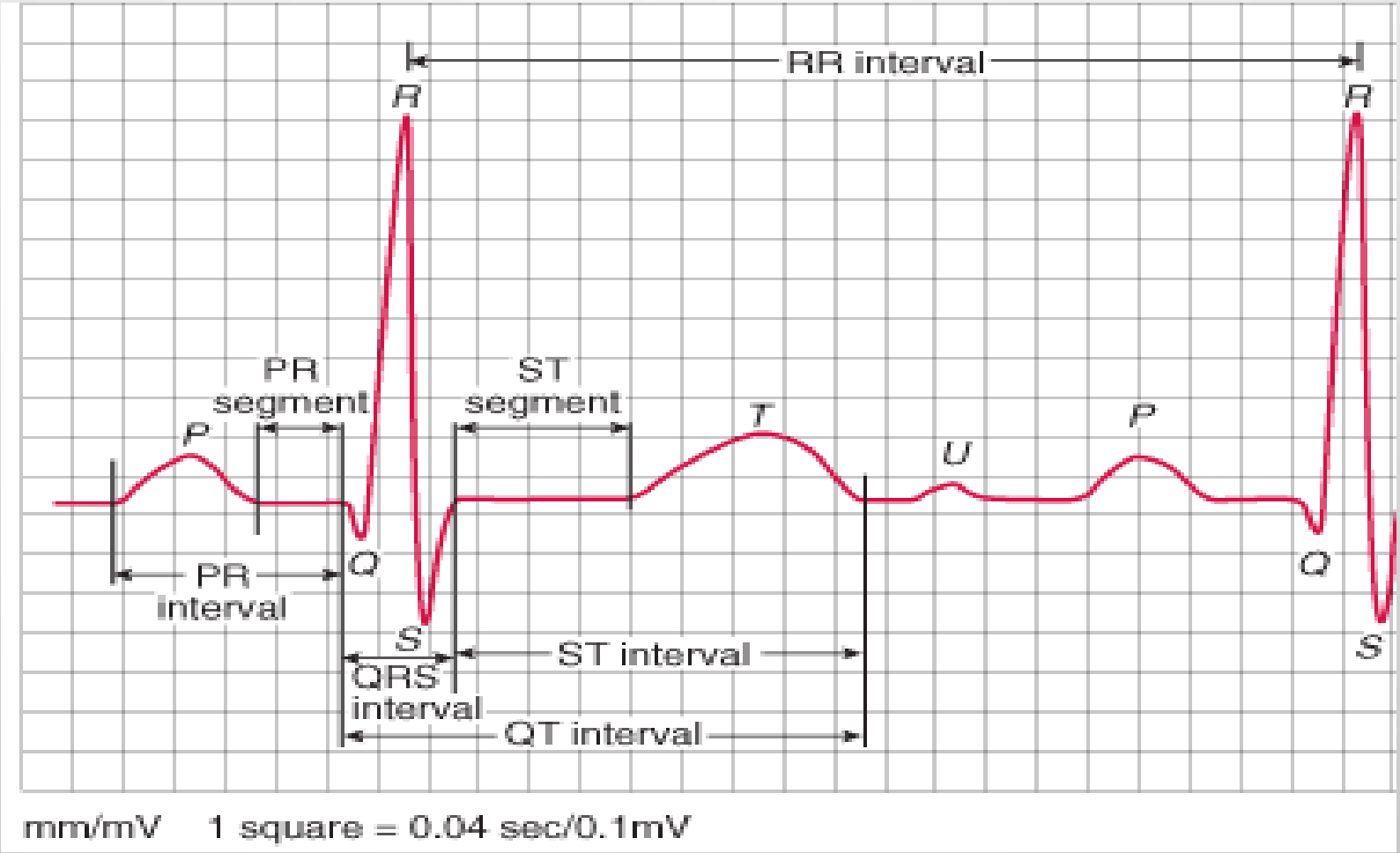
Dysrhythmias



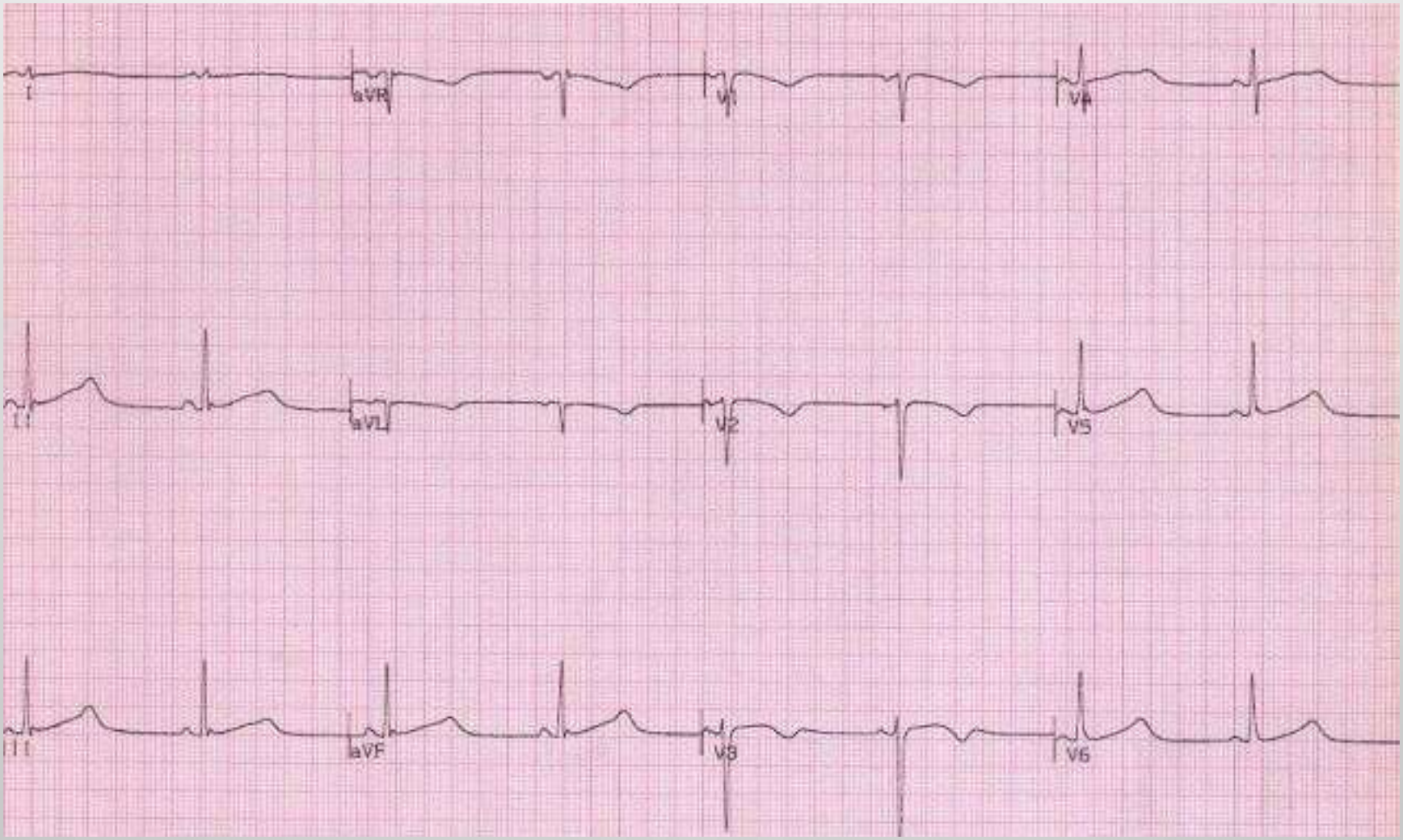
Ischemic Changes



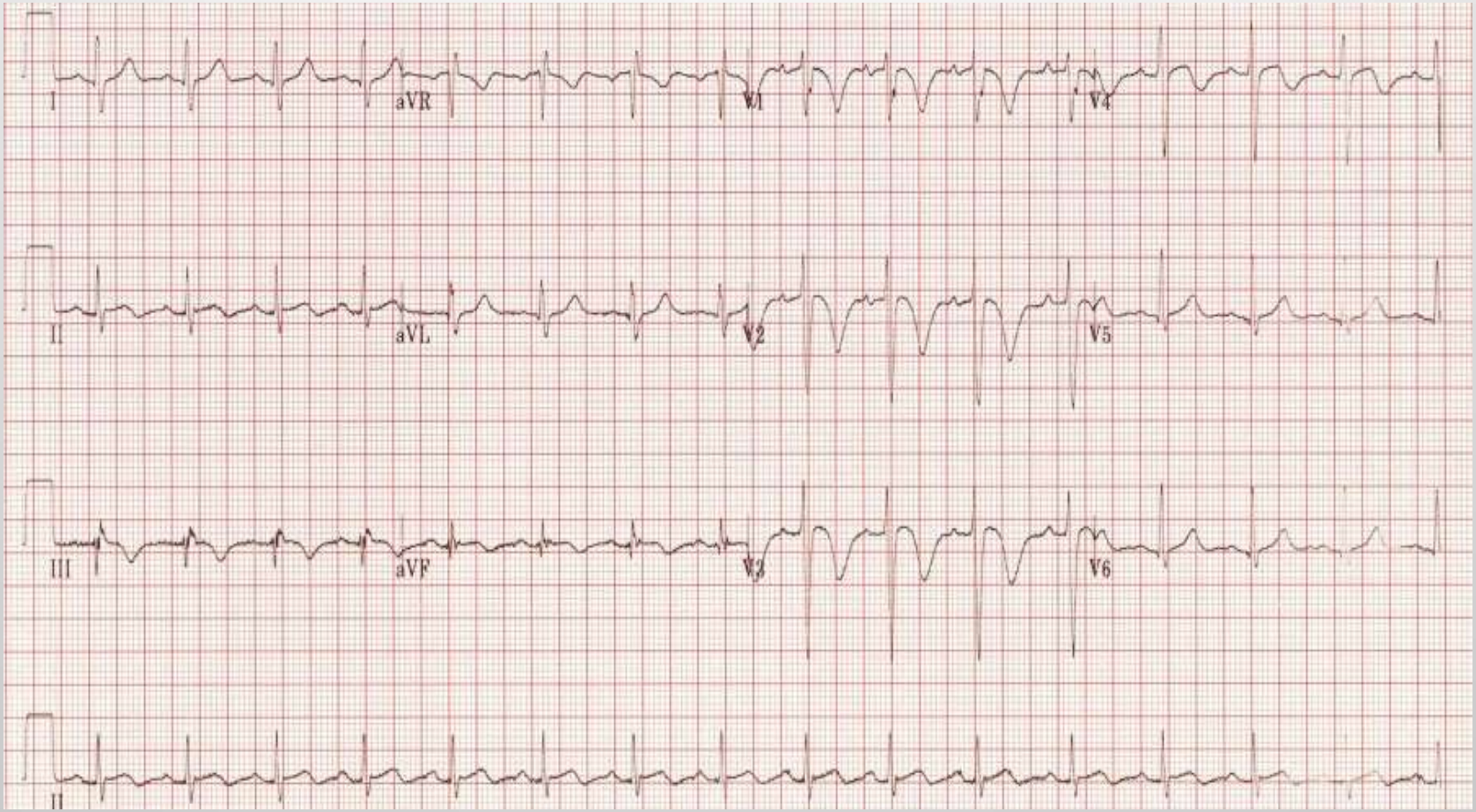
Prolonged QT



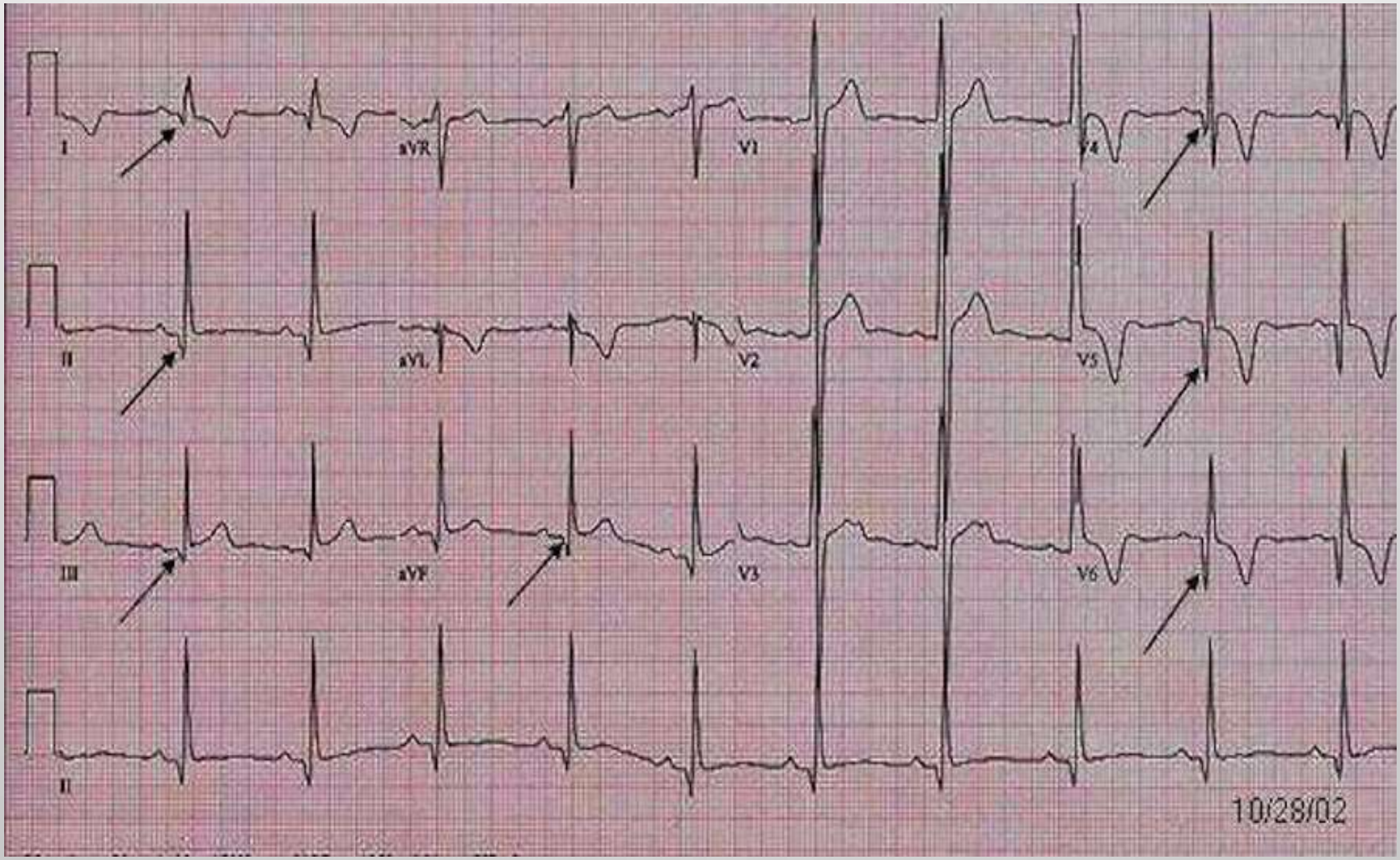
Prolonged QT



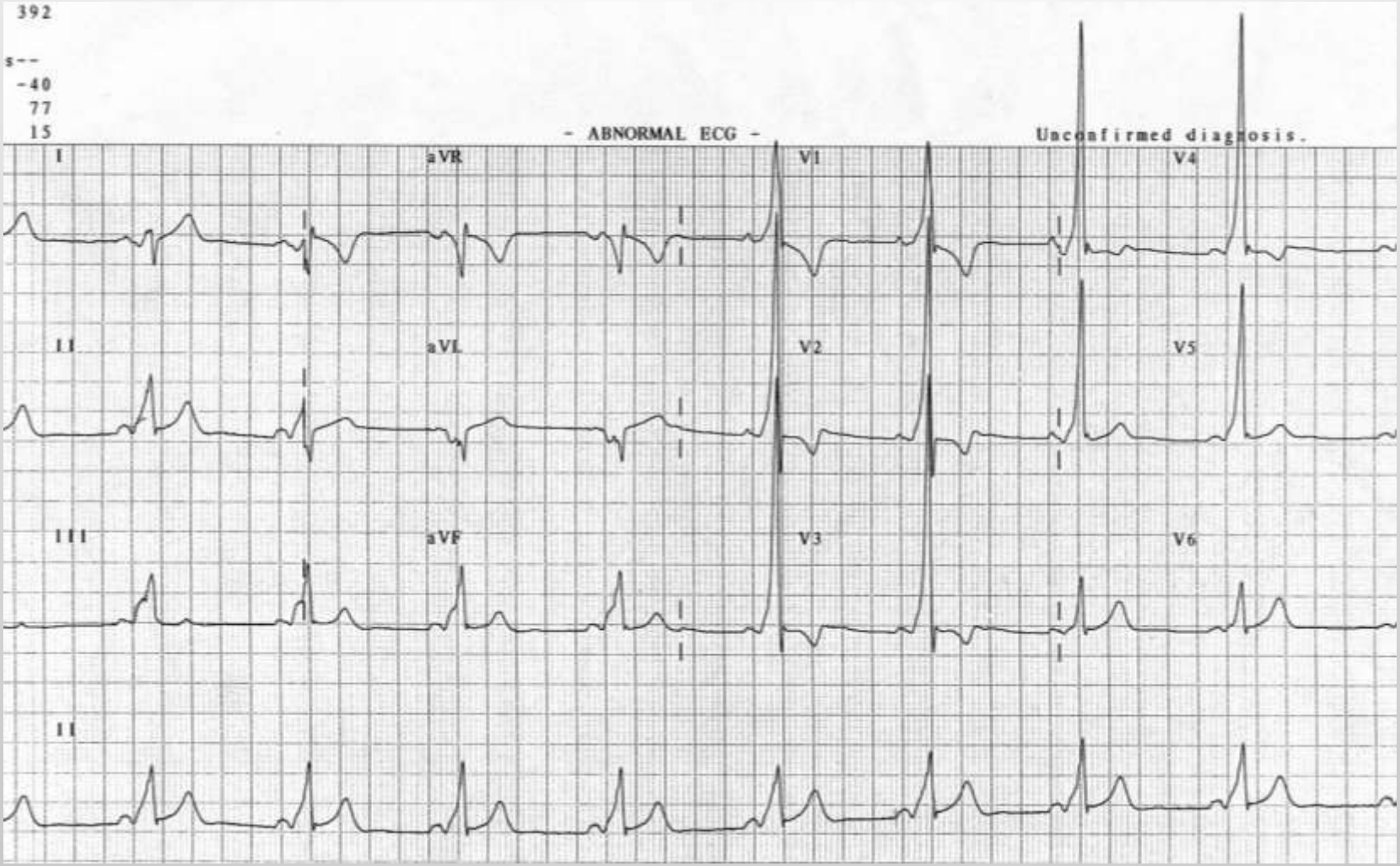
Right Heart Strain/PE



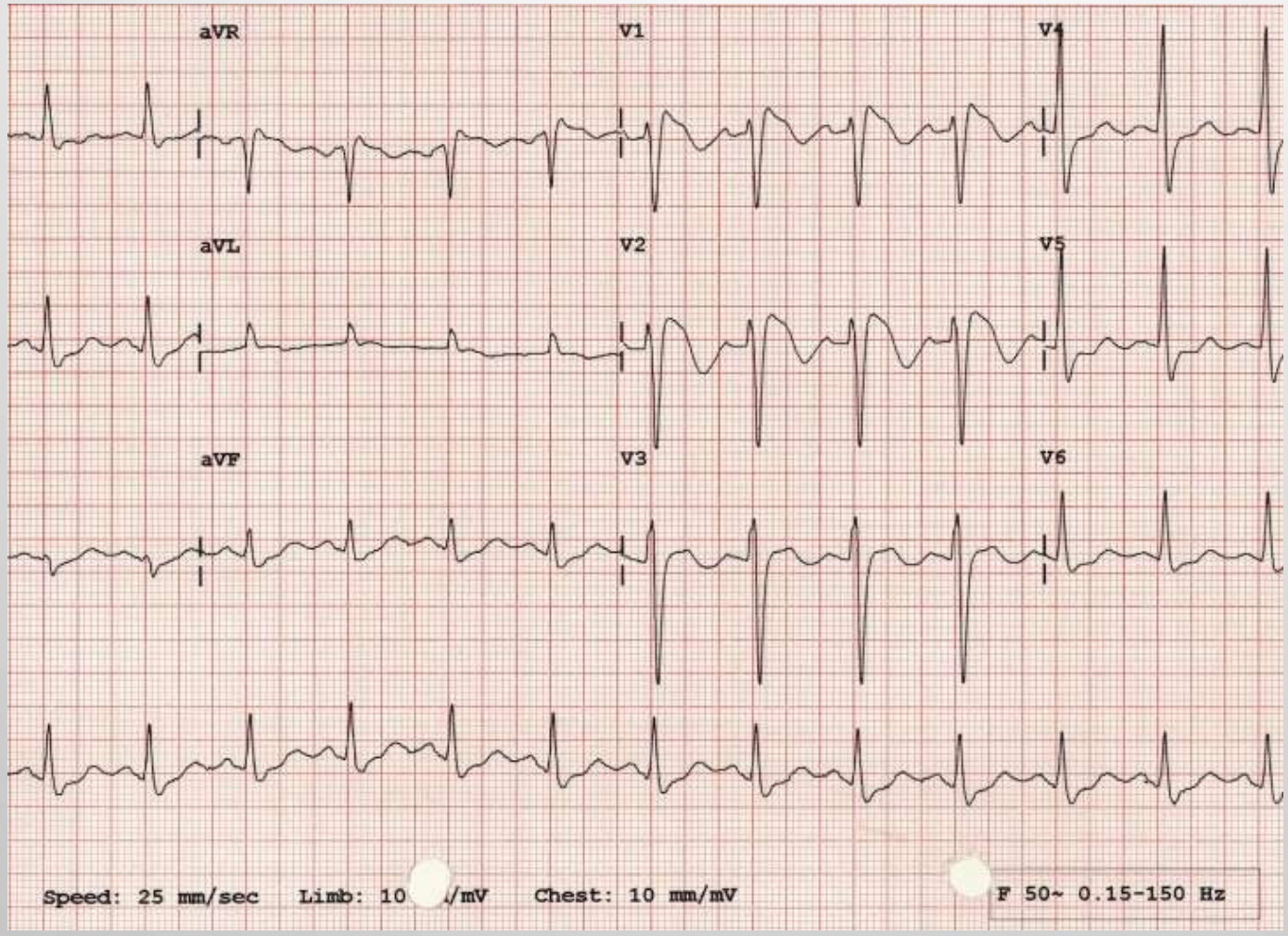
Left Ventricular Hypertrophy

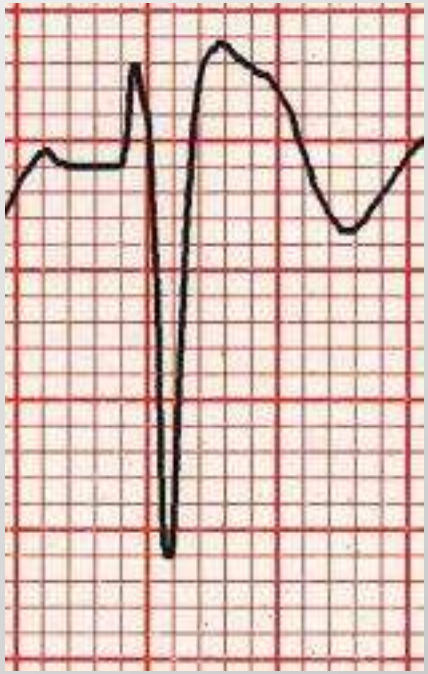


WPW


392
s--
-40
77
15
- ABNORMAL ECG -
Unconfirmed diagnosis.
I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
II

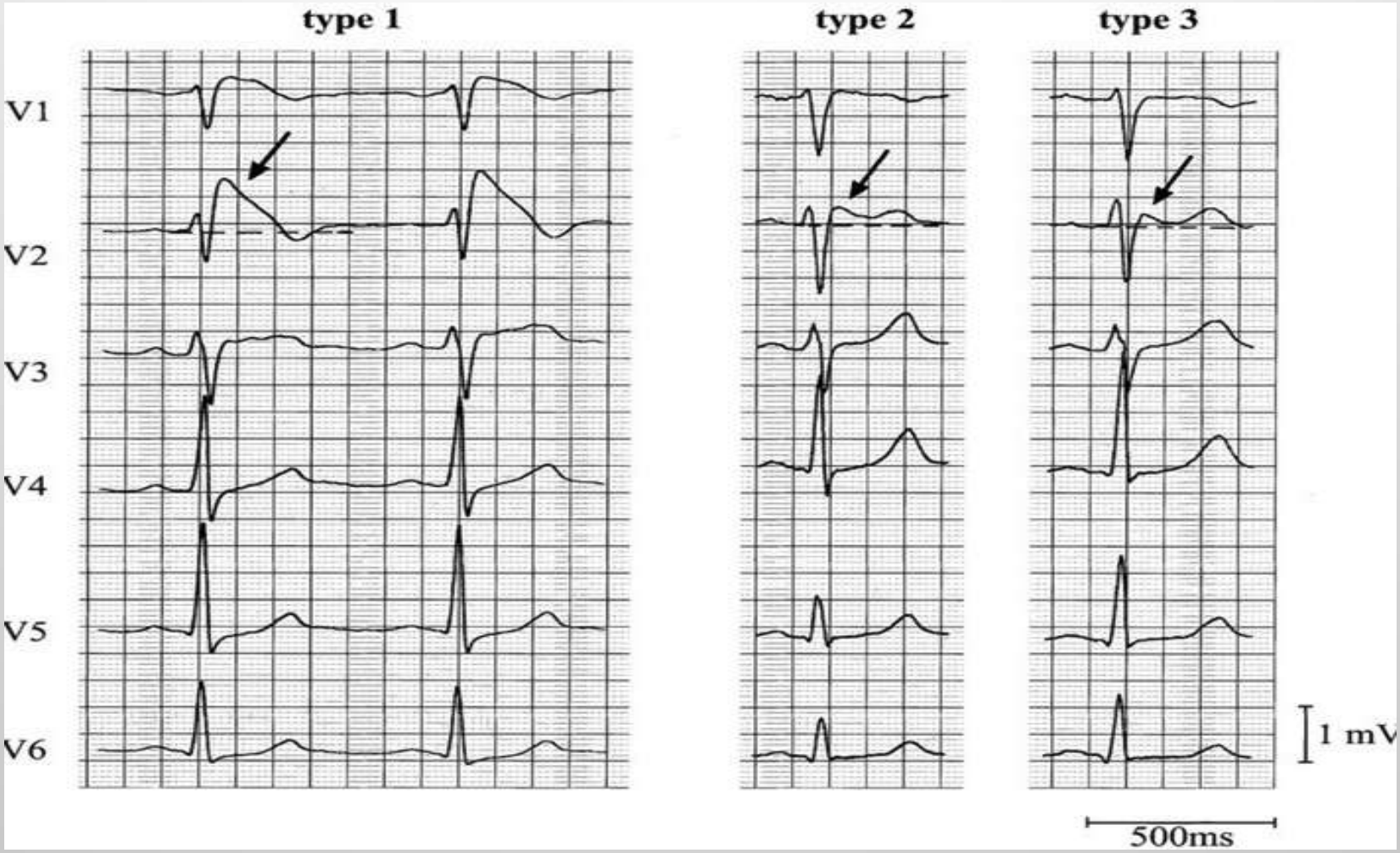
Brugada Pattern





Brugada's Sign

Brugada Types



Case 4

Dispatched to a 67-year old male with syncopal event in the bathroom.

On arrival, patient reports urinating, then waking up on the floor. He has severe left leg pain that was sudden in onset

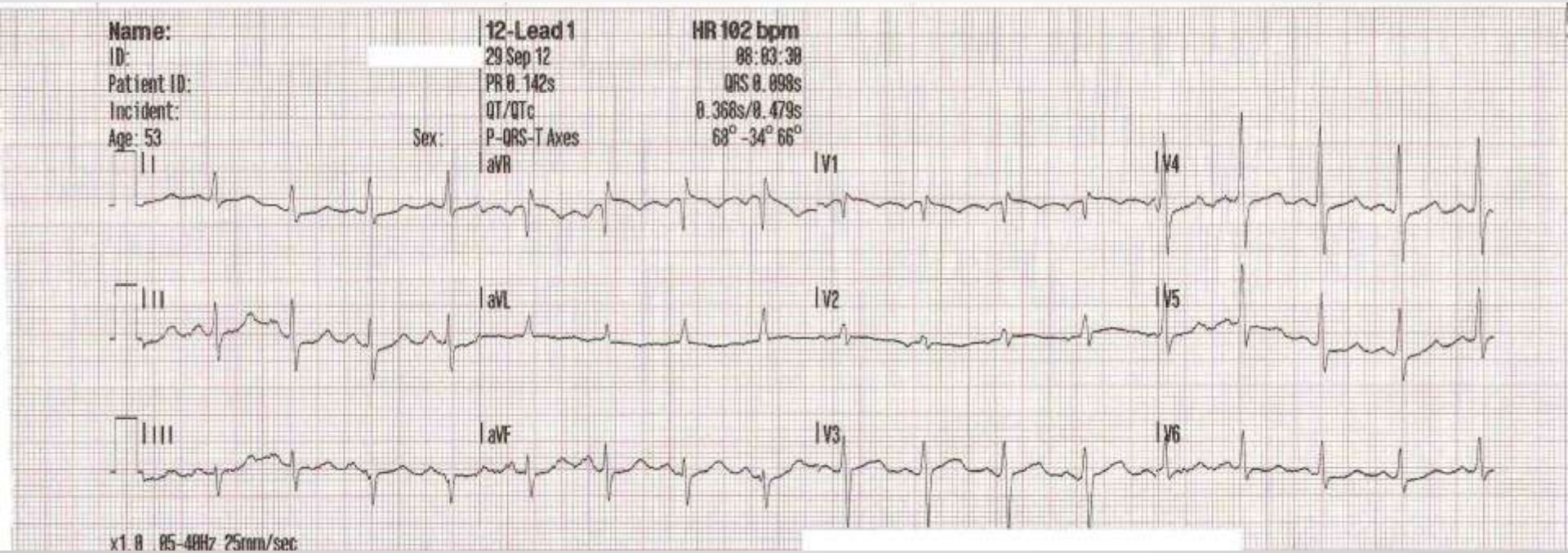
On assessment patient has normal vital signs, large scalp hematoma with bleeding laceration.

Evaluation and Management

- What was he doing prior to the syncopal event?
- How does he look now?
- Are there any new medications?
- Are there any “red flags”?



Case 4 – EKG #1


Name:
ID:
Patient ID:
Incident:
Age: 53
Sex:
12-Lead 1
29 Sep 12
PR 0.142s
QT/QTc
P-QRS-T Axes
HR 102 bpm
08:03:30
QRS 0.098s
0.368s/0.479s
68° -34° 66°
I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
x1.0 05-40Hz 25mm/sec

Case 4

Patient is only having leg pain now and states it's not uncommon to pass out when he urinates.

Patient wants to refuse transport.

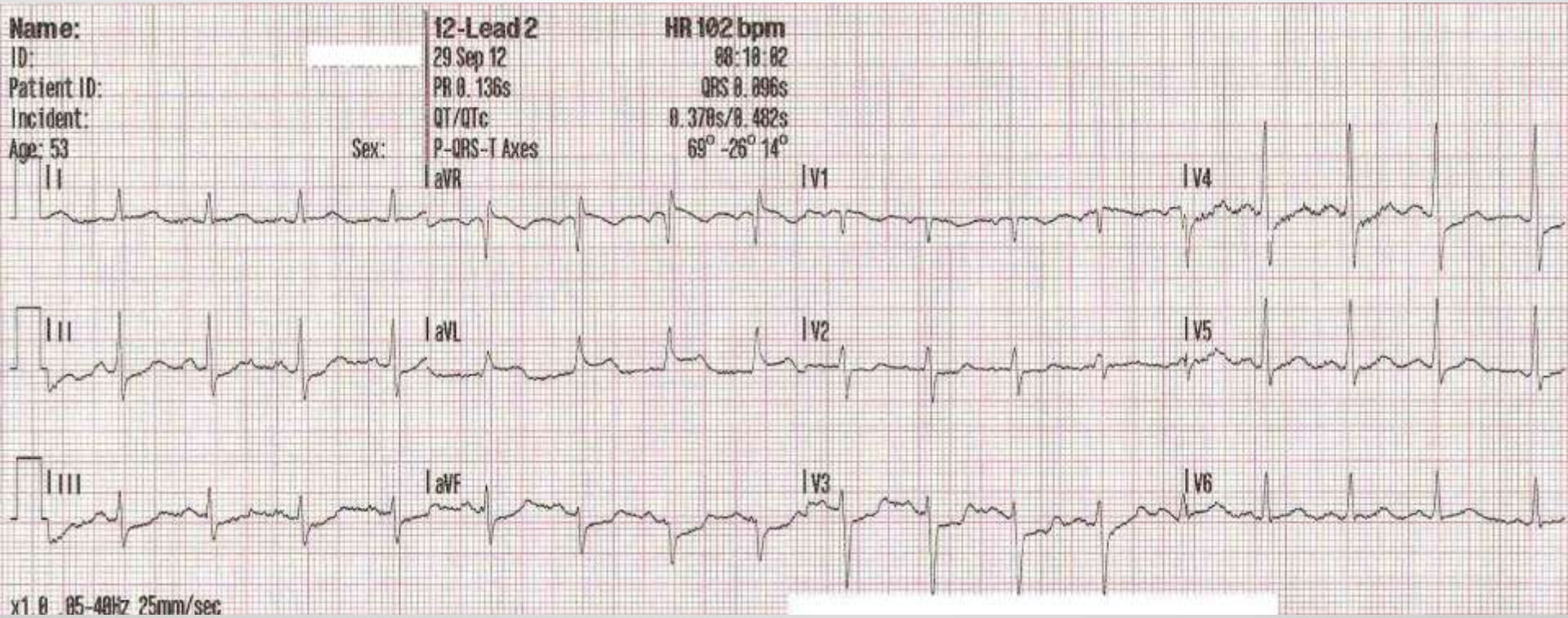
Do you let him refuse?

Case 4

You ask him more questions:

- PMH: CAD, HTN, HLD, Smoker
- Patient briefly mentions possible chest pain
- You give ASA 324mg, nitro and convince him to transport

Case 4 – EKG #2


Name:
ID:
Patient ID:
Incident:
Age: 53
Sex:
12-Lead 2
29 Sep 12
PR 0.136s
QT/QTc
P-QRS-T Axes
HR 102 bpm
88:18:82
QRS 0.096s
0.370s/0.482s
69° -26° 14°
I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
x1 0.05-40Hz 25mm/sec

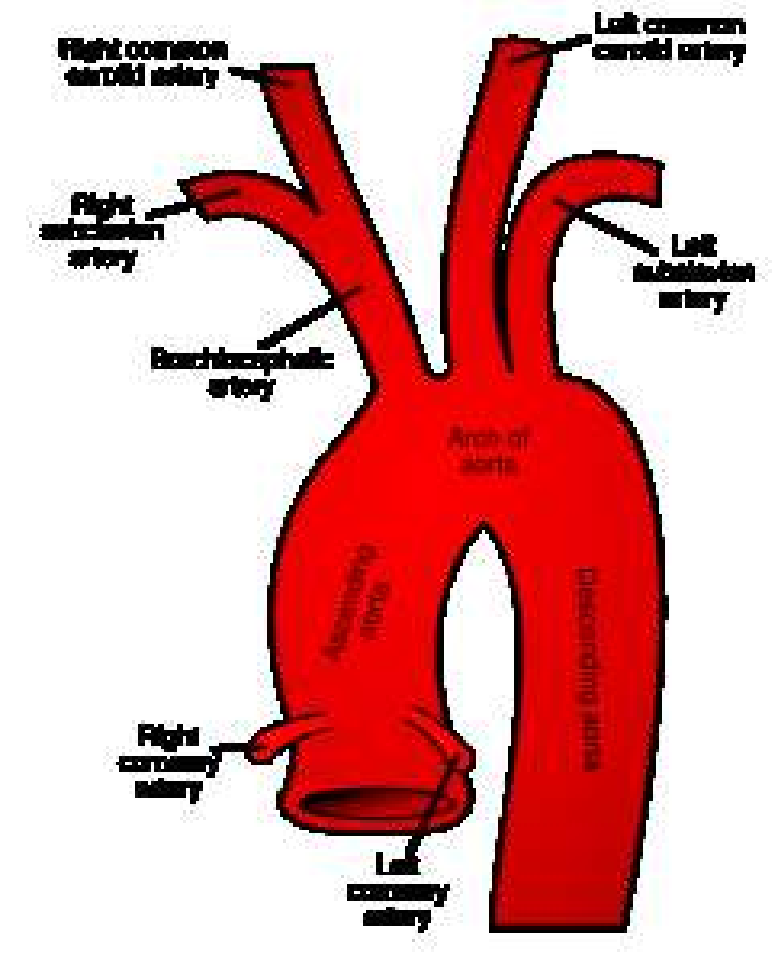
Case 4 - Differential Diagnosis?

- DVT/PE?
- STEMI?
- Aortic dissection?

Case 4 - Evaluation and Management

- IV
- Oxygen
- Possibly more nitroglycerin with his blood pressure

Thoracic aortic dissection



- ***CAN'T MISS*** diagnosis for syncope
- Ascending thoracic aortic dissection ***usually*** dissects into the right coronary artery – resulting in inferior STEMI.
- Can involve the left main coronary artery
- Needs aggressive BP control and surgery

Case 5

Dispatched to a 49-year old female who reports passing out at home while cooking dinner. Patient complained of HA yesterday, then had sudden onset of severe HA radiating into her neck prior to syncopal event.

On arrival, patient is laying on the floor, uncomfortable and moaning.

Case 5

HR 50, BP 180/110, RR 24, O2 Sats 94% RA

Gen: Pale, moderately overweight

Cardiac: tachy, no murmur

Pulm: Clear to auscultation

Abd: nontender

Ext: no deformities



Case 5

Patient states she feels weak, and wants to go to bed, does not want to go to the hospital

PMH: none

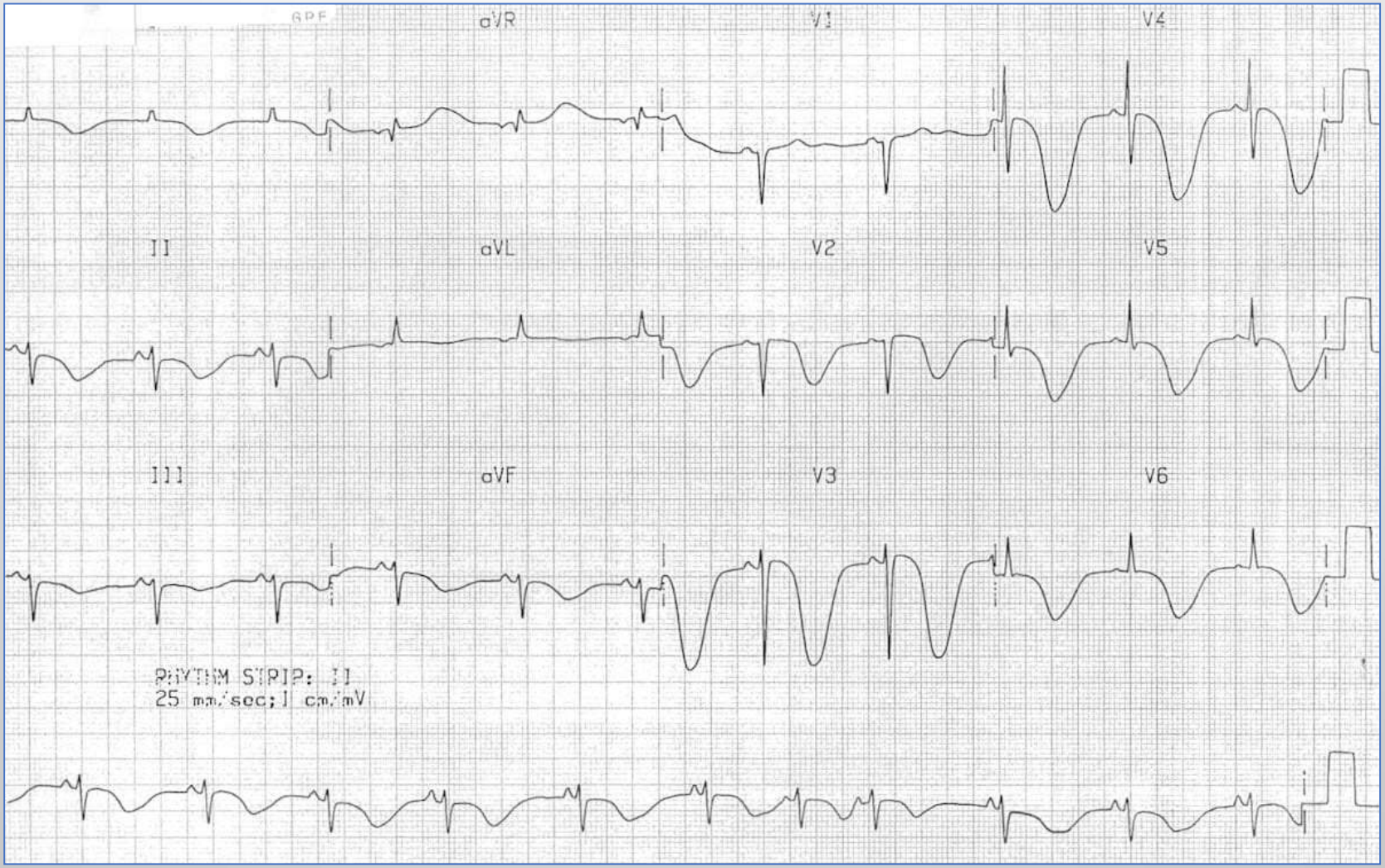
Meds: none

All: NKDA

Glu 120

EKG

Case 5 - EKG

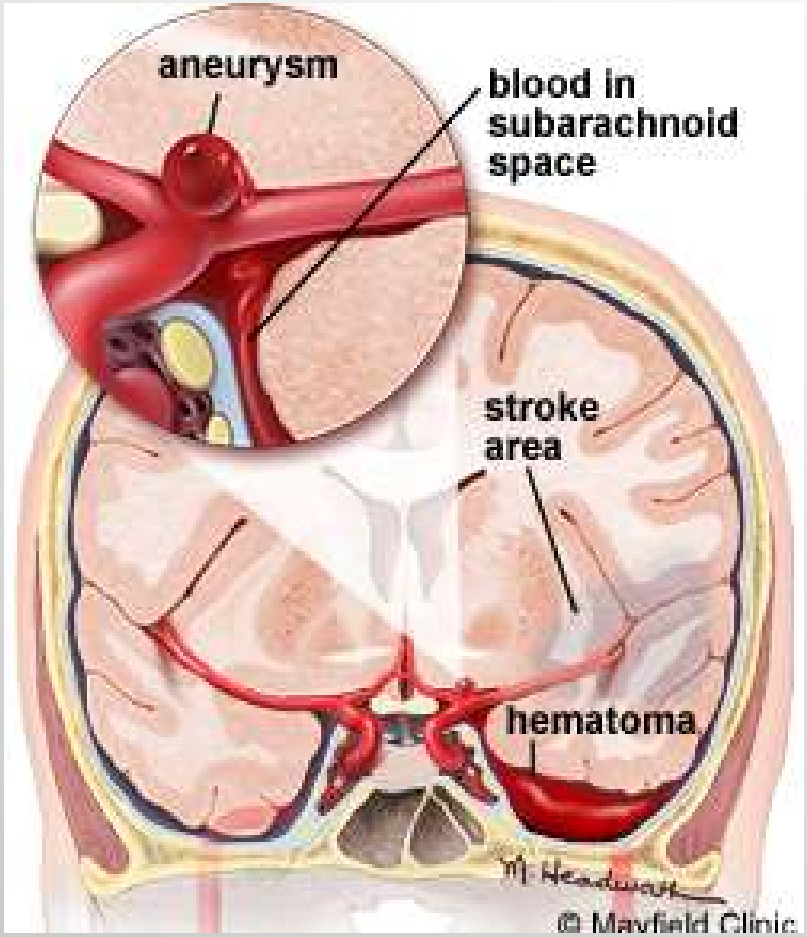

aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
RHYTHM STRIP: II
25 mm/sec; 1 cm/mV

Evaluation and Management

- What was she doing prior to the syncopal event?
- How does she look now?
- Are there any new medications?
- Are there any “red flags”?

Differential Diagnosis?

Subarachnoid Hemorrhage



- Sudden onset “worst headache of life”, often with posterior headache and neck pain.
- Aneurysm rupture
- Can have seizures, syncope, decreased LOC
- 50% overall fatality rate

Case 6

Medics are dispatched to the home of a 35-year old female with abdominal pain and loss of consciousness.

On arrival, patient seems in pain and is a poor historian. Living in a home with multiple other adults. One person reports patient was in pain and “passed out” prompting them to call 911.

Case 6

PMH: bipolar, borderline personality, opiate dependence

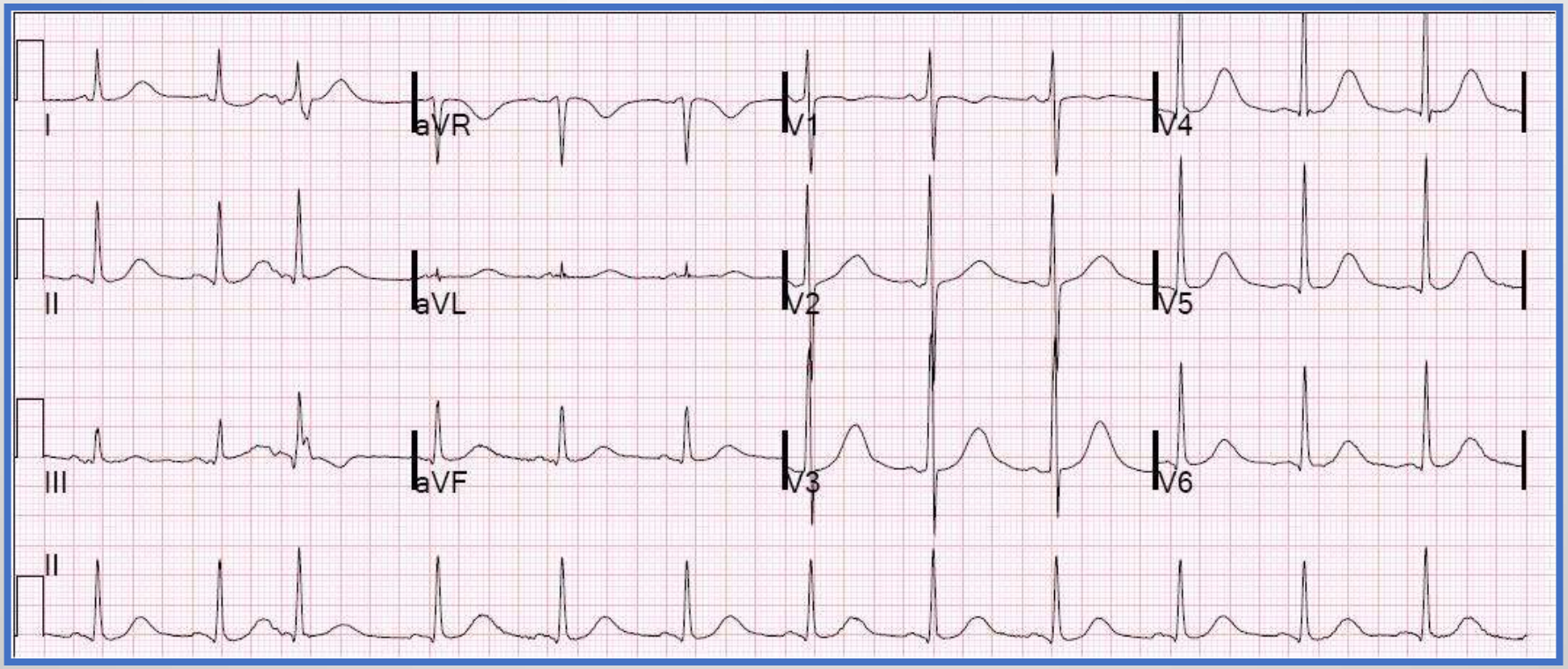
Meds: lamictal, buproprion, methadone

Case 6

HR 130 BP 95/58 RR 30 SpO2 98% RA
Gen: Moaning, on floor
Cardiac: tachycardic, no murmur
Pulm: clear
Abd: firm, diffusely tender
Ext: no edema, multiple track marks

Glu 150
EKG

Case 6 - EKG



Evaluation and management

- What was she doing prior to the syncopal event?
- How does she look now?
- Are there any new medications?
- Are there any “red flags”?

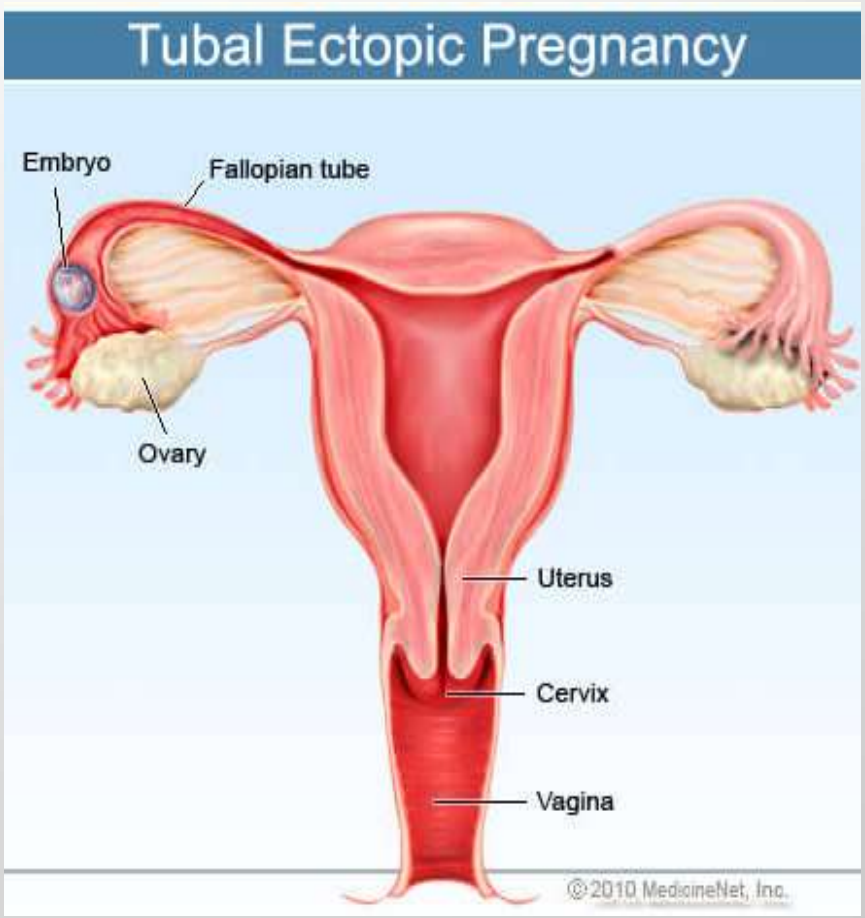
Differential diagnosis?

Ruptured Ectopic Pregnancy

Pelvic/abdominal pain or bleeding in the setting of pregnancy

Risk factors:

History of ectopic, tubal ligation, tubal infection, IUD, fertility treatment



Case 7

Dispatched to the home of a 65-year old female for syncope

On arrival, patient reports she had a syncopal event en route to the kitchen. She felt it coming on and was able to lower herself before losing consciousness.

Case 7

On assessment, patient is obese, wearing a knee immobilizer, with crutches nearby.

HR 110 BP 84/40 RR 40 SpO2 88% RA

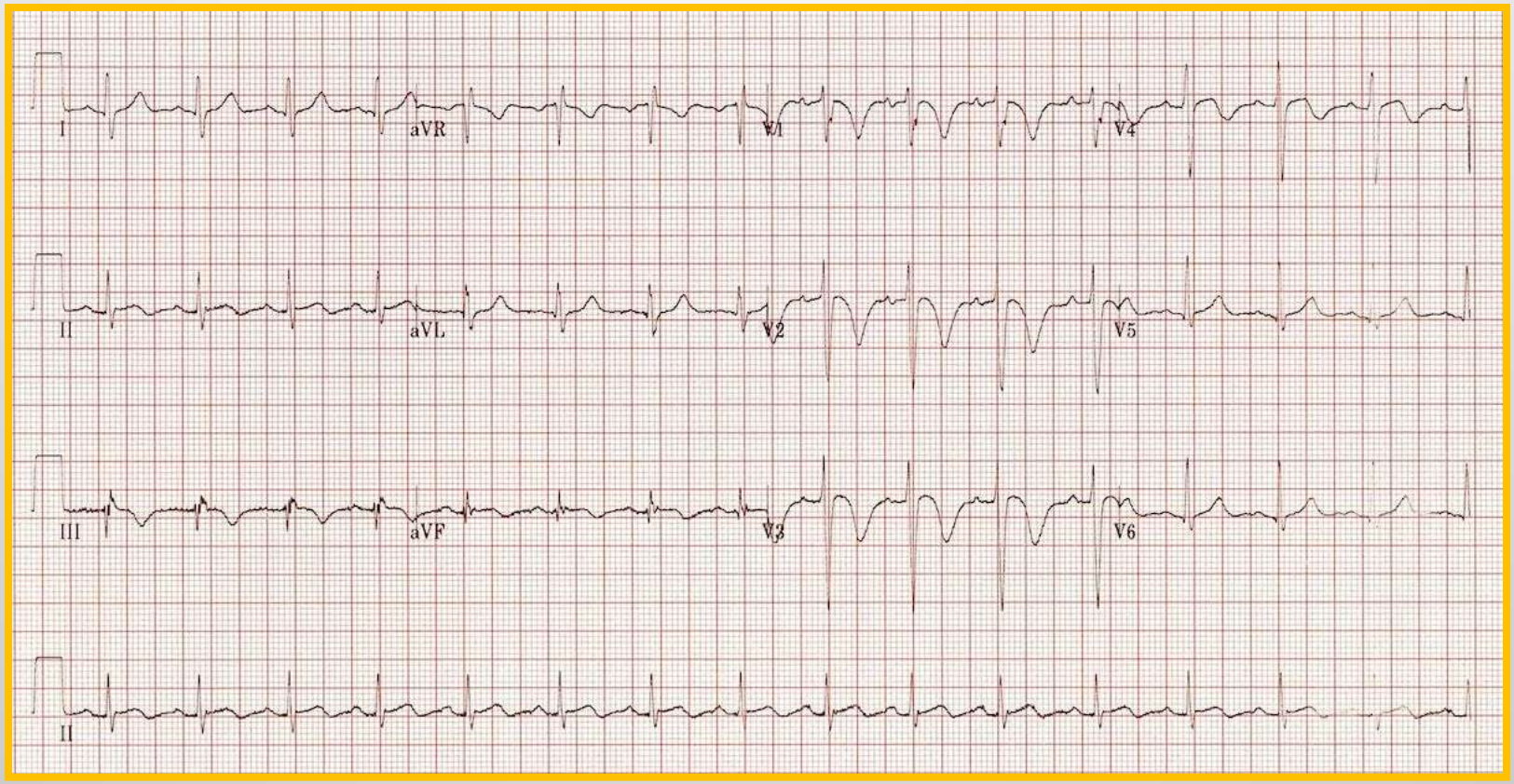
Ill-appearing, breathing heavily



Glu 110

EKG

Case 7, EKG



Evaluation and Management

- What was she doing prior to the syncopal event?
- How does she look now?
- Are there any new medications?
- Are there any “red flags”?

Differential Diagnosis?

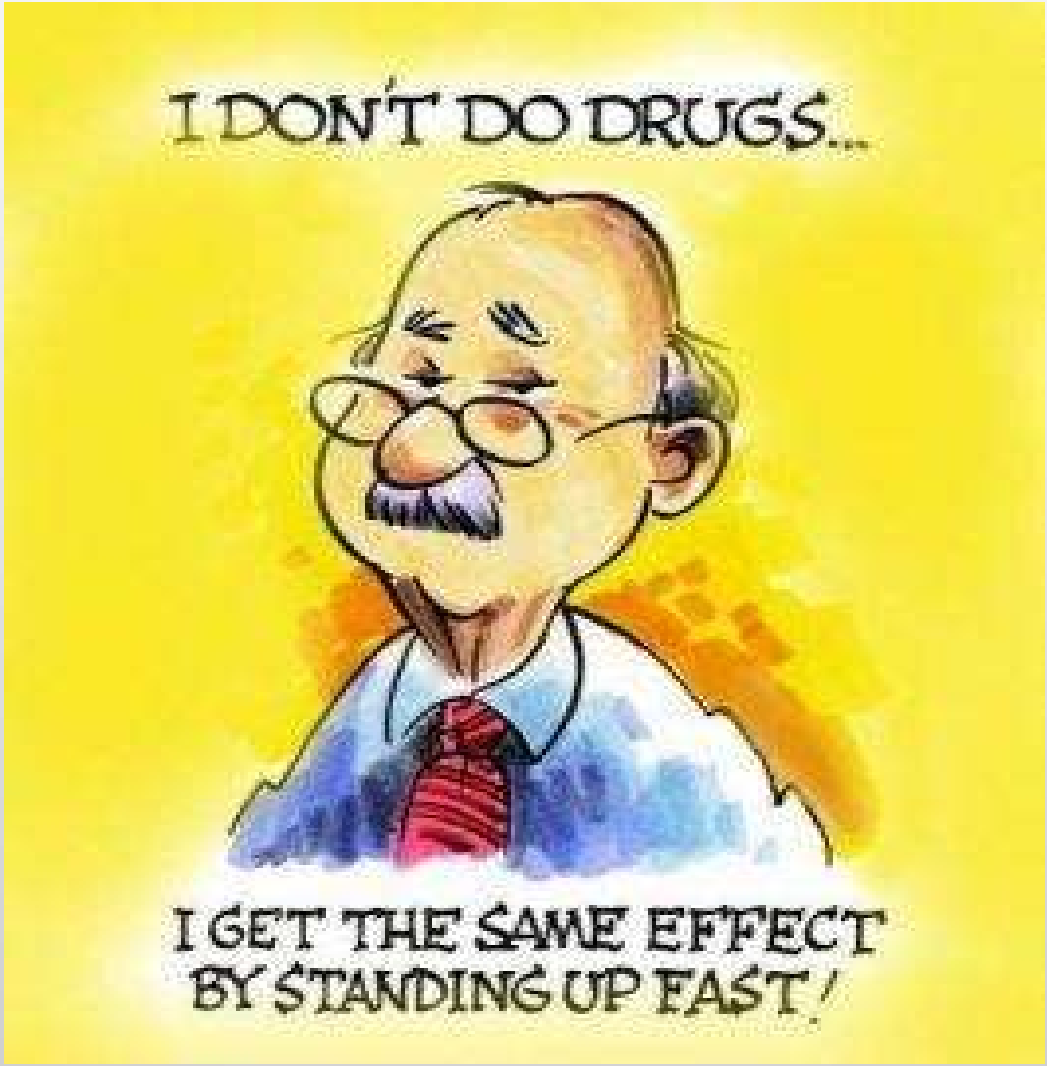
Case 7 - ED

You arrive in the ED with the patient, who is now more hypotensive with increased WOB.

She has a bedside US demonstrating right heart strain and right atrial collapse.

Concern for post-total knee arthroplasty PE is high and PERT called.

Patient taken to OR for catheter-directed clot lysis.


I DON'T DO DRUGS...
I GET THE SAME EFFECT BY STANDING UP FAST!

Summary

Over a third of the time the cause of syncope is idiopathic.

History and exam are key for “can’t miss diagnoses.

Most cases will require an EKG evaluation.

Treatment is variable and depends of etiology.

Have a low threshold to transport.

Questions?

