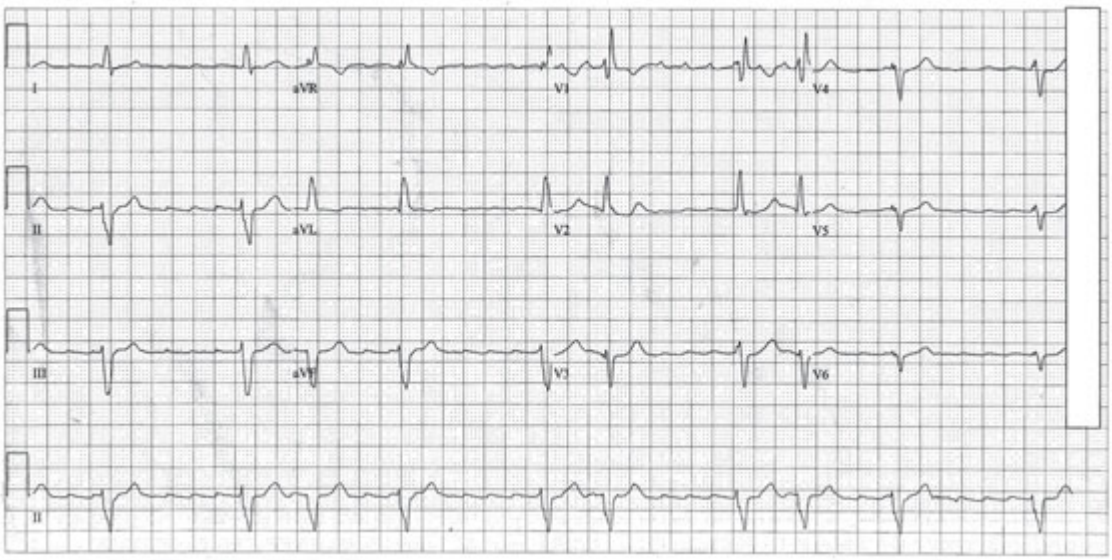
QUICK QUIZ
WHAT IS THE DIAGNOSIS?

BACKGROUND

An 82-year-old man is brought in to the emergency department by ambulance because of a sudden loss of consciousness, which occurred at home while he was walking to the bathroom. The patient's wife heard a thump from the other room and came to find her husband lying on the floor. She reported that his upper extremities twitched a couple of times, and his eyes rolled back, but within a minute he was awake and alert and asking what had happened. He remained stable during transport and the main finding that the paramedics mentioned was that his pulse seemed irregular and sometimes slow.

On arrival the patient was alert and awake with his baseline normal mental status; he was not groggy or confused. Given the lack of premonitory symptoms and the abnormal pulse rhythm, you are concerned that the patient has had cardiac syncope. The monitor shows an irregularly irregular rhythm and a heart rate of 62 bpm. The patient's blood pressure is 150/82 mm Hg, and his oxygen saturation is 99% on room air. You ask for a 12-lead ECG.



QUESTIONS

1. **What is the diagnosis?**
2. **What else should you consider?**
3. **What is the treatment?**

ANSWERS & DISCUSSION

1. Diagnosis

Atrial flutter with variable block

Note the sawtooth f waves in the inferior leads (II, III, aVF) and in V_1. These leads are usually where flutter waves are most easily recognized. Also note the variability in the timing of the QRS complexes that follow. The atrial rate in flutter is generally 250-350 bpm; in this case, the atrial rate is 300 bpm. Patients with atrial flutter typically present with a regular ventricular response of about 150 bpm as a result of 2:1 arteriovenous (AV) conduction. Slower rates may occur with a diseased conduction system, as in this case, or with the use of rate-slowing agents, such as beta-blockers, calcium channel blockers, or digoxin. The structurally normal heart that is not given rate-slowing medications typically produces ventricular rates of 100-180 bpm in atrial flutter.

Atrial flutter is a rhythm that has increasing incidence with the elderly population of about 50-90 cases per 1000 people aged 65-90 years. Patients may present with variable block (as in this case); especially prone are the elderly, who may have a diseased conduction system and underlying sick sinus syndrome (SSS). In fact, one of the common presenting rhythms in SSS is atrial fibrillation or flutter, which may be associated with a slow ventricular rate depending on the degree of block. Patients with SSS may present with syncope as a result of the tachycardia-bradycardia ("tachy-brady") syndrome. This syndrome occurs when a combination of fast and slow supraventricular rhythms occur in the presence of SSS. Either bradycardia or tachycardia (often atrial fibrillation or flutter) may cause syncope. A concomitant lack of a sufficient junctional or ventricular escape rhythm is necessary for SSS-related symptomatic bradycardia to cause syncope.

2. Other Considerations

Remember that patients with digoxin toxicity classically present with atrial tachycardia or atrial flutter with block. Moreover, the main differential diagnoses for the patient with an irregular rhythm on the ECG (aside from respiratory variation and premature atrial or ventricular beats) are atrial fibrillation, atrial flutter, and multifocal atrial tachycardia. The first of these is the most common; however, the latter 2 are often not diagnosed because they are not considered in the differential.

3. Treatment

Patients with SSS nearly always have AV nodal disease, therefore the treatment for the atrial fibrillation or flutter has important differences from the standard rate control or cardioversion therapy. Rate-slowing agents or cardioversion in such patients may produce disastrous consequences, including worsening of the heart block and progression to clinically significant bradycardia and hypotension. In this patient (whose syncope was likely due to the high degree of block and resultant bradycardia), rate-slowing agents and cardioversion are contraindicated. Patients such as this one generally require a pacemaker to manage recurrent syncope or symptomatic bradycardia. The need for cardiac medications to treat tachydysrhythmias (which may be intermittent) is a separate indication for pacemaker placement, as these medications alone may worsen the existing heart block. Therefore, pacing to treat bradycardia and drug therapy to treat the tachycardia are required for those with tachycardia-bradycardia syndrome.