

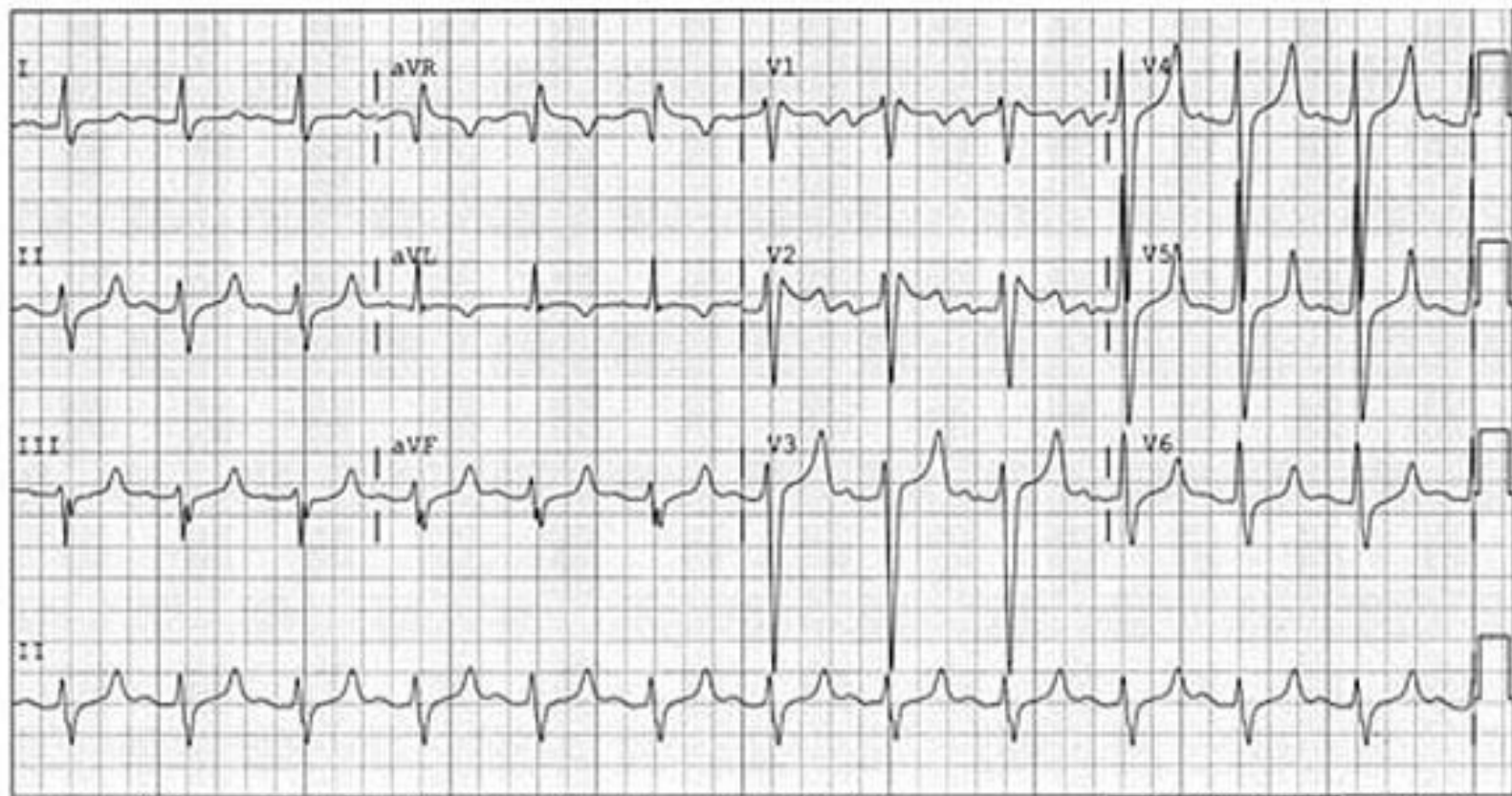
# ECG complication of treatment

ZSMU

Department of general practice – family  
medicine

# Case 1

- ▣ A 65-year-old woman presents to the Emergency Department (ED) with generalized fatigue and palpitations.
- ▣ She was started on an angiotensin-converting enzyme (ACE) inhibitor 2 months ago but has missed her follow-up appointments.
- ▣ What life-threatening metabolic abnormality could be responsible for the findings shown in her ECG tracing?



Device: 9360

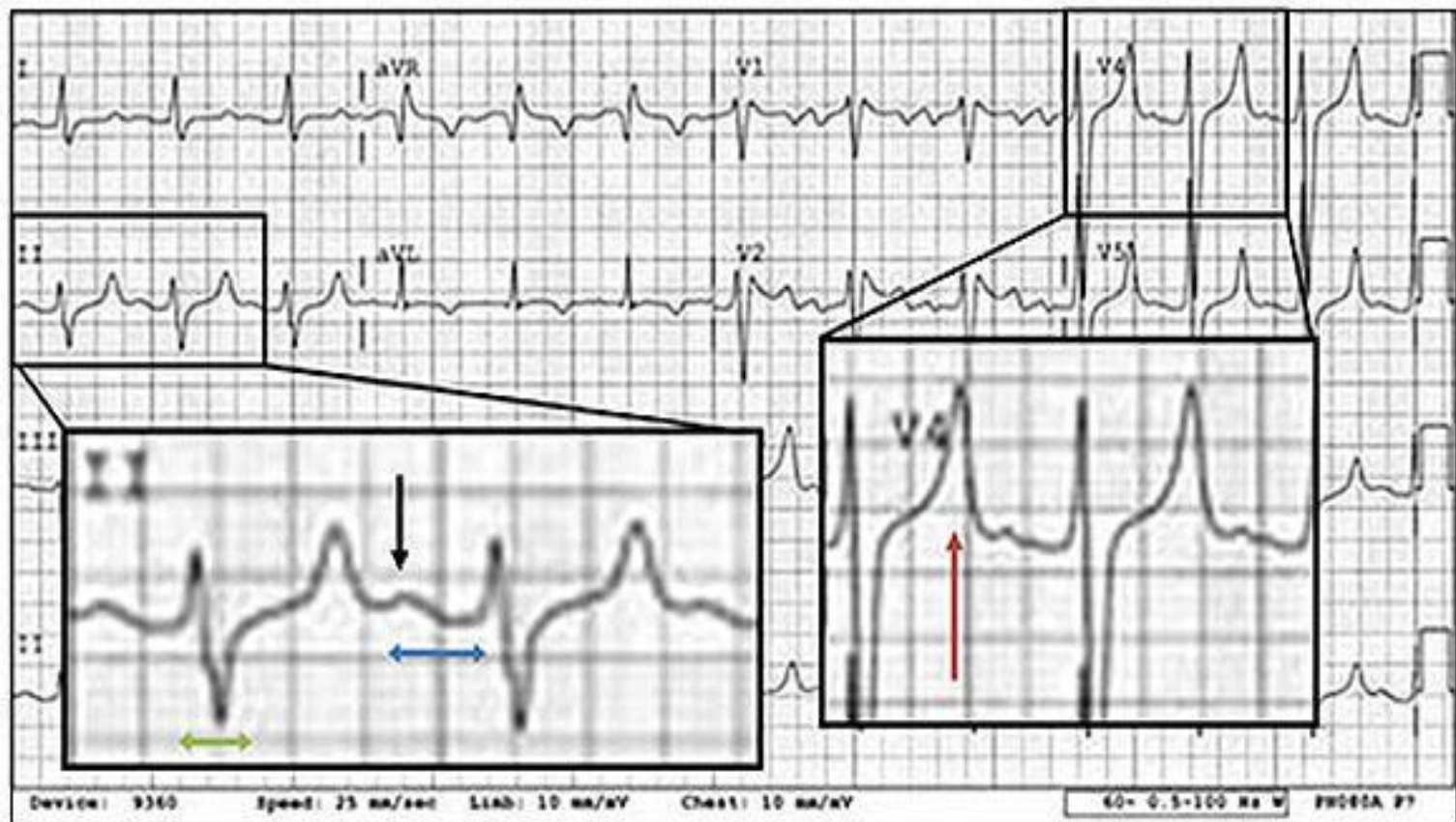
Speed: 25 mm/sec

Limh: 10 mm/mV

Chest: 10 mm/mV

60-0.5-100 Hz W

PROBQA P7



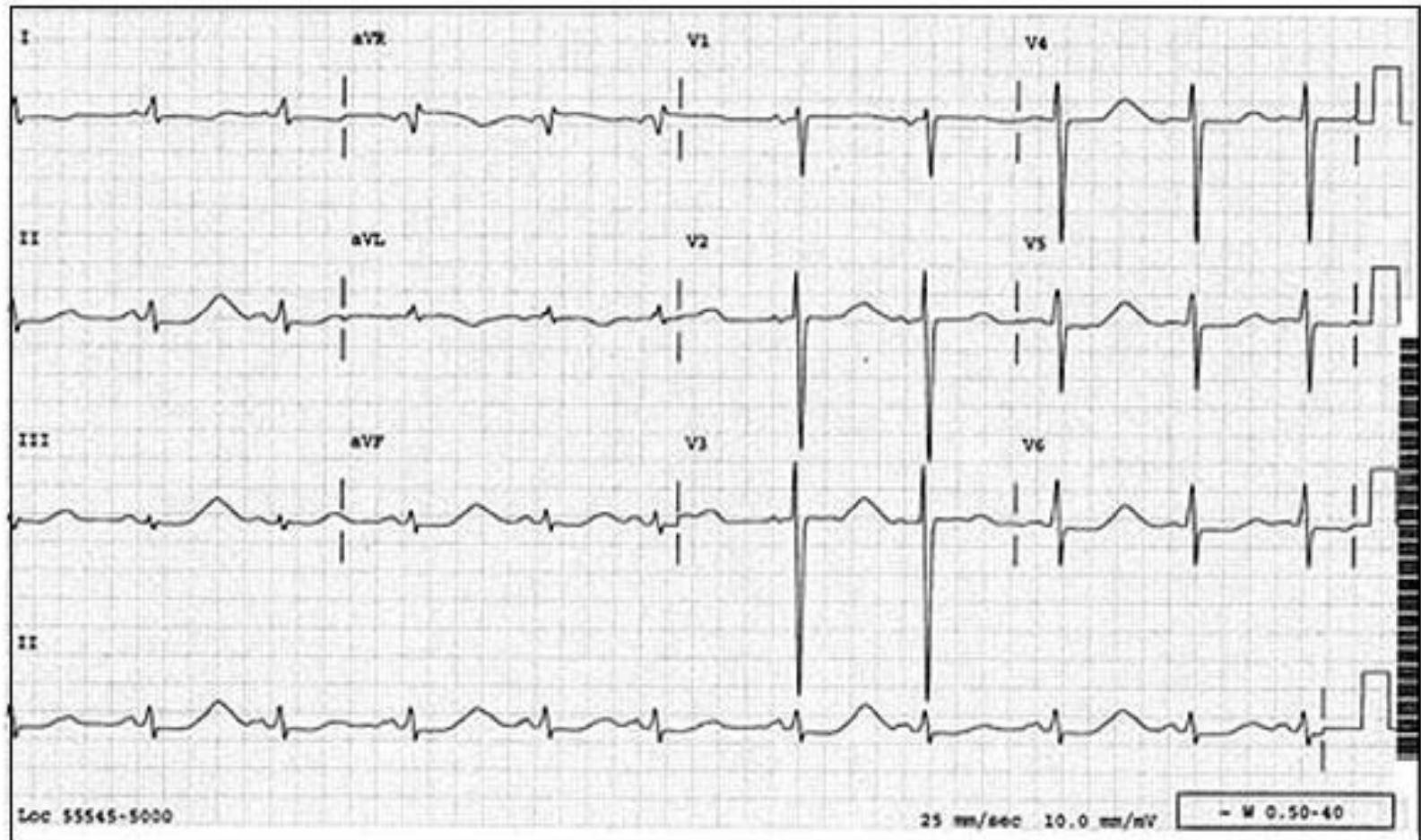
## **Life-Threatening Condition (I): Hyperkalemia.**

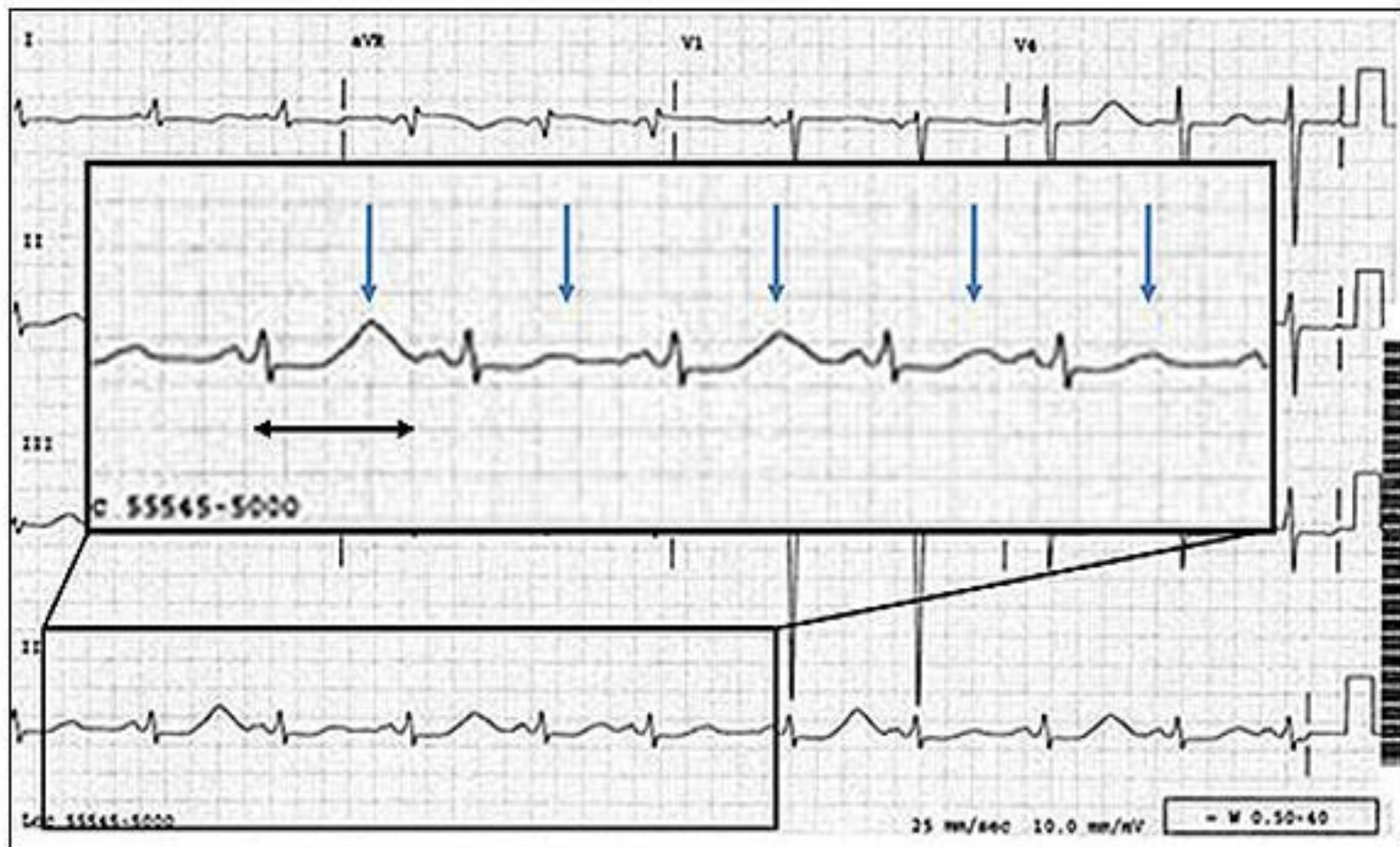
- The tracing shows a regular rhythm at 75 beats/min.
- A P wave is present in front of each QRS complex, indicating that the rhythm is sinus.
- A flattened P wave (black arrow), a prolonged PR interval (blue bar), borderline widened QRS complexes (green bar), and — more pathognomonic — pointed, narrow, and tented tall T waves (red arrow) are all features of hyperkalemia.
- The patient's serum potassium concentration when the tracing was recorded was 7.2 mEq/L.

# Case 2

- An 83-year-old man with known ischemic cardiomyopathy has an out-of-hospital cardiac arrest.
- He is rushed to the Emergency Department by paramedics.
- What life-threatening condition is shown in his ECG tracing, and what rhythm is he at risk of developing?





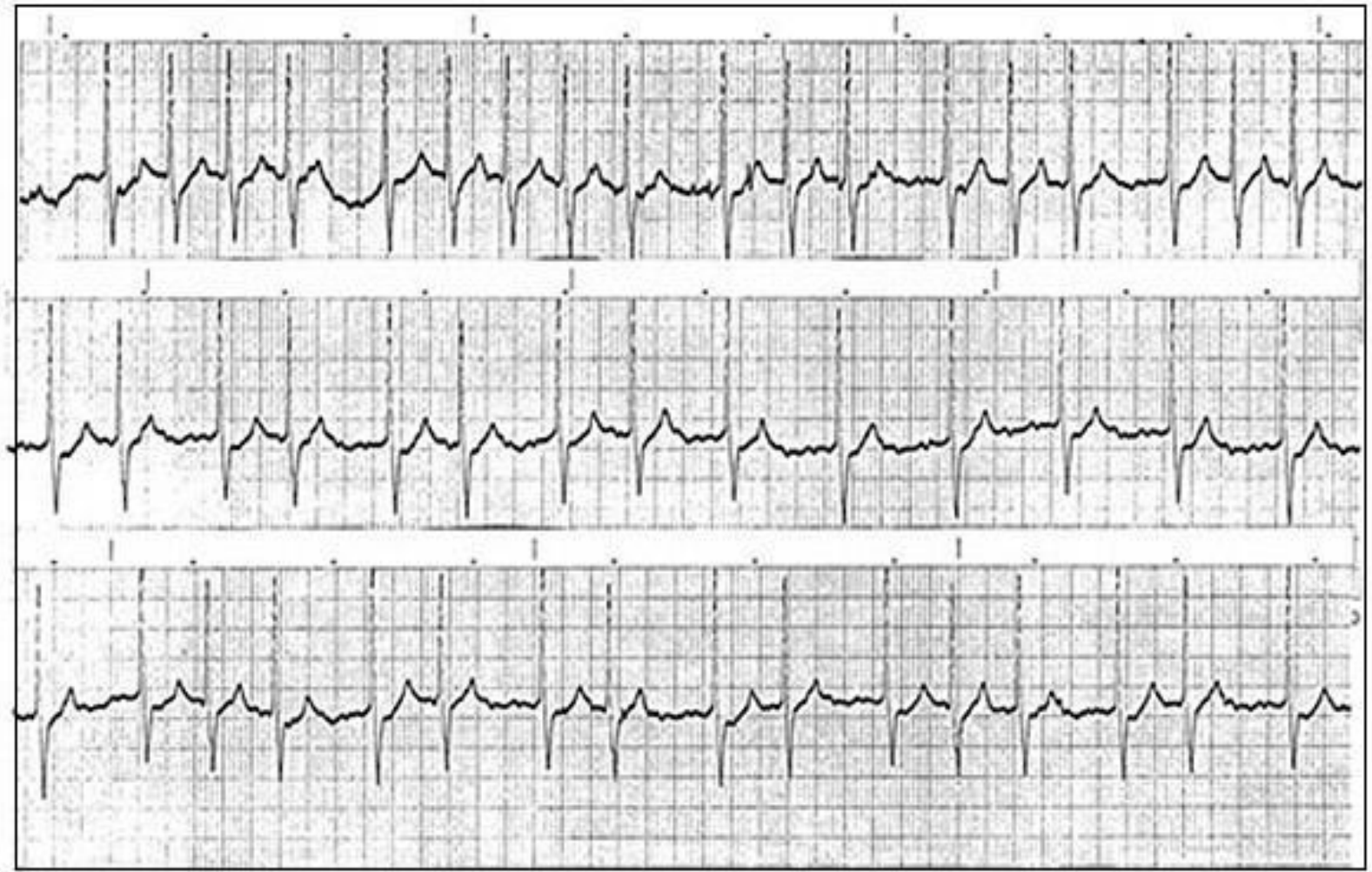


## Life-Threatening Condition (II): Long QT Interval and T-Wave Alternans.

- The tracing shows a sinus rhythm at 60 beats/min.
- The QT interval (black bar) is prolonged to 680 msec (normal, 300-440 msec), with a QTc also of 680 msec (normal, <460 msec).
- The T-wave heights alternate (blue arrows), and such alternation is often a precursor to the more severe rhythm of torsades de pointes.

# Case 3

- A 74-year-old man with mild dementia presents to the Emergency Department with worsening confusion.
- His medications include omeprazole, aspirin, simvastatin, and digitalis.
- He lives alone at his home, and his daughter comes to visit once a week to lay out his weekly medications.
- What life-threatening condition could be responsible for the findings shown on his ECG tracing?



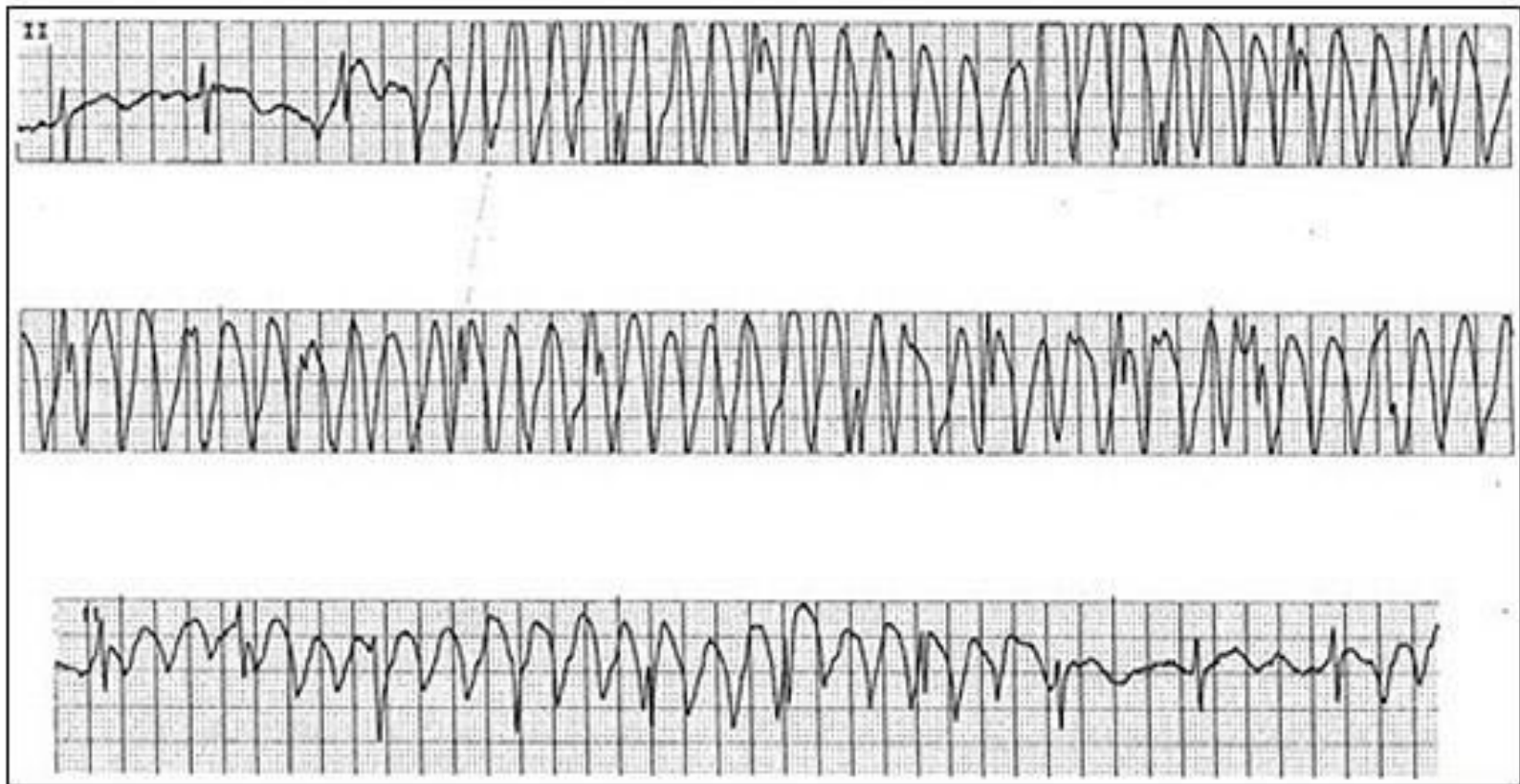


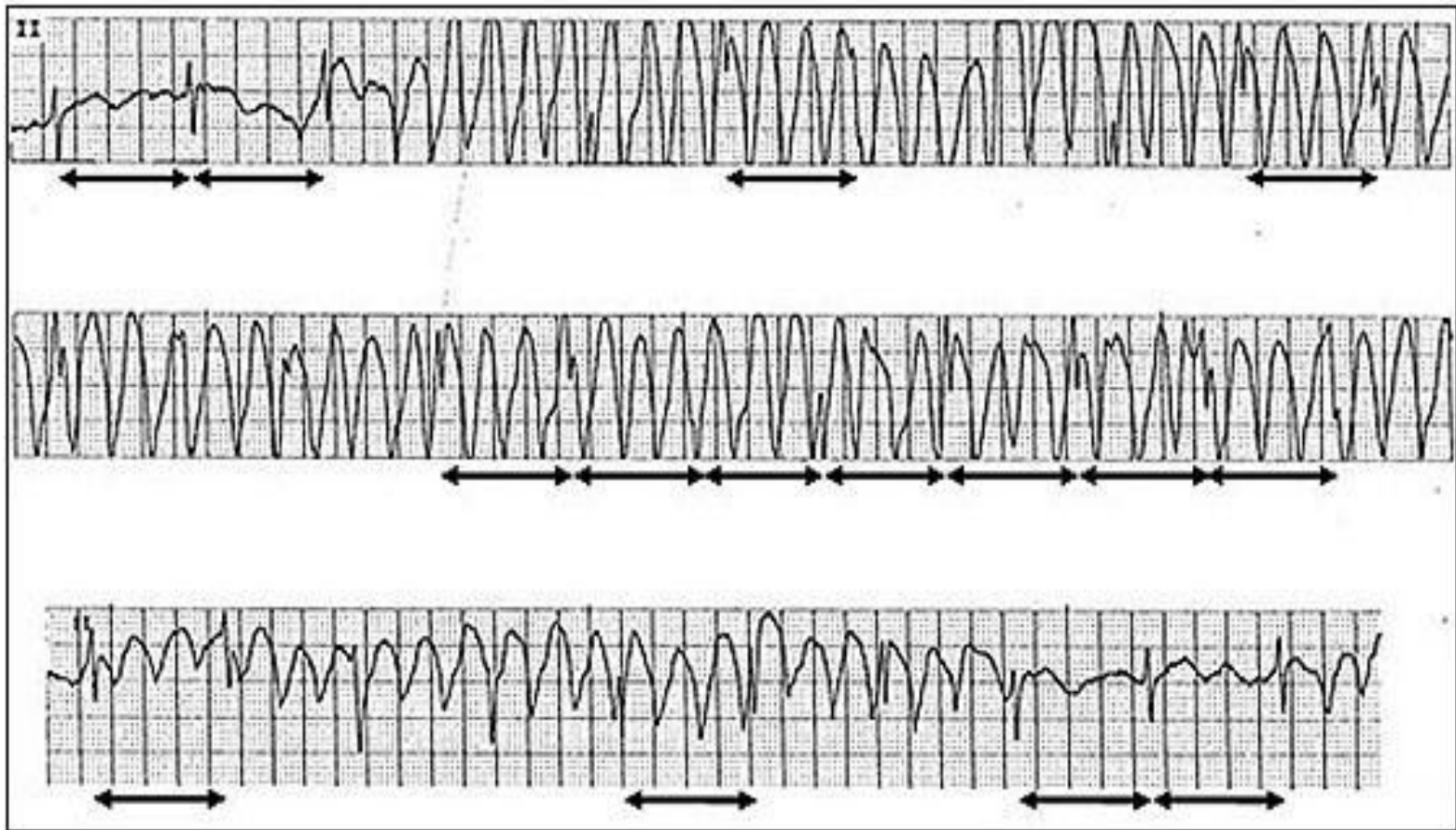
- **Life-Threatening Condition (III):**
- **Digitalis Toxicity.** The tracing shows no P waves, with a baseline of irregular, fine undulations, reflecting atrial fibrillation.
- The QRS complex is narrow and occurs regularly sometimes (in the latter part of the middle strip) and in groups at other times.
- This tracing is an example of junctional tachycardia with variable conduction to the ventricle.
- Conducted and skipped QRS complexes are present in patterns of 2:1 (black asterisk), 3:2 (blue asterisk), or 4:3 (red asterisk).
- The tracing is highly suggestive of digitalis toxicity, especially in this clinical context.



# Case 4

- A 25-year-old man arrives at the Emergency Department with a heavy cough after getting caught outside in a snowstorm while hiking.
- A routine ECG is performed.
- The concerned intern takes one look at it and rushes over to show you what he believes to be a serious problem.
- Do you agree with the intern's assessment of a life-threatening condition seen on the tracing?



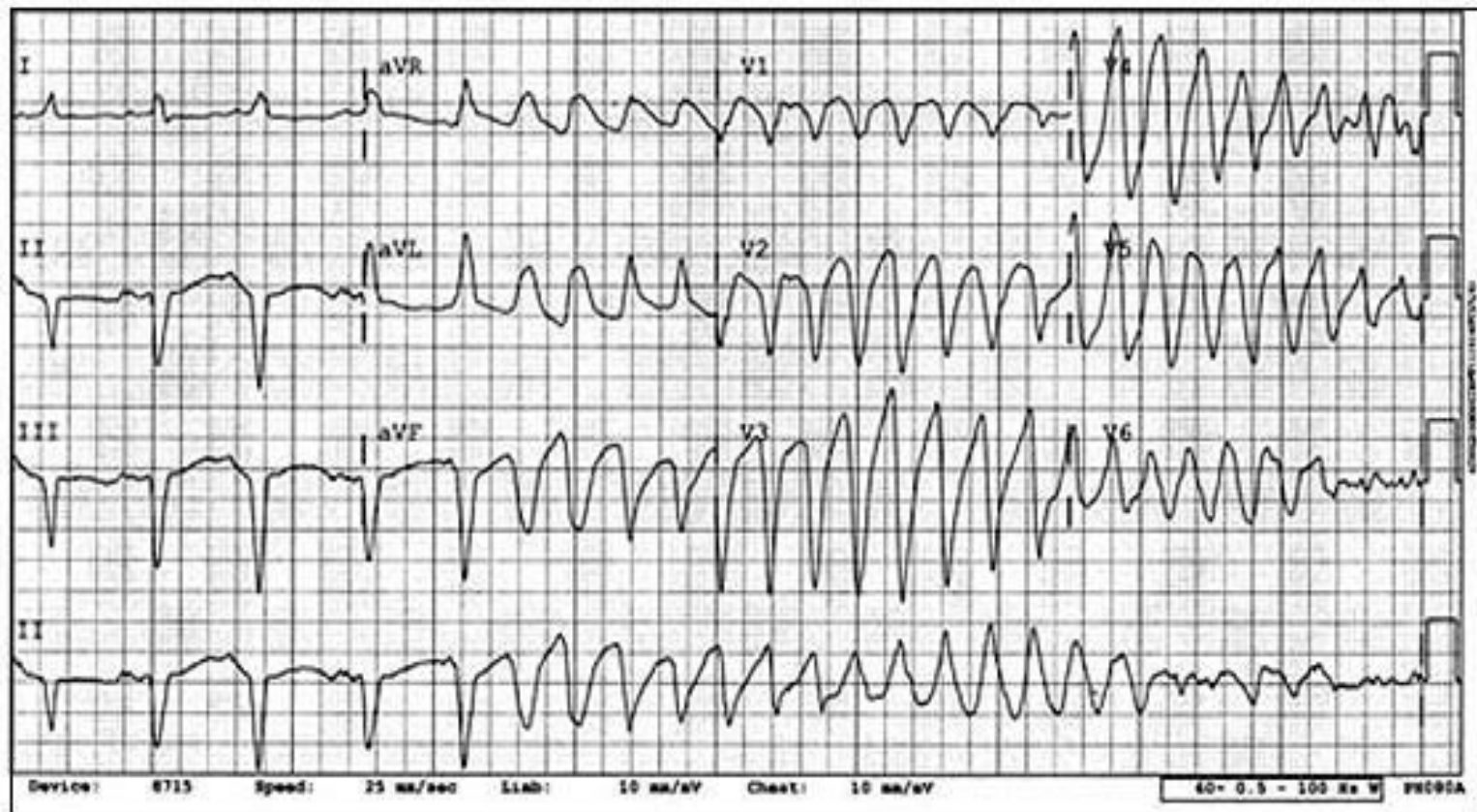


- **Life-Threatening Condition (IV):**
- **Artifact Simulating a Run of Ventricular Tachycardia.**
- At first glance, this ECG suggests a run of ventricular tachycardia.
- However, sharp deflections occur regularly at the same rate as the sinus rhythm seen at the beginning and at the end of the tracing (black bar).
- These deflections are undoubtedly QRS complexes of the sinus rhythm and provide an example of an artifact simulating ventricular tachycardia

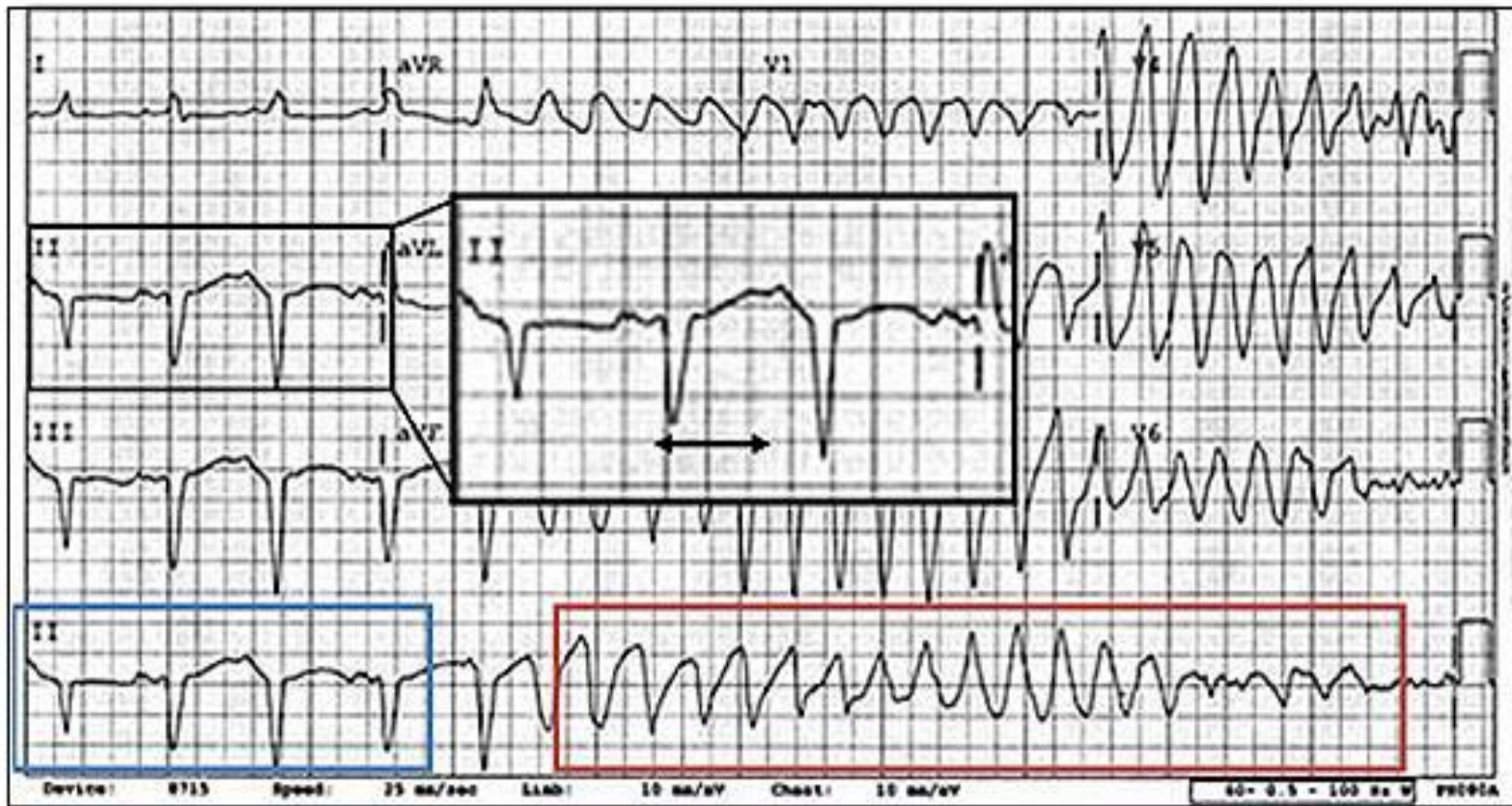
# Case 5

- A 32-year-old woman comes to the Emergency Department complaining of light-headedness and sweating.
- She is 5'6" tall and weighs less than 100 lb.
- An ECG is immediately obtained, which evolves while you are watching.
- What life-threatening condition is seen on the ECG tracing?

2009-4







- **Life-Threatening Condition (V):**
- **Torsades de Pointes.**
- Sinus rhythm is present at the beginning (blue box), but the QT interval of the sinus beats is long (black bar).
- This is followed by a wide QRS tachycardia at a rate of approximately 200 beats/min (red box).
- The QRS morphology and axis continuously change, indicating torsades de pointes, which is life-threatening.