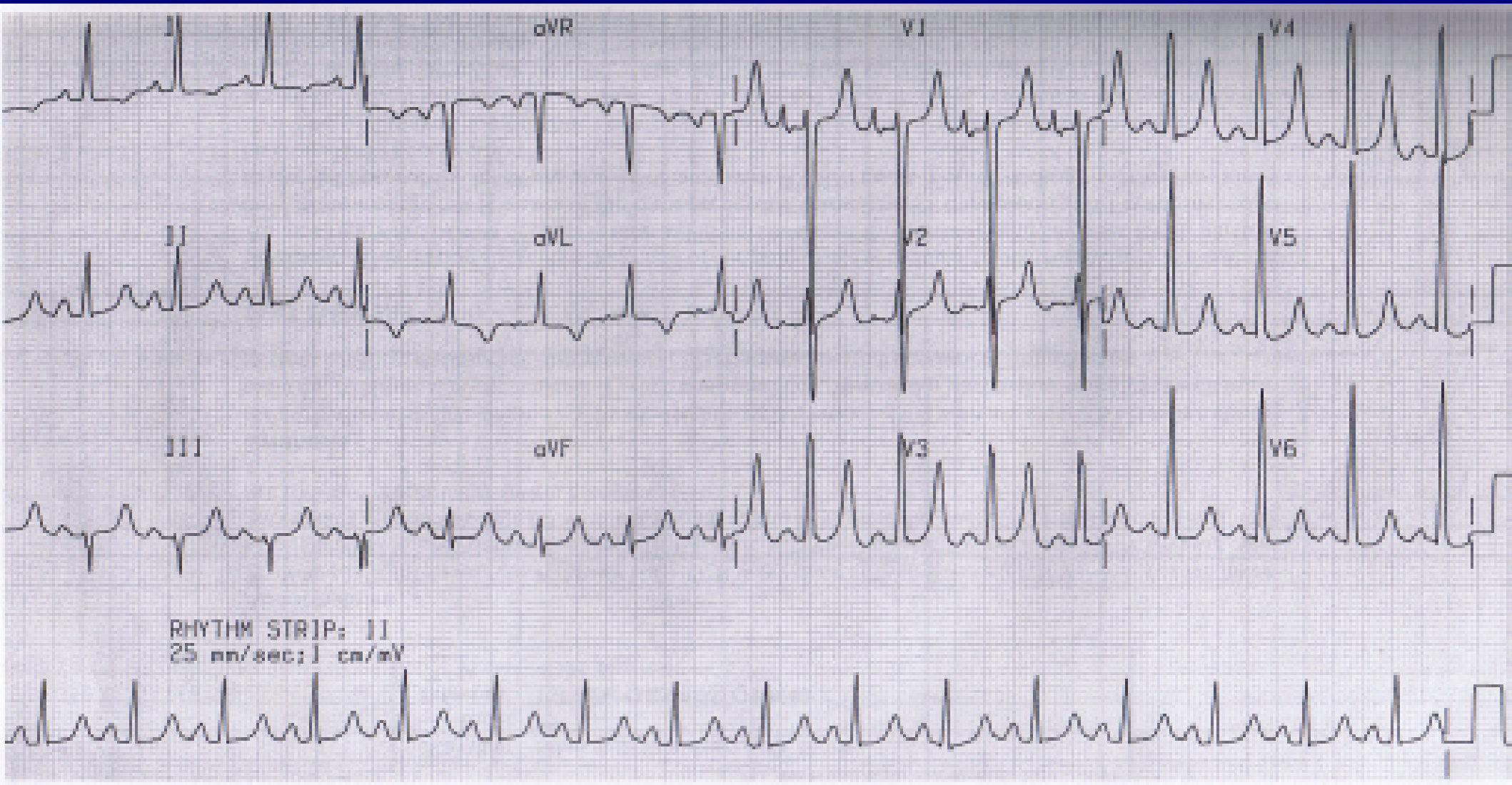
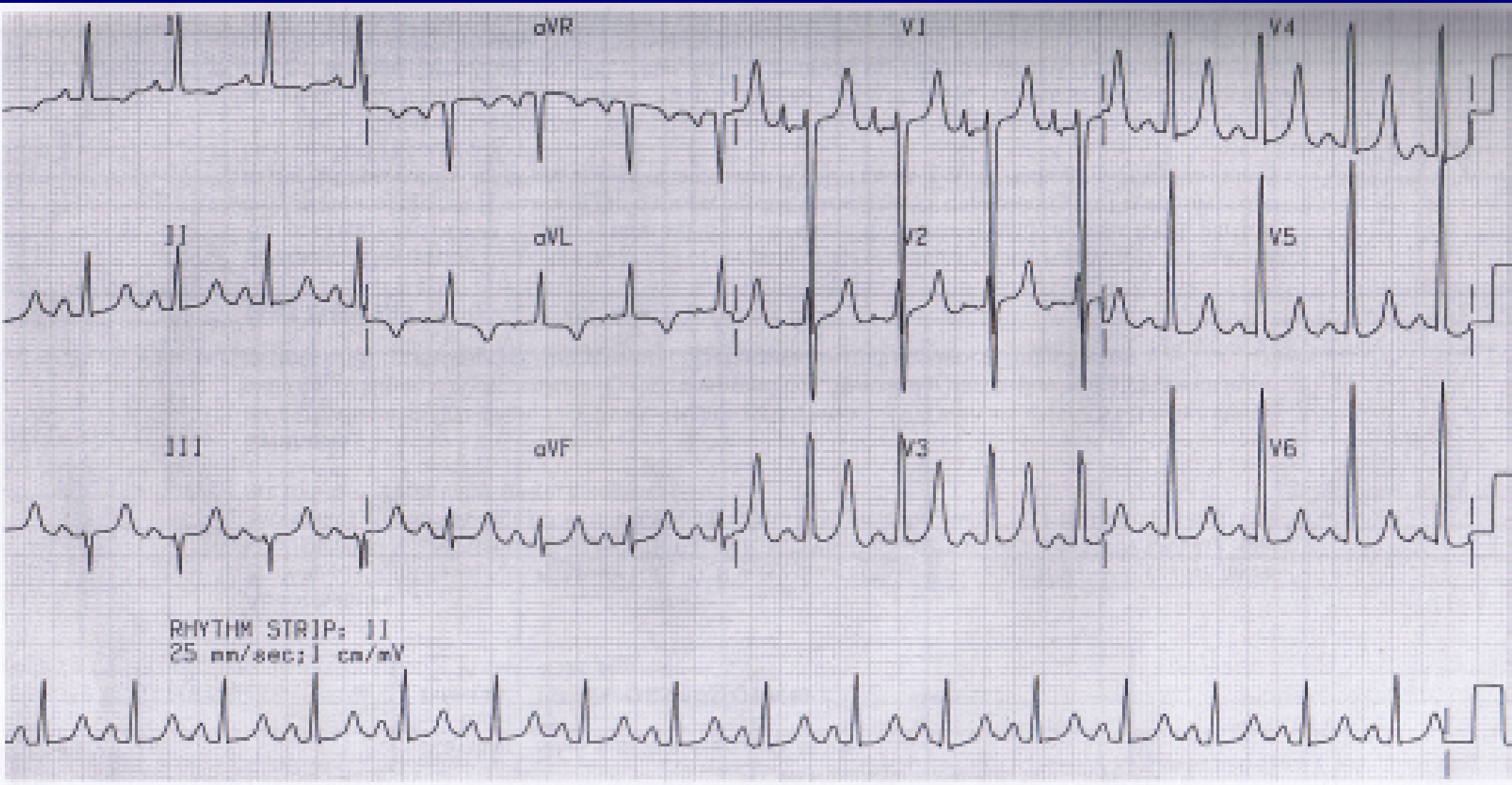
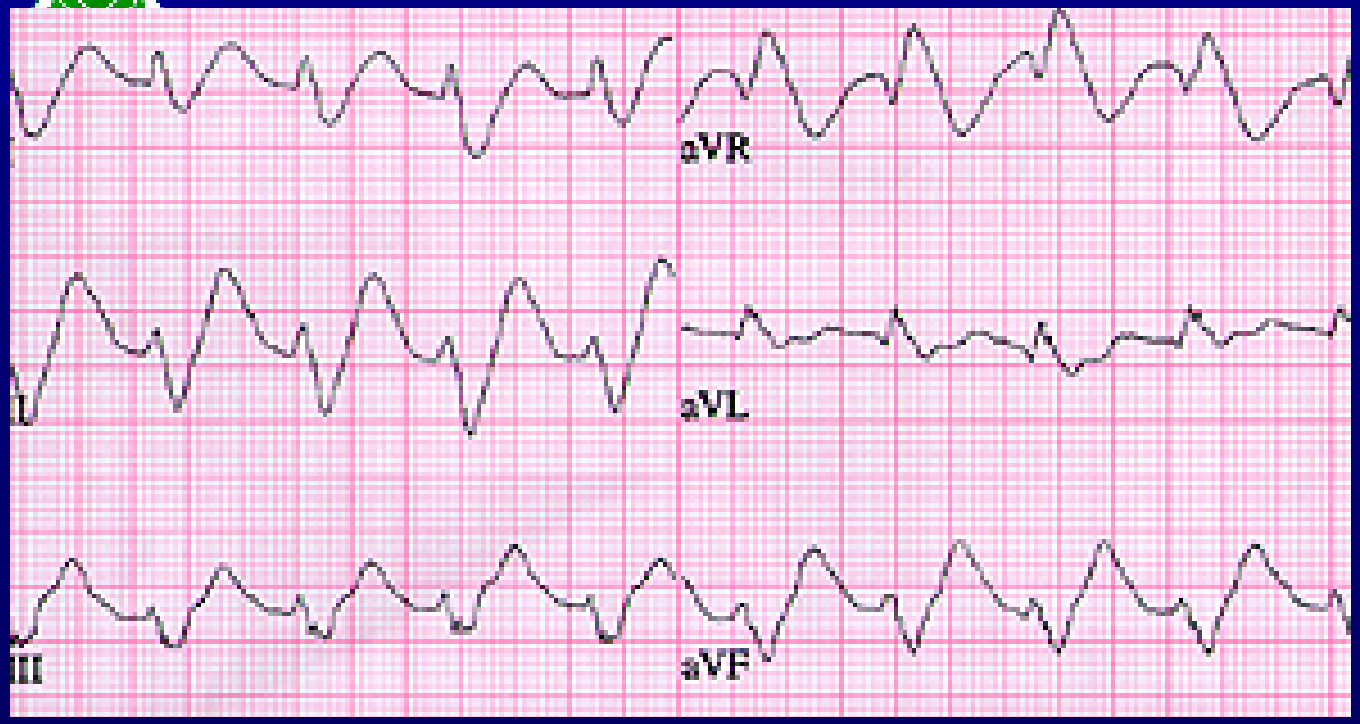
ECG in Non Cardiac Disease

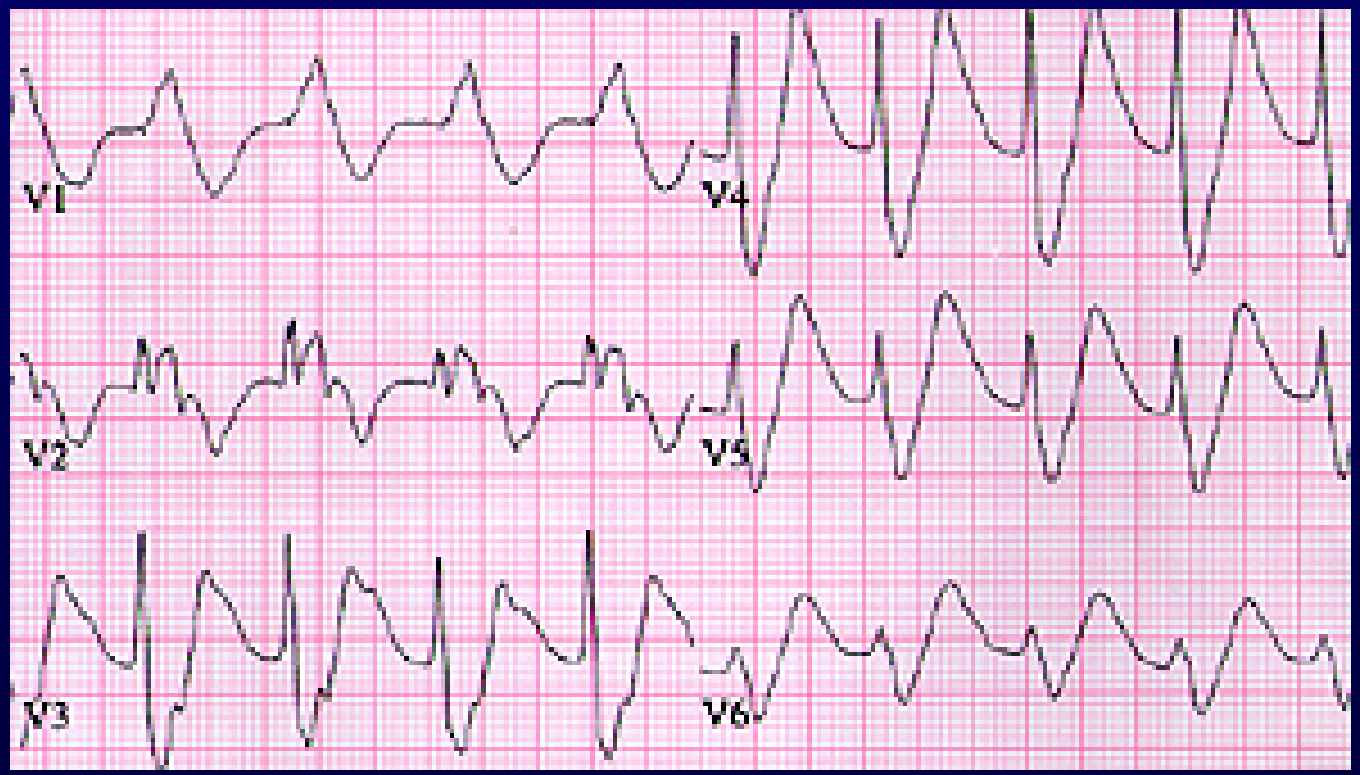

I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
RHYTHM STRIP: II
25 mm/sec; 1 cm/mV

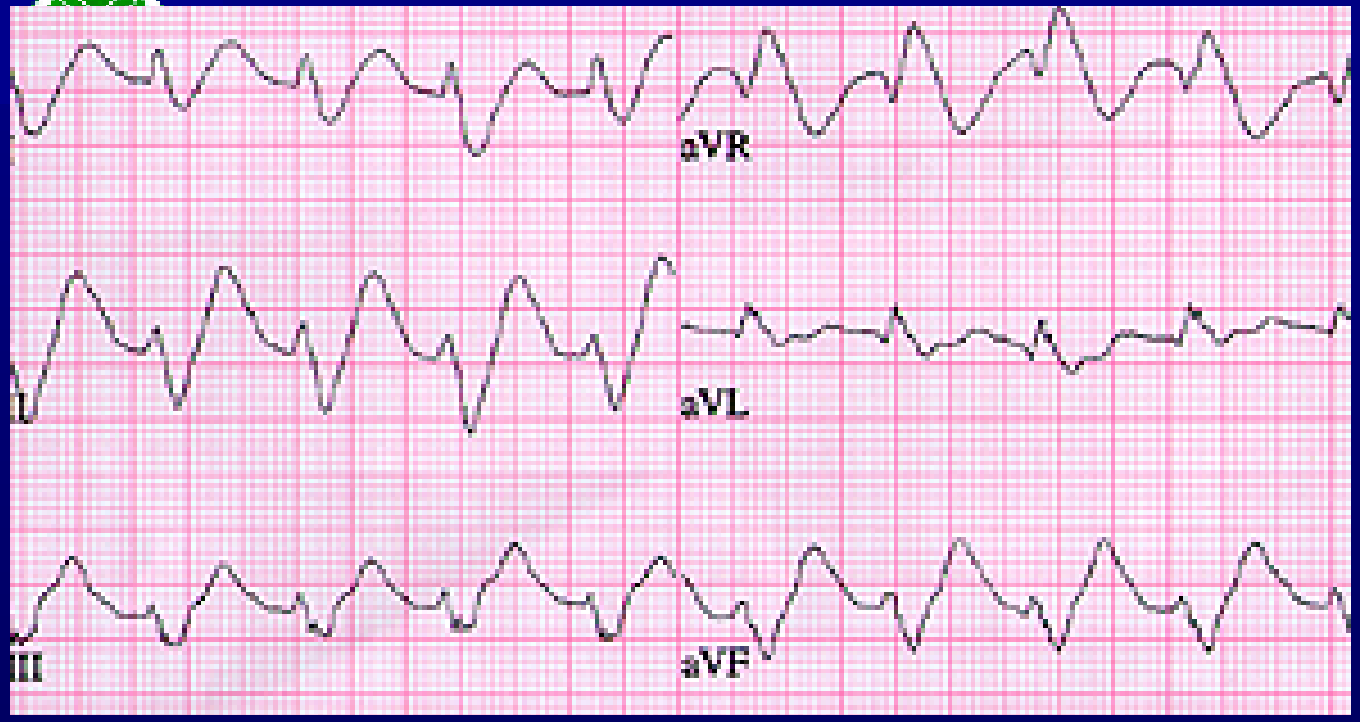
HYPERKALEMIA

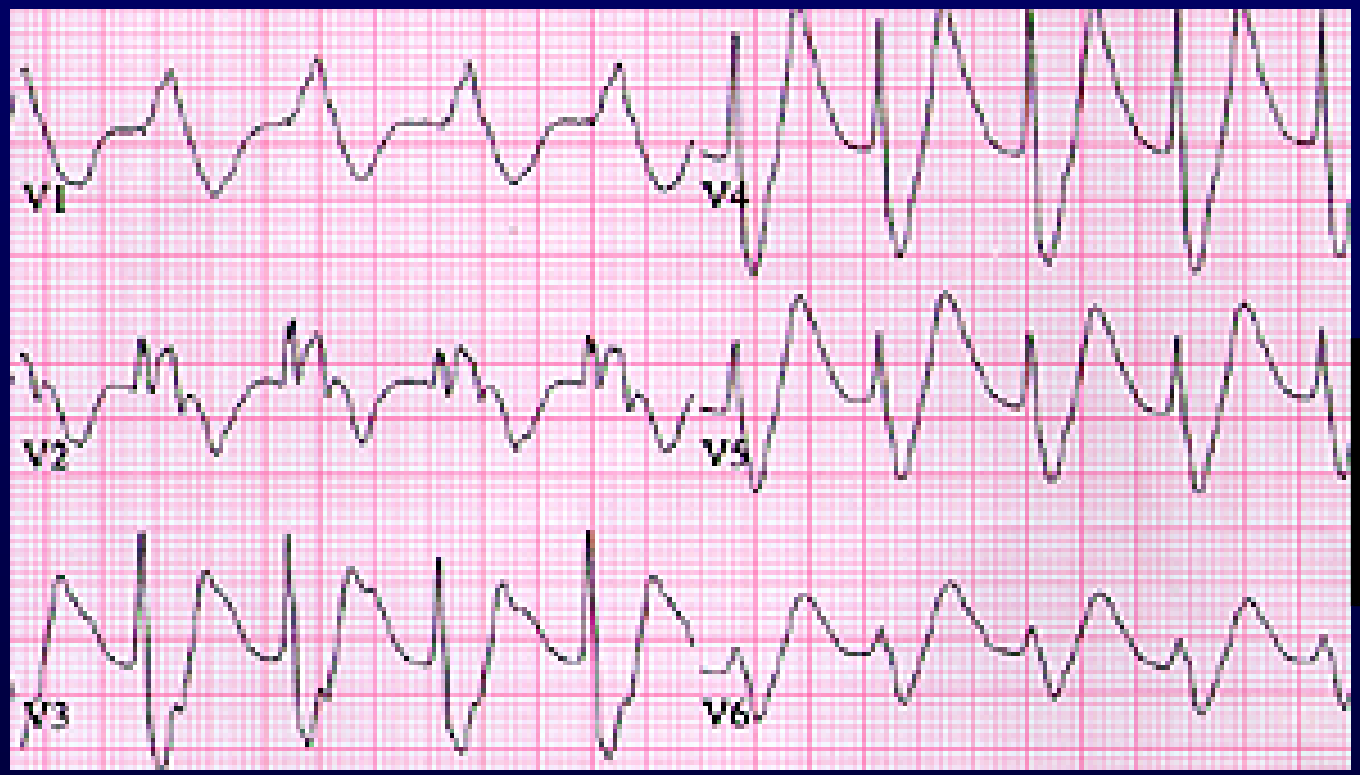


- Tall, thin and peaked T waves
- Increased duration of the QRS complex
- Wider P waves and prolongation PR interval


aVR
aVL
III
aVF


V1
V4
V2
V5
V3
V6

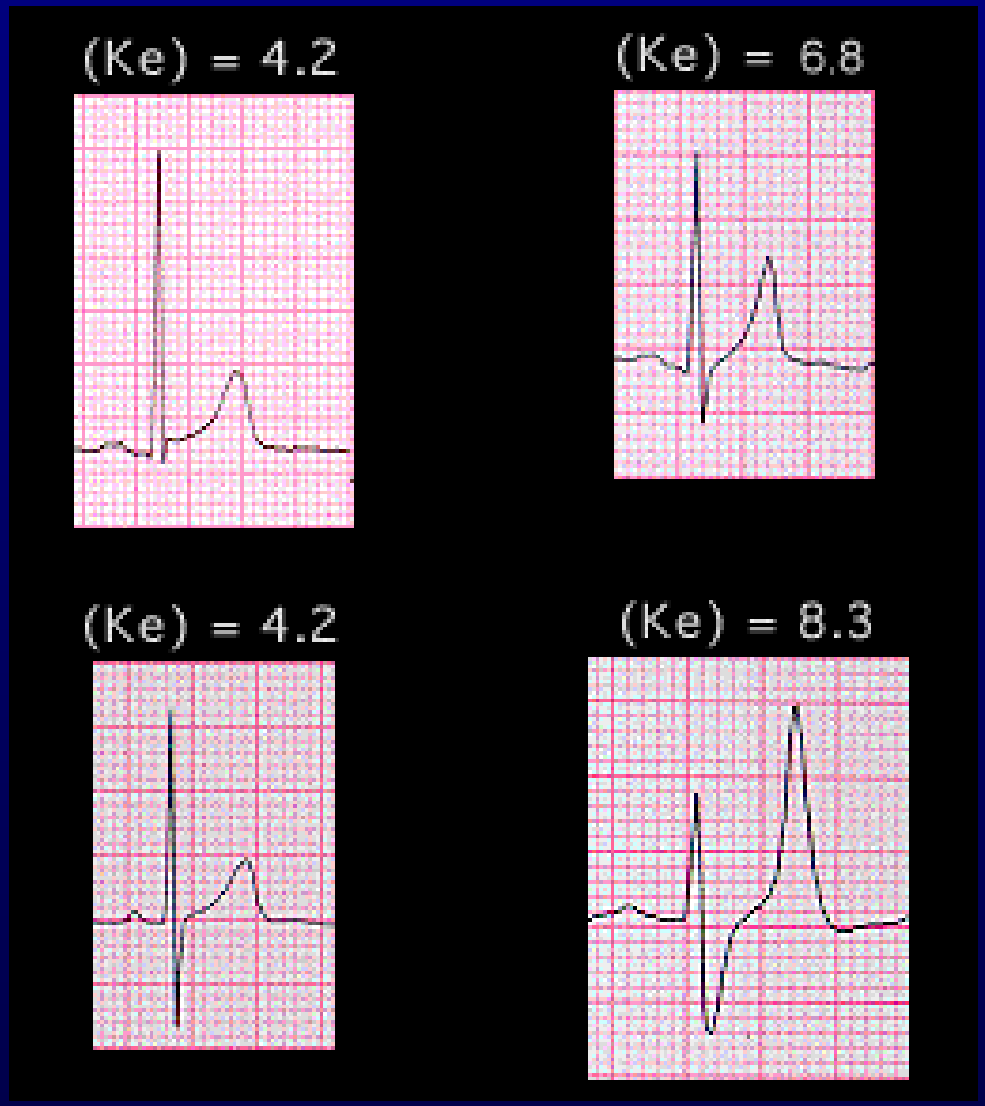




Severe HYPERKALEMIA

(K = 8.8 mEq/L)

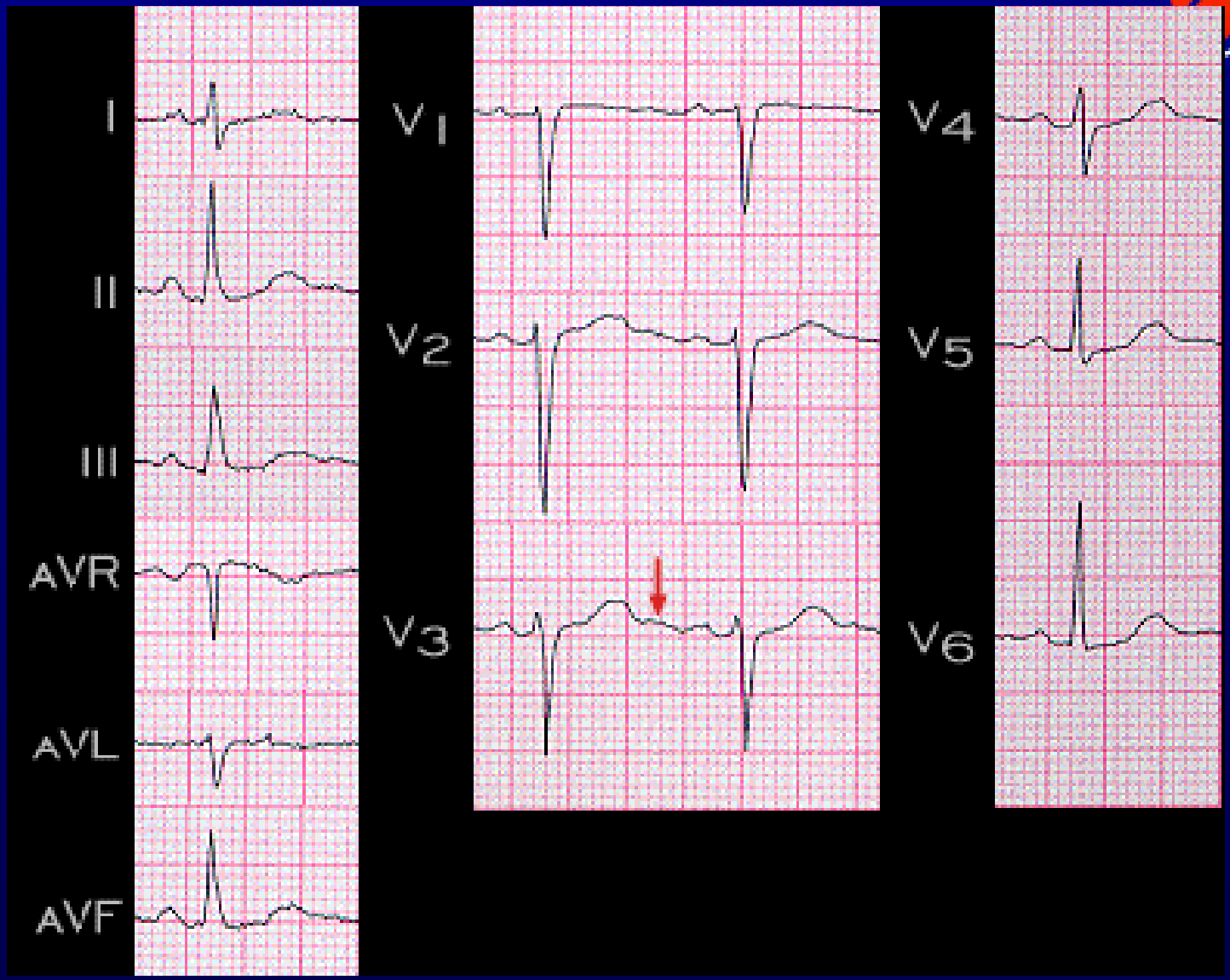
- marked widening of the QRS complex and T wave with a sine wave pattern



- Peaking T
- Shortening QT interval

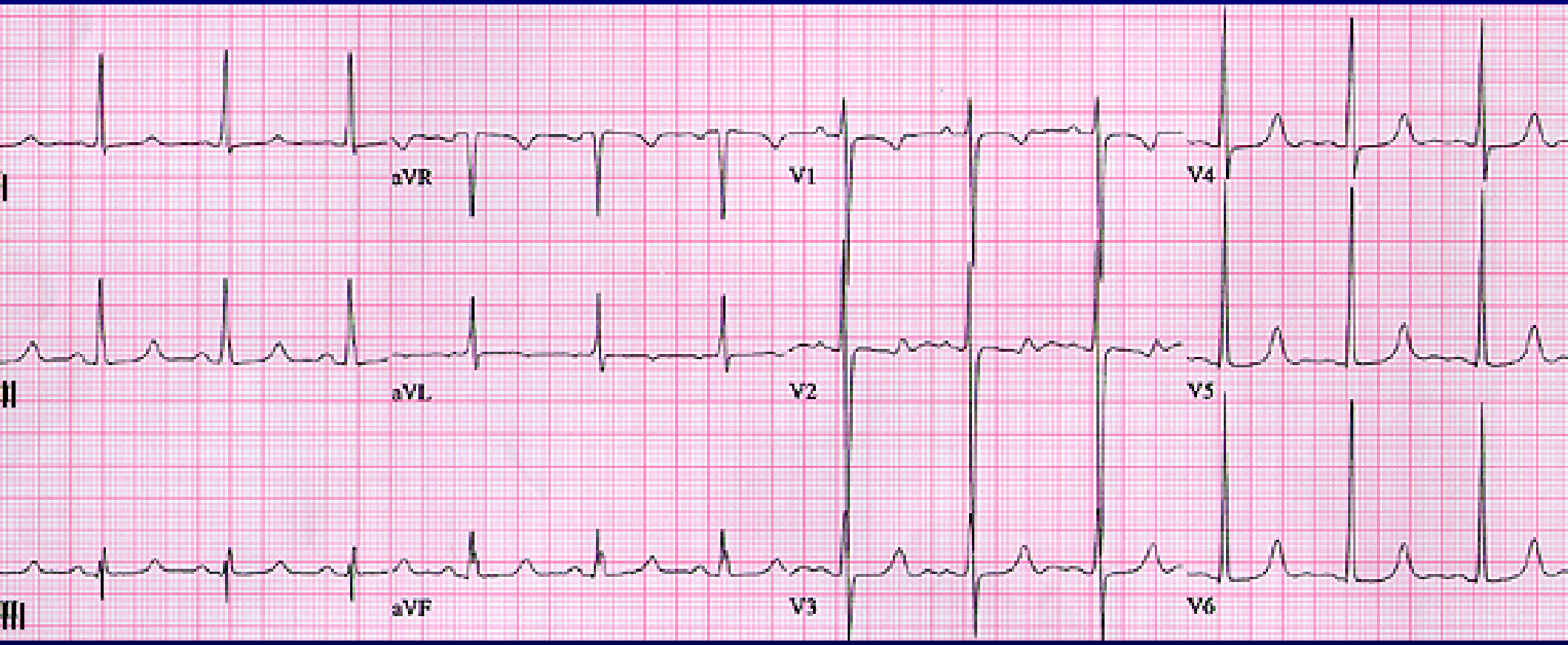
- Widening P wave, QRS complex
- Prolongation PR interval

HYPOKALEMIA



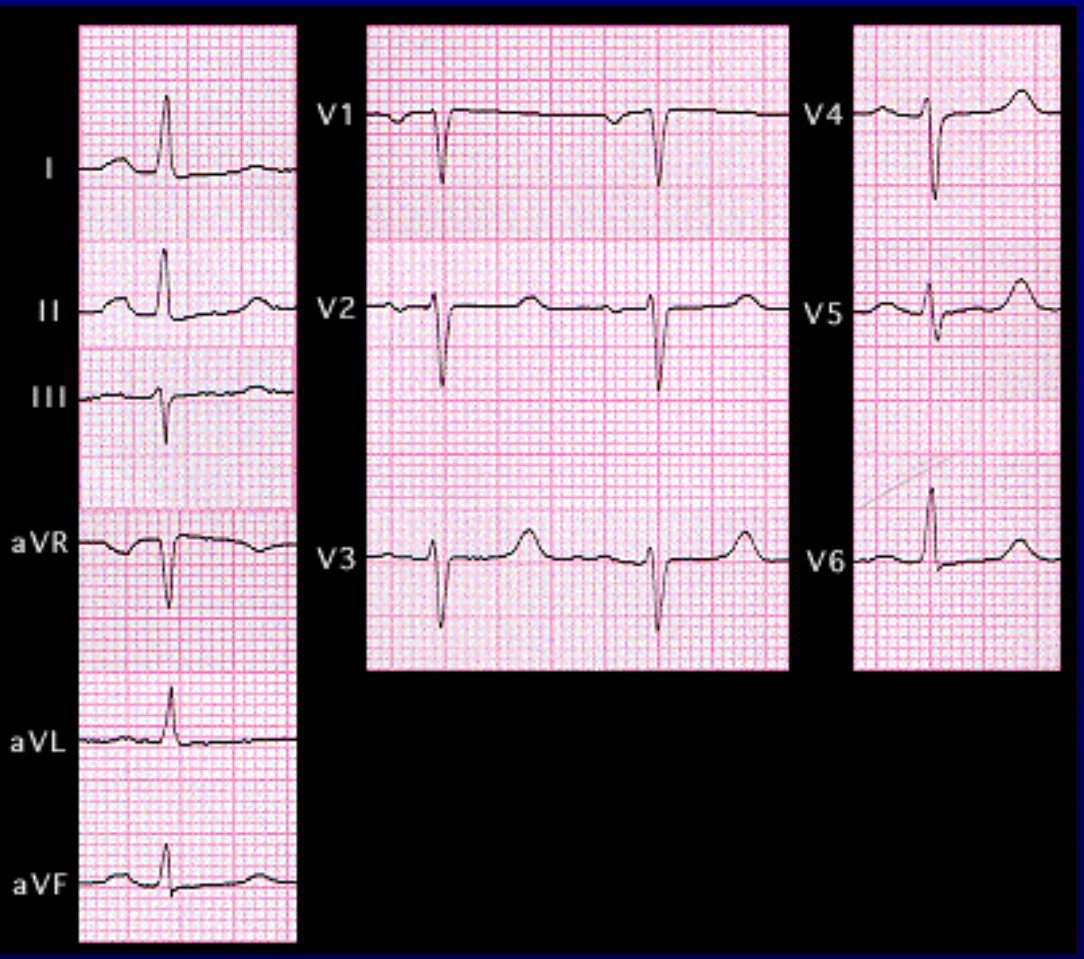
- Decrease in amplitude, flattening or inversion of the T wave
- Prominent U wave
- ST segment depression

HYPOCALCEMIA

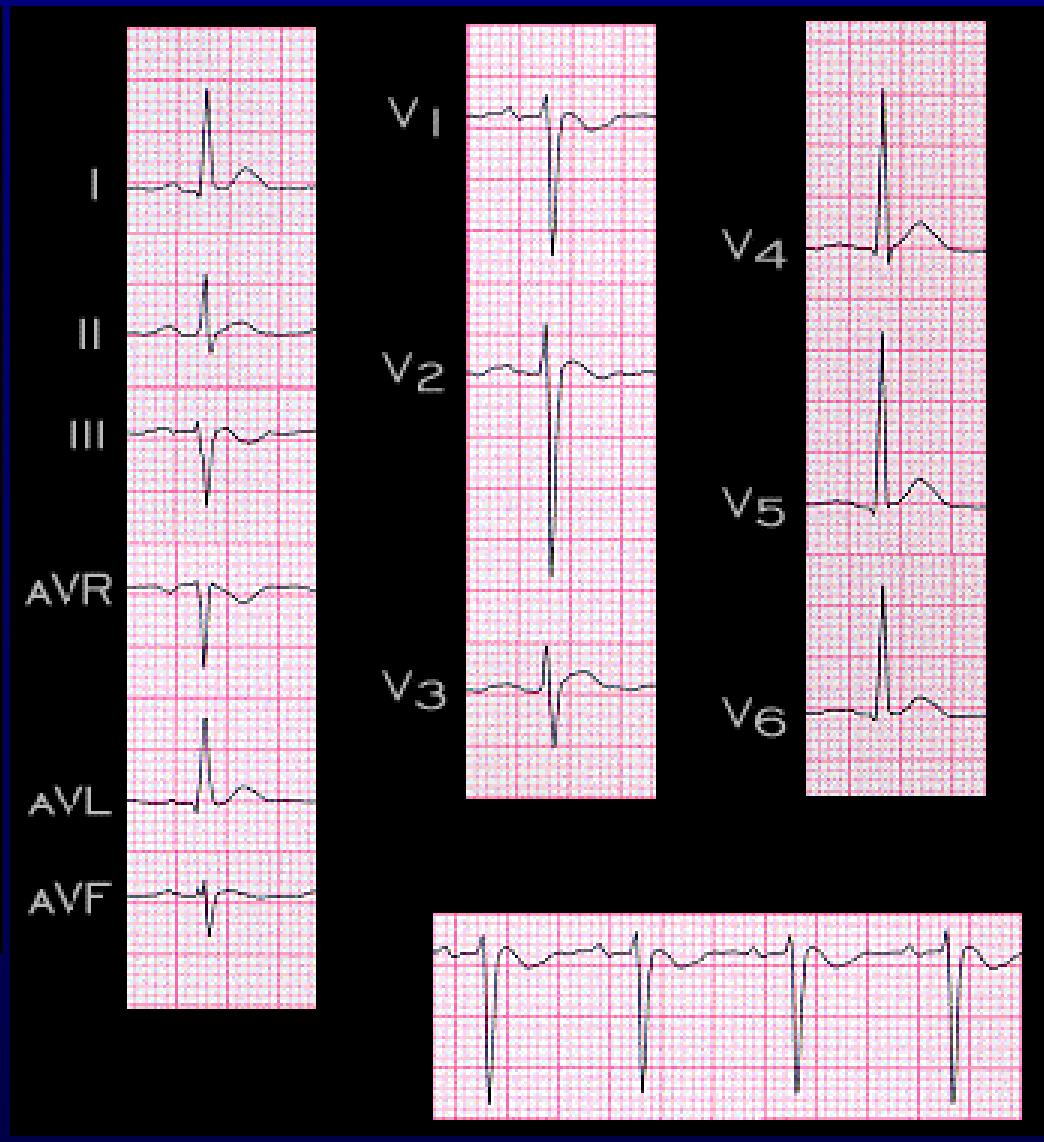


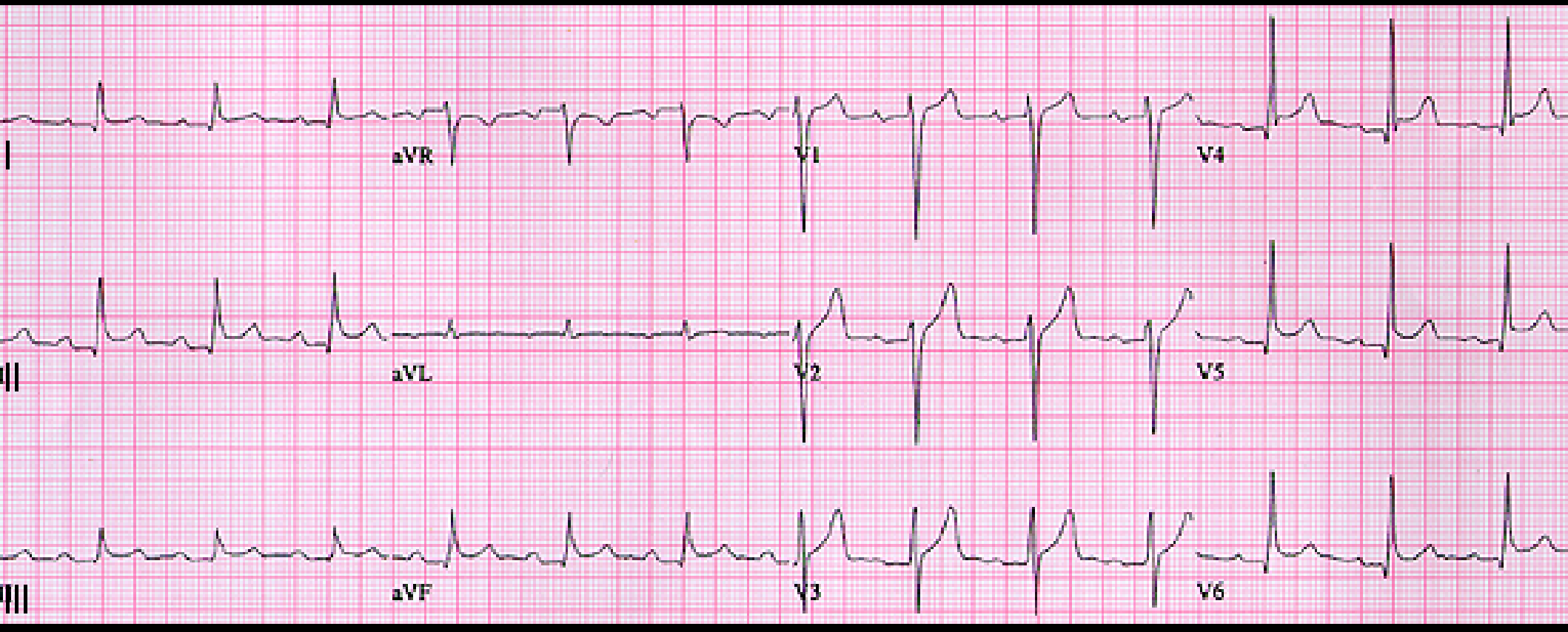
- Prolonged QT interval (QT = 480 ms, QTc = 520 ms)
- Lengthened ST segment
- T waves may be flat or inverted

HYPOCALCEMIA



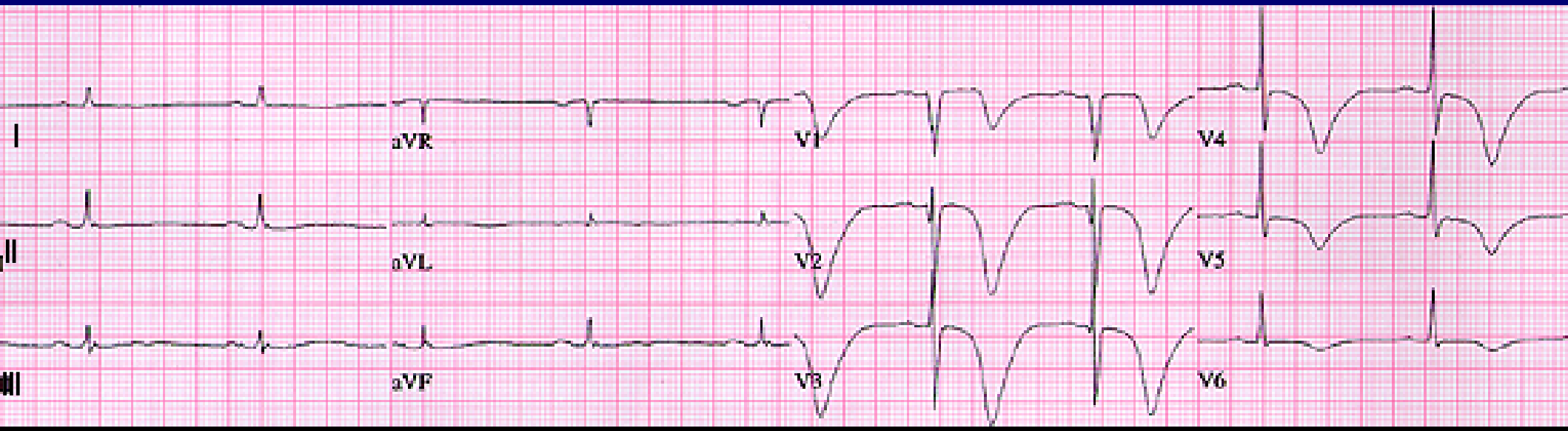
HYPERCALCEMIA





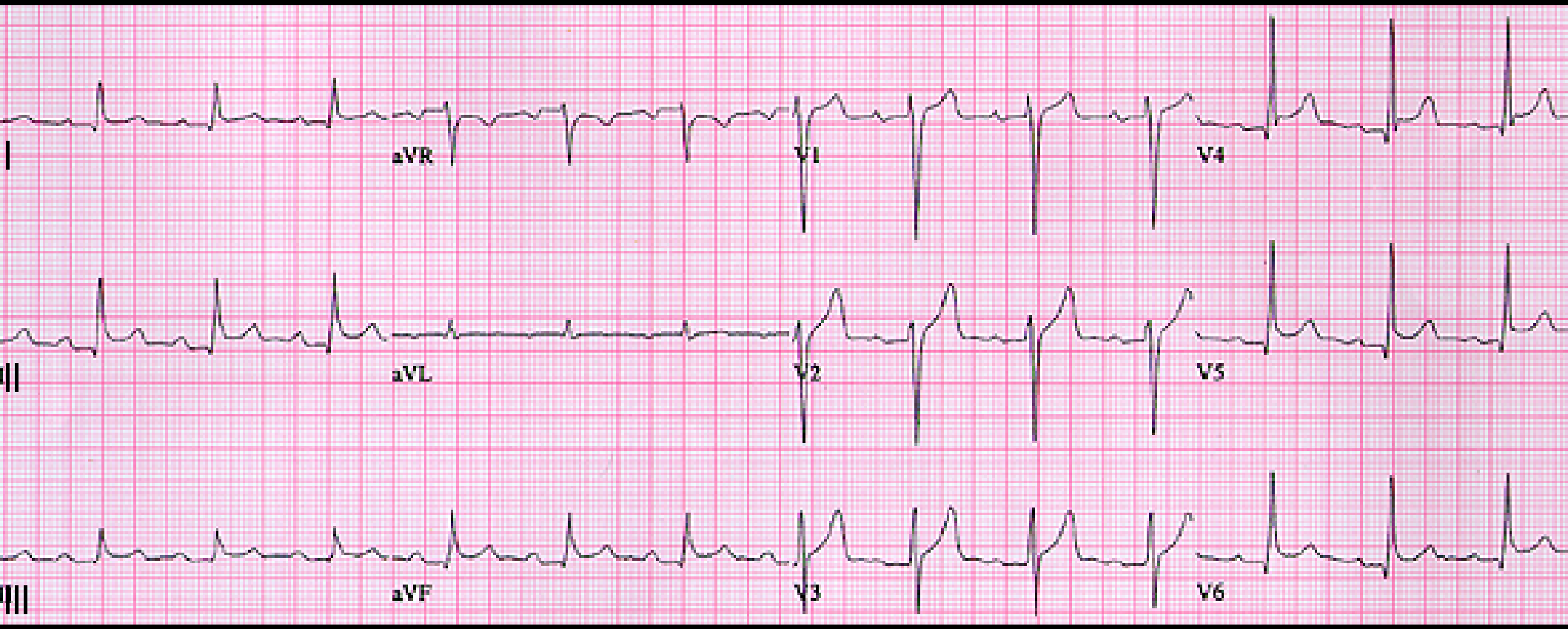
- Male, 60 y.o. patient with end stage renal disease who was receiving chronic dyalisis
- Chest and epigastric pain

CEREBRAL VASCULAR ACCIDENT



- Large, wide, deeply, inverted or prominent, peaked, upright T waves
- Prolongation of the QT interval
- Changes are most pronounced in the precordial leads

PERICARDITIS



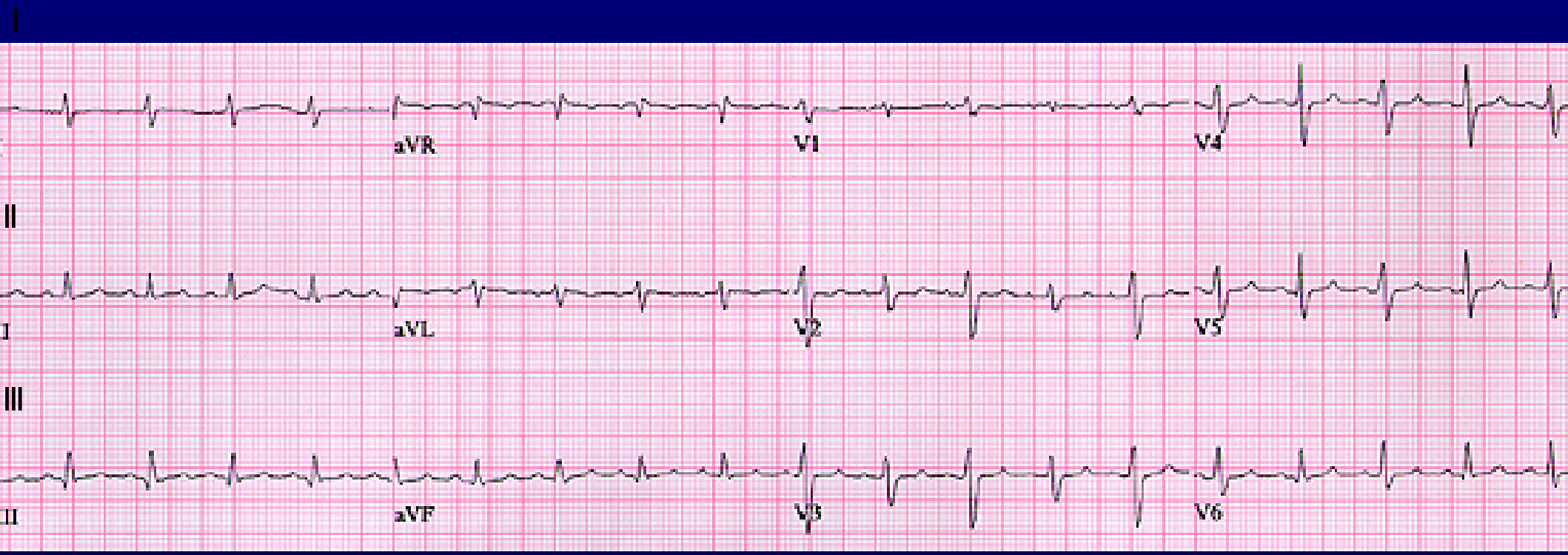
- Diffuse ST segment elevation with concavity upward in most leads
- Diffuse P-R interval depression in most leads
- T waves are upright (in contrast to ischemia)

PERICARDITIS

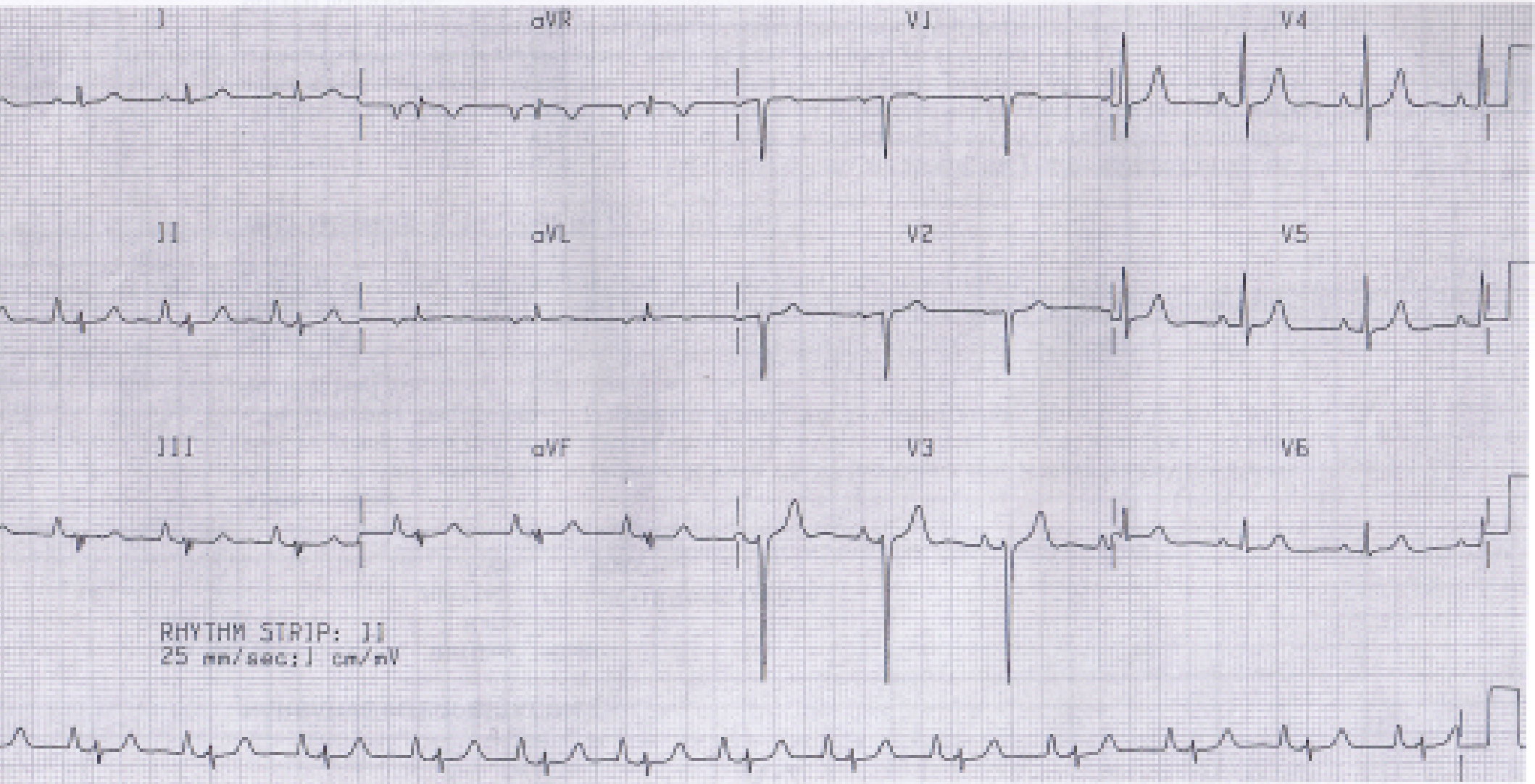
ECG Characteristic	Acute Ischemia	Pericarditis
ST elevation	local	diffuse
Reciprocal ST segment depression	yes	no
ST elevation greater than 4 mm	More often	Less often
Monophasic wave form	yes	no
T wave inversion	local	diffuse

- Diffuse ST segment elevation with concavity upward in most leads
- Diffuse P-R interval depression in most leads
- T waves are upright (in contrast to ischemia)

ELECTRICAL ALTERNANS (PERICARDIAL EFFUSION)



- Cyclic alternation in amplitude of R wave from beat to beat
- May involve P or T waves, or WRS complex, or all three
- Low voltage, total amplitude of the R and S waves is < 5 mm in any limb lead, < 10 mm in any precordial lead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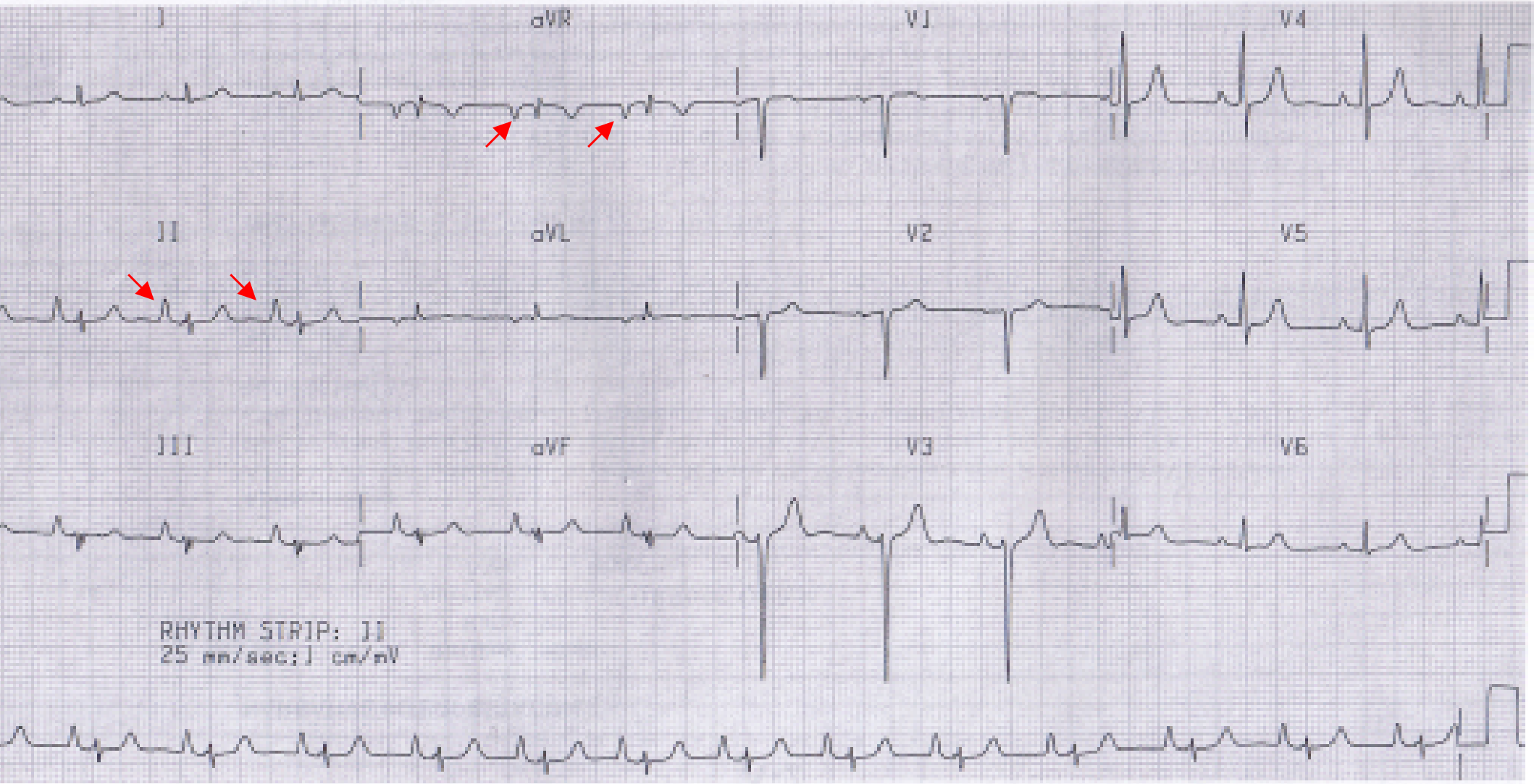
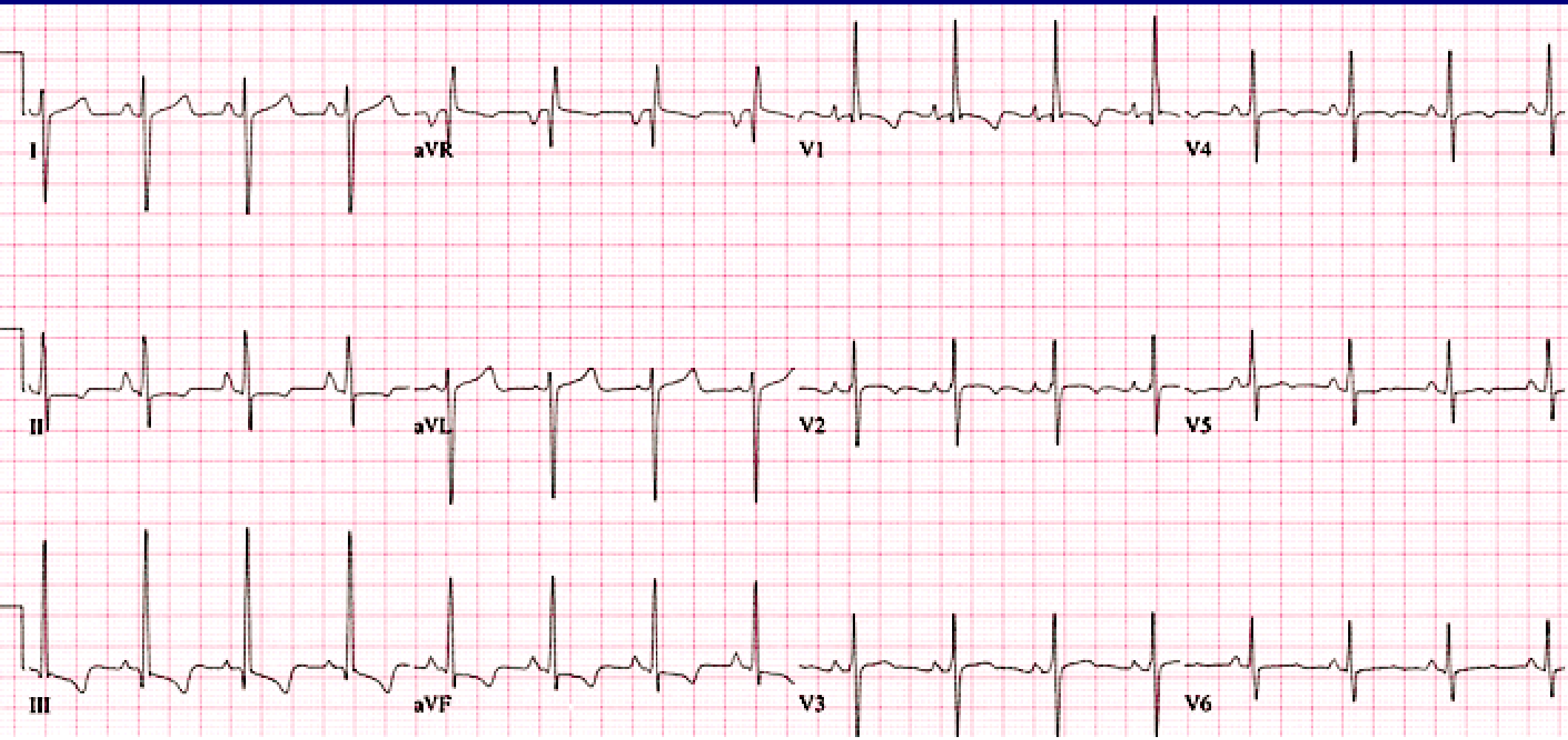
25 mm/sec; 1 cm/mV

CHRONIC OBSTRUCTIVE PULMONARY DISEASE

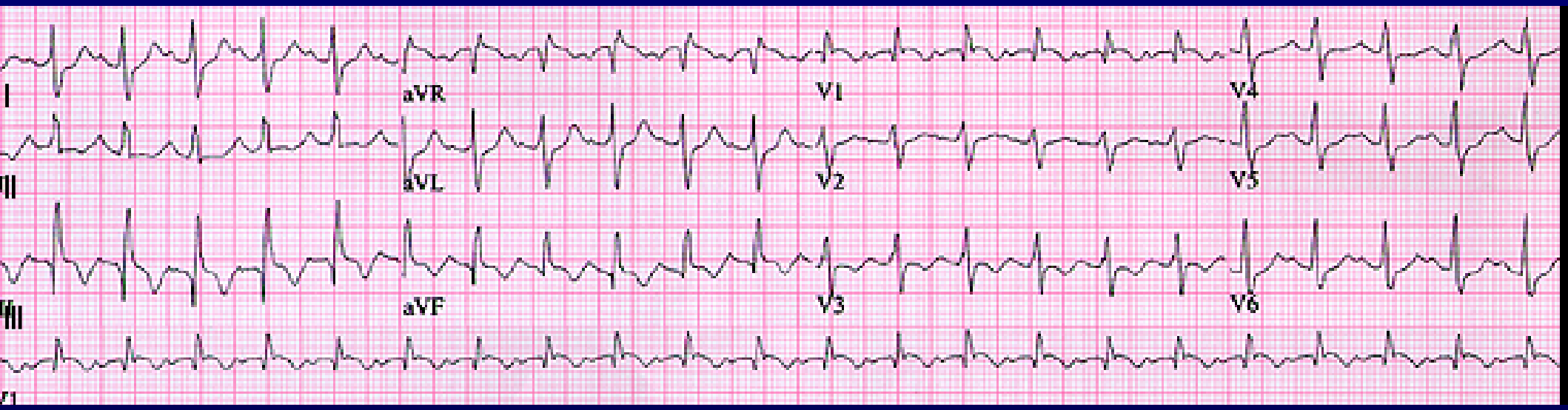


- Secondary right atrial abnormality due to elevated right heart pressure
- Low voltage limb leads
- Poor R wave progression

PRIMARY PULMONARY HYPERTENSION

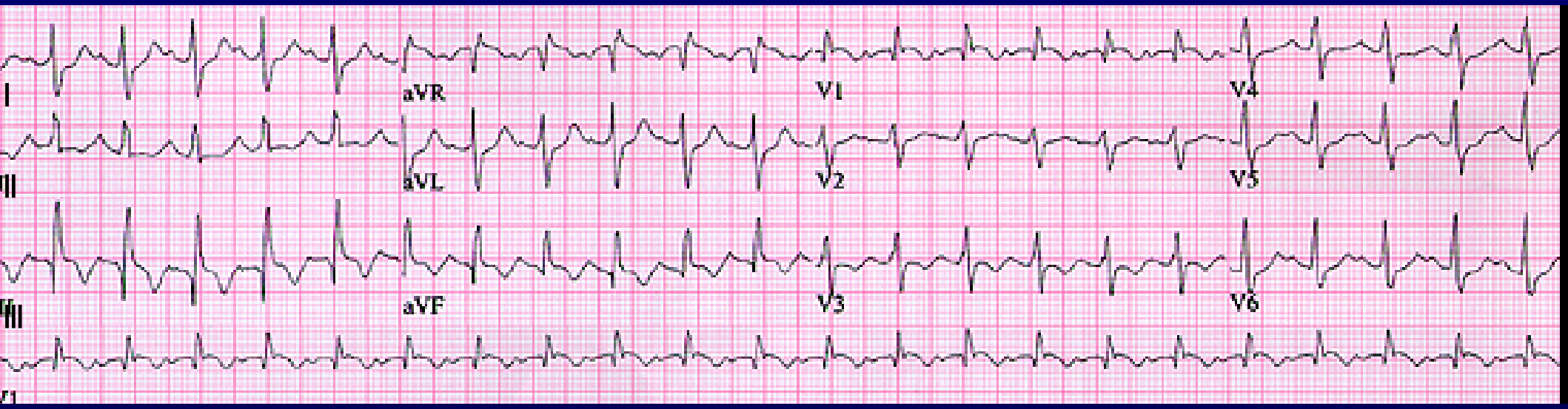


- R/S ratio > 1 in lead V1 (extremely tall monophasic R wave in lead V1)
- Prominent lateral precordial terminal S waves
- Right axis deviation
- Right atrial enlargement



- Female, 60 y.o.
- Chest pain, shortness of breath, hypotension

PULMONARY EMBOLISM



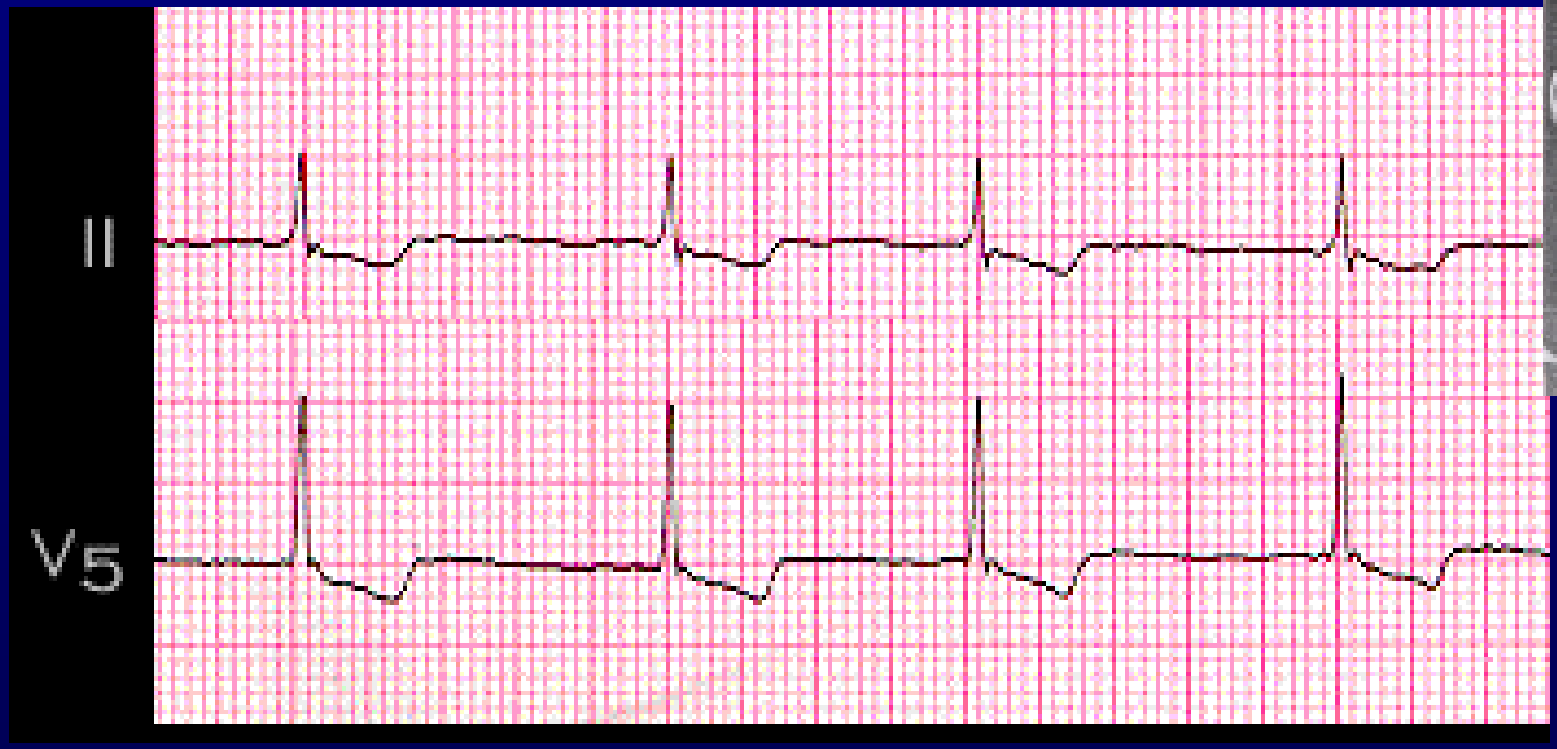
- Large S wave in lead I
- Large Q wave in lead III (with T wave inversion)
- ST depression in lead II
- T wave inversion in leadsV1-V4
- Transient Right Bundle Branch Block

Digitalis

- It inhibits the active transport of sodium and potassium ions across the cell membrane
- Increasing the vagal tone

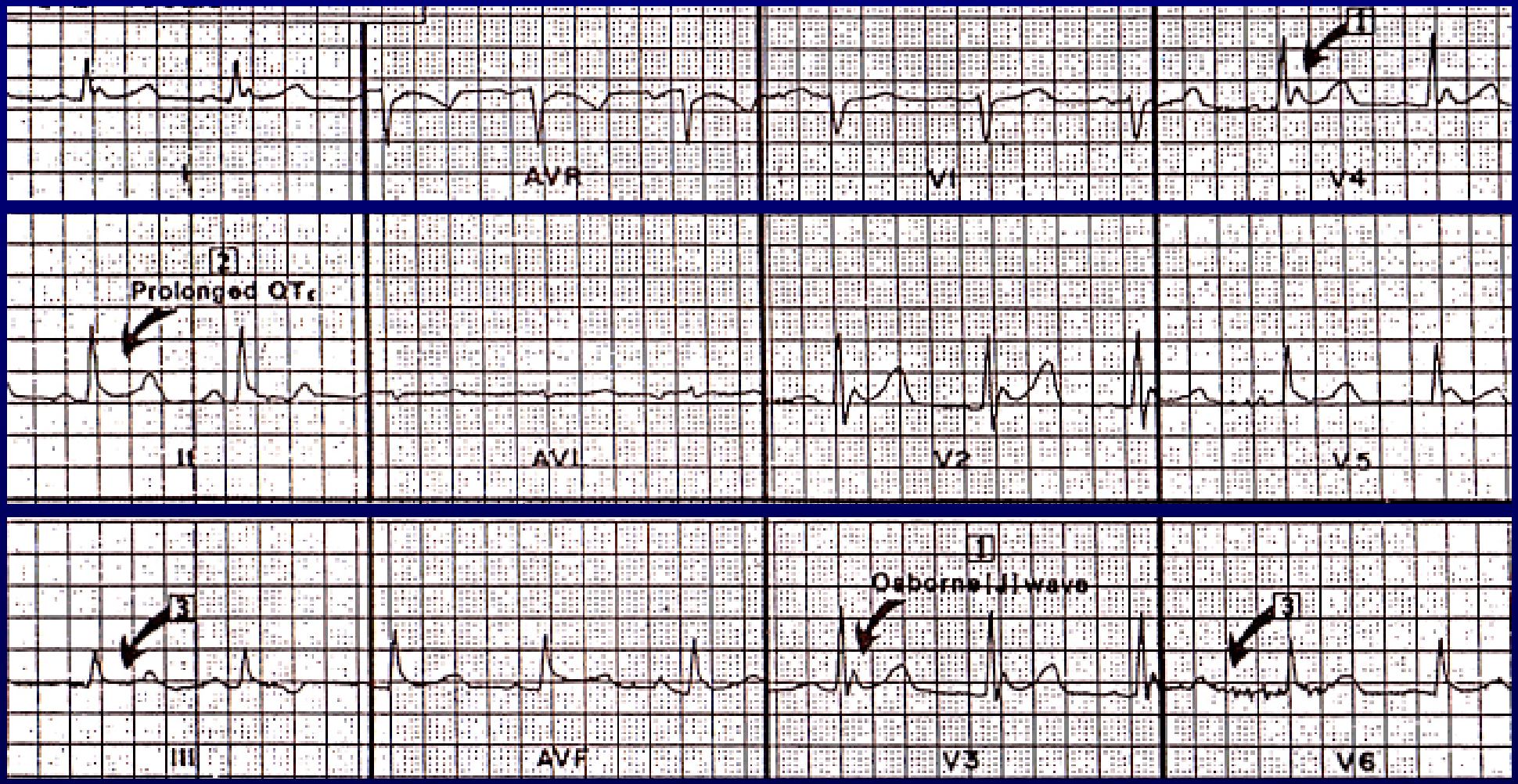
- So…Digitalis may alter automaticity, excitability, and conductivity

DIGITALIS EFFECT



- Decrease in amplitude, flattening or inversion of the T waves
- ST segment depression “scooping” or “reversed check mark”
- PR interval prolongation
- Slowing of the sinus rate
- Slowing of the ventricular rate in atrial fibrillation

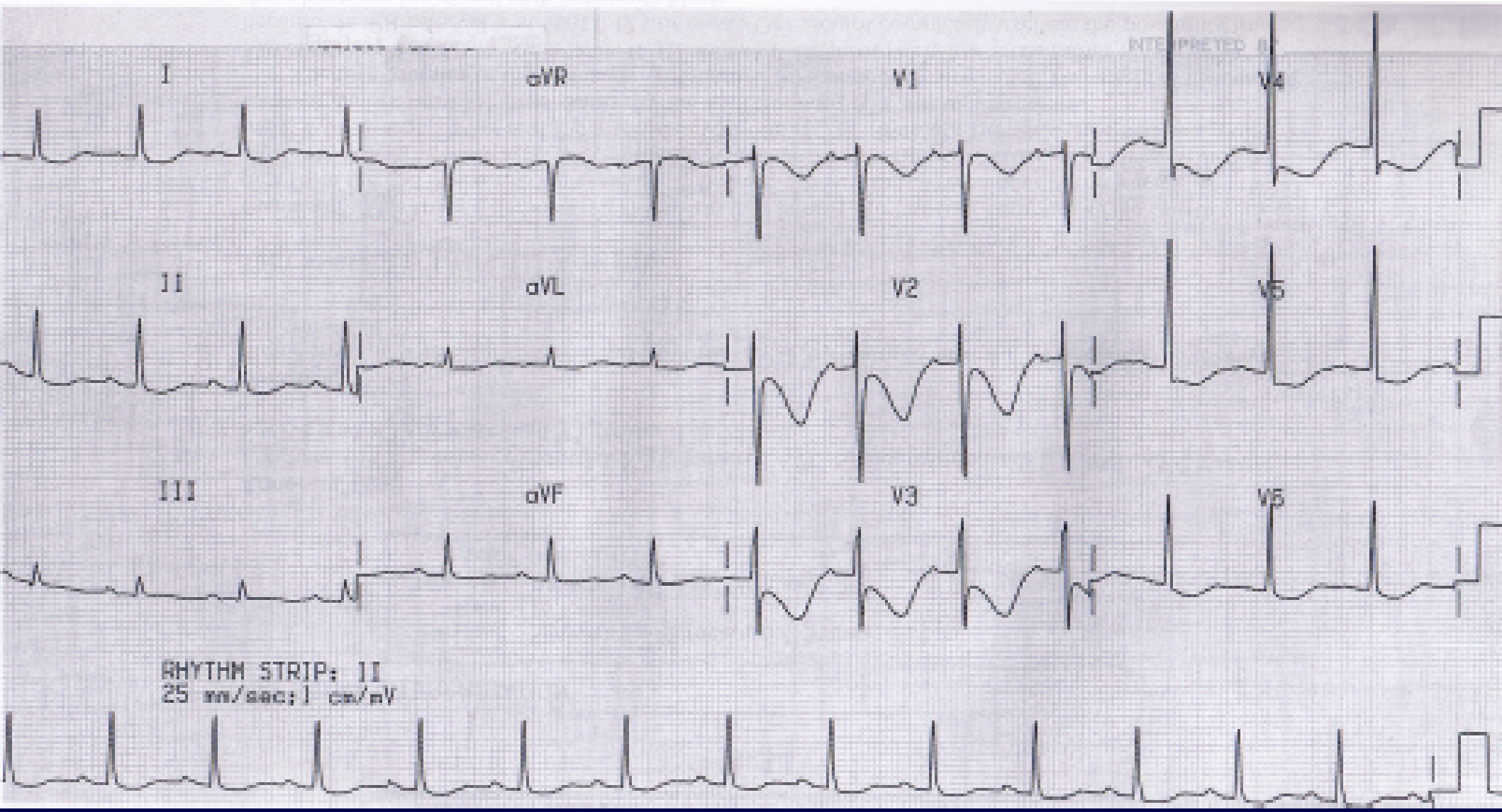
HYPOTHERMIA



- J wave deflection or Osborne wave (1)
- Prolongation of some or all of the ECG intervals (2)
- Low, flat, or inverted T waves
- ECG baseline with muscle tremor artifact (3)

Quinidine

- Blocks the fast sodium channels in cell membrane
- Toxic effect:
  - Widening QRS complex
  - Various degrees of AV block
  - Prolonged QTc
  - Ventricular arrhythmias
  - Marked sinus bradycardia, sinus arrest, or SA block



Prolonged QT Interval for Heart Rate ; treatment with Quinidine