Clinical vignette

A 69-year-old female was found to have an abnormal electrocardiogram (ECG) (Figure 1) in her cardiologist’s office. She reported no symptoms and specifically denied chest pain, shortness of breath, dizziness, lightheadedness, or syncope. Her vital signs on presentation were normal. She was recently hospitalized for an anterior ST-elevation myocardial infarction and had a drug-eluting stent placed in the proximal left anterior descending artery. She also had ischaemic cardiomyopathy with a left ventricular ejection fraction of 44% based on echocardiography after stenting. Her medications were atorvastatin 80 mg daily, aspirin 81 mg daily, clopidogrel 75 mg daily, and metoprolol succinate 25 mg daily. Due to the ECG findings, she was started on apixaban 5 mg twice daily for stroke prophylaxis and her metoprolol succinate was held for the concern of heart block noted on the ECG.

Questions:

1. What is the diagnosis?
   - A. Complete heart block
   - B. Atrial flutter with 3:1 conduction
   - C. Atrial tachycardia with slow ventricular conduction
   - D. Ectopic atrial bradycardia
   - E. Atrial fibrillation with slow ventricular conduction

Figure 1 Presenting electrocardiogram.

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Handling Editor: Parag Ravindra Gajendragadkar
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Answer: The correct answer is (D).

On this ECG, there is a unifocal P wave preceding each QRS complex suggesting unifocal atrial activation. There are additional P waves with multiple morphologies and variable PP intervals seen as well. The additional P waves (blue arrows) before the P waves of 4th and 5th QRS complexes (red arrows) have PP intervals shorter than atrial refractory period indicating a non-physiological cause. These P waves are absent on lead III confirming artefacts. Lead III shows inverted P waves suggesting possible ectopic focus, and this rules out atrial flutter. Repeat ECG is shown in Supplementary material online, Figure S1.

2. All the following conditions can cause artefacts mimicking atrial arrhythmia except which one?

A. Equipment-related artefact  
B. Muscle contraction  
C. Parkinson’s disease  
D. Hypothermia  
E. Limb leads misplacement

Answer: The correct answer is (E).

Artefacts that can mimic atrial arrhythmia include muscle contraction, Parkinson’s disease, other causes of tremors, shivering from hypothermia, as well as equipment-related artefacts.1–3 Artefacts caused by tremors and shivering usually mimic atrial fibrillation and less frequently atrial flutter. Muscle contraction produces electrical signals that represent muscle action potentials and these electromyographic signals can be recorded by ECG imitating P waves.4 The absence of artefacts on certain lead can assist in the diagnosis of artefacts as well as localizing the artefact source.

Limb lead misplacement may cause inverted P wave, QRS complex, and T wave but not additional P waves.

3. What should be the management for this patient?

A. Continue apixaban and metoprolol succinate at the same dose  
B. Continue apixaban and decrease metoprolol succinate dose  
C. Discontinue apixaban and continue metoprolol succinate at same dose  
D. Discontinue apixaban and decrease metoprolol succinate dose  
E. Discontinue both apixaban and metoprolol succinate

Answer: The correct answer is (D).

The ECG did not show atrial fibrillation or atrial flutter; thus, patient has no indication to use apixaban for stroke prophylaxis. Given patient’s recent STEMI and ischaemic cardiomyopathy with reduced left ventricular ejection fraction, metoprolol succinate is indicated; however, her ECGs showed bradycardia with heart rate in 40 s, thus, her metoprolol dose should be decreased.

Supplementary material

Supplementary material is available at European Heart Journal – Quality of Care and Clinical Outcomes online.

Consent: The authors confirm that written consent for submission and publication of this case report including images and associated text has been obtained from the patient’s next-of-kin in line with COPE guidance.

Conflict of interest: All authors have no conflict of interest.

Funding: This ECG challenge case has no fund.

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