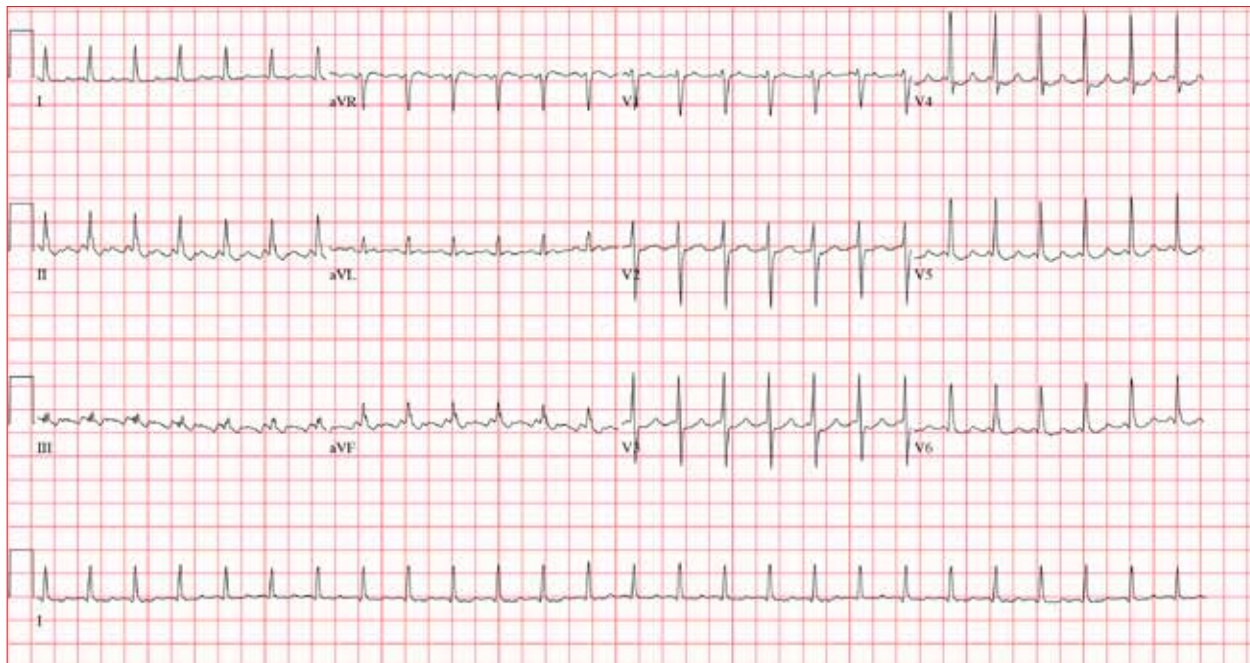


His Heart's Awkward Timing

Lyle W. Larson, PhD, PA-C



Approximately 5 AM yesterday, a 59-year-old man was awakened by a racing heart rate. When he got out of bed, he felt lightheaded enough to need to lay back down. After about 5 minutes, his heart rate and rhythm abruptly returned to normal.

Feeling fine, he went about his normal workday—but in the afternoon, while sitting at his desk, his rapid heart rate returned. He called over a coworker, who observed that he was “pale” and “sweaty.” His pulse was 130 beats/min. After “a few minutes,” the rapid heart rate spontaneously terminated, and he decided to take off the rest of the day.

This morning, he again awoke with a rapid heart rate and lightheadedness—but he also felt like the room was spinning. At that point, he called 911. By the time the paramedics arrived, his rapid heart rate had spontaneously terminated. Understandably concerned, however, he requested transport to your facility.

The patient says he is in normal health, with no



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prior cardiac history. He denies any chest pain, dyspnea, shortness of breath, nausea, vomiting, syncope, or near-syncope associated with his recent episodes.

Medical history is remarkable for hypertension, hyperlipidemia, and type 2 diabetes. He has had no surgical procedures. His medications include aspirin, lisinopril, and lovastatin; he says he takes his medications as prescribed and there have been no recent changes to the drugs or dosages. He has no known drug allergies.

Family history includes myocardial infarction in both parents; they are alive and well. The patient's younger brother has Wolff-Parkinson-White syndrome and underwent an ablation at age 24.

The patient is a practicing attorney for a local firm. He is married with 2 children. He has no history of alcohol, tobacco, or illicit drug use.

Review of systems is positive for a 10-lb weight gain over the past 6 months and new-onset nocturia.

During the physical exam, the patient informs you that his heart is racing again. The exam is suspended, and a 12-lead ECG is quickly performed. It shows a ventricular rate of 155 beats/min; no measurable PR interval; QRS duration, 78 ms; QT/QTc interval,

272/437 ms; P axis, unmeasurable; R axis, 34°; and T axis, -50°.

The physical exam is completed after the tachycardia spontaneously terminates. The patient's blood pressure is 148/88 mm Hg; pulse, 94 beats/min and regular; respiratory rate, 18 breaths/min⁻¹; and temperature, 97.9°F. He appears frightened but otherwise healthy. Pertinent findings of the physical exam include a normal fundoscopic examination with sharp disc margins, clear breath sounds bilaterally, normal heart sounds with no murmur or rub, a soft abdomen with no palpable masses, strong and equal pulses bilaterally in both upper and lower extremities, and a normal neurologic exam with no cognitive deficits.

Now that the physical exam is complete, what is your interpretation of this ECG?

ANSWER

The correct answer is atrial flutter with 2:1 atrioventricular (AV) conduction. The QRS complexes are narrow and regular, indicating the rhythm originates within the atria or AV node, with conduction down the normal His-Purkinje system, and not from the ventricles.

The regular rate of the P waves and QRS complexes rules out atrial fibrillation with a rapid ventricular response. If you look carefully, you'll see a P wave immediately before each QRS complex, and you'll also see a P wave at the onset of the T wave (best seen in leads II, V₃, and V₆) resulting in what looks like a notched T wave. If you measure the duration of the P at the onset of the T wave to the P wave prior to the QRS complex, you'll see the intervals are regular and march through the QRS complexes.

With 2 P waves for every QRS complex, the atria are contracting at 310 beats/min (193 ms), a rate consistent with atrial flutter in a 2:1 conduction pattern, compared to the ventricular rate of 155 beats/min (387 ms). **CR**