

“Using the ears”

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Vignette

A 75-year-old man presents with complaints of palpitations, mild chest discomfort, and light-headedness for the preceding hour. He had a myocardial infarction several years earlier, and since that time has been treated with warfarin for “an irregular heart rhythm.” The ECG shown in Figure 1 is obtained; no previous ECGs are available for comparison.

Questions

1. What is your approach to the systematic analysis of this arrhythmia?
2. What is the most likely diagnosis?

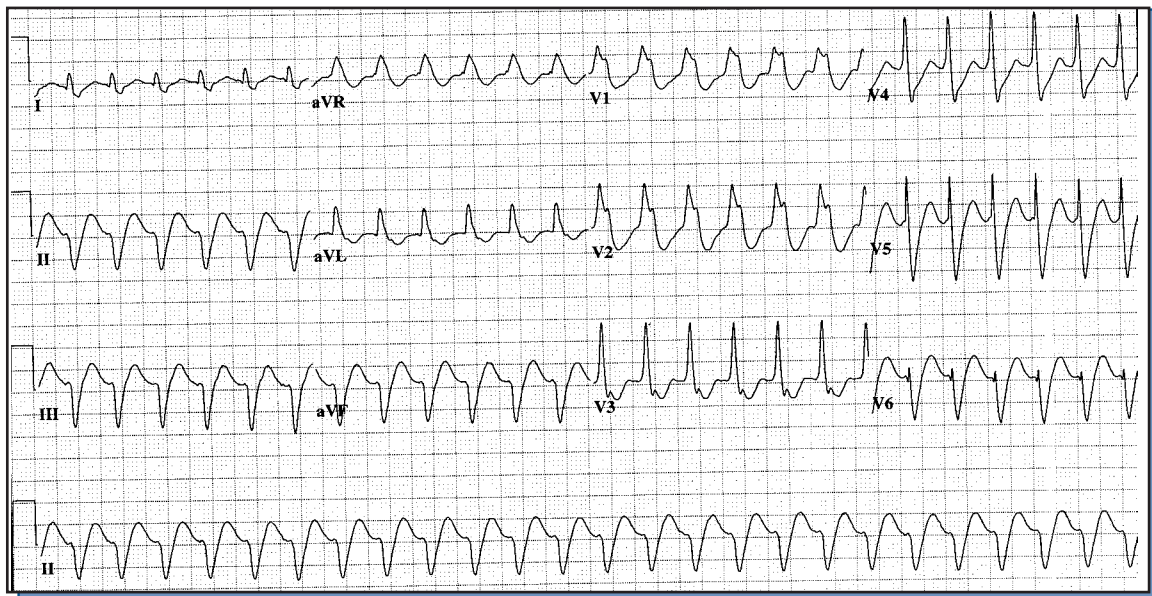


Figure 1

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Answer

1. After an appropriate assessment to ensure that the patient is clinically stable, use a pair of calipers to check whether the rhythm is regular or irregular; most irregular tachycardias will prove to be atrial fibrillation. If the rhythm is regular (as here) and the QRS duration is normal, then the arrhythmia is some form of supraventricular tachycardia. If the QRS duration is prolonged, the differential diagnosis will include ventricular tachycardia, atrioventricular reciprocating tachycardia with antegrade conduction down an accessory pathway (Wolff-Parkinson-White), and some form of regular supraventricular tachycardia with a functional (rate-related aberration) or pathologic bundle branch block. Our patient has a regular wide QRS tachycardia with a slightly atypical right bundle branch block (RBBB) morphology. The important practical question is: is this ventricular tachycardia?

Table 1

Wide QRS Tachycardia Algorithm

Brugada and colleagues have suggested the following simple four step algorithm when dealing with a wide QRS tachycardia. If the answer to any step is YES, the diagnosis is almost certainly ventricular tachycardia; if the answer is NO, proceed to the next step.

- Is an RS complex absent in all precordial leads?
- Is the RS interval (measured from the beginning of the R wave to the nadir of the S wave) more than 0.1 seconds (2 1/2 small squares)?
- Is there evidence of AV dissociation (intermittent independent P waves, capture or fusion beats)?
- Are morphology criteria for ventricular origin present in both V1-2 and V6?

In Table 1, application of the algorithm to this ECG leads us to (d), morphology criteria. For tachycardias with an RBBB-like morphology, a monophasic R or biphasic qR pattern in V1, and an R/S ratio less than one in V6 suggest a ventricular origin. When a double-peaked RsR complex is seen in V1 with the left peak higher than the right one, a ventricular origin is almost certain. This concept has been popularised by Marriott as “rabbit ears;” when the left rabbit ear is taller than the right (viewed from behind the rabbit), the rhythm is likely to be ventricular.

2. This patient’s arrhythmia fulfils the morphology criteria for ventricular tachycardia and this is the likely diagnosis. For those who find it difficult to remember the various morphology criteria, a more simple approach is to ask oneself “does this look like a typical right or left bundle branch block pattern?” If the answer is clearly no, supraventricular tachycardia with aberrant conduction is unlikely, although the converse does not hold true. The circumstances in which the arrhythmia is encountered may also be helpful; most regular wide QRS tachycardias in patients with a history of myocardial infarction are of ventricular origin. Finally, when previous ECGs in this patient were located they showed chronic atrial fibrillation, precluding any likelihood of detecting dissociated P waves during ventricular tachycardia. \square

Avapro^{*}
(irbesartan)

Angiotensin II Receptor Blocker

Avalide^{*}
(irbesartan/hydrochlorothiazide)

Angiotensin II Receptor Blocker/Diuretic

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