

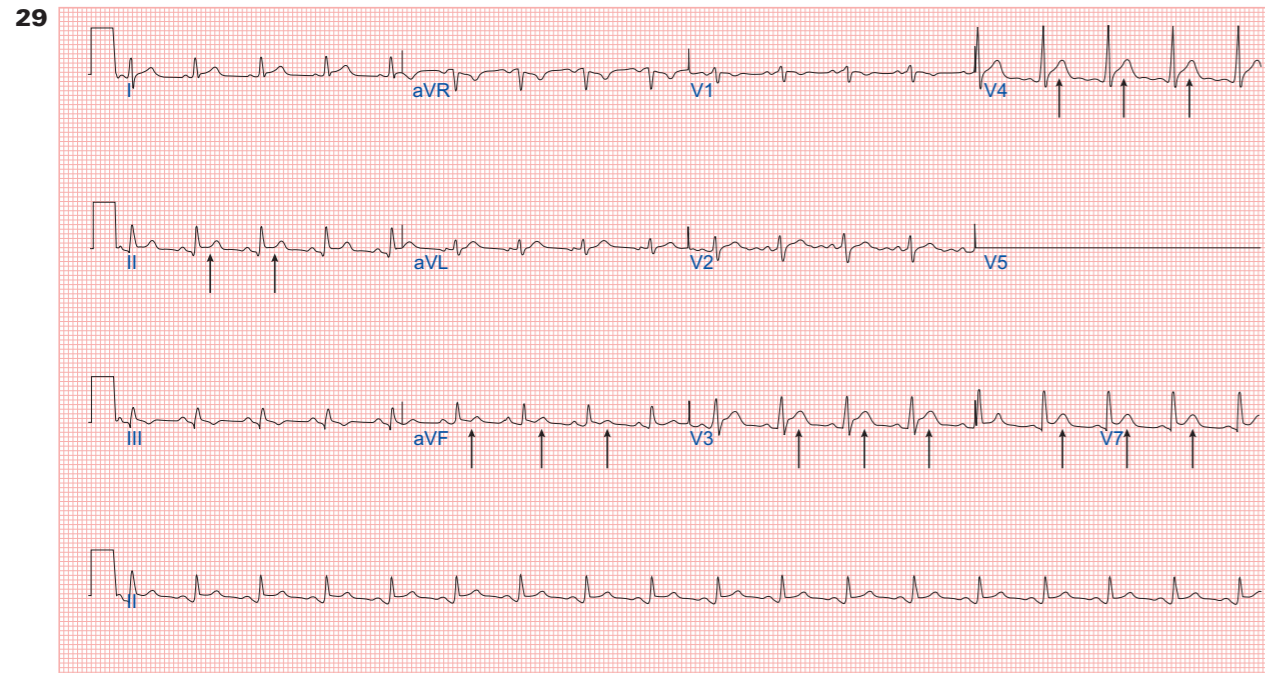
Answer 29

1 ECG 29 shows sinus rhythm with normal P waves, PR interval, and QRS complexes. The Q wave in leads II and III are nonpathological. There is an ST segment elevation seen both in the inferior leads LII, aVF and in the anterior leads V3, V4, and V7 (arrows). Leads V5 and V6 are missing because of a dressing on the chest wall.

2 This patient should not be thrombolysed. Severe trauma is a relative contraindication to thrombolysis. Despite the past history of angina and risk factor status of the patient, these changes are consistent with myocardial contusion. A clue to this can be seen from the ECG where lead V5 and V6 could not be positioned.

Cardiac damage may be caused by penetrating and nonpenetrating injury to the chest. Serious cardiac damage can occur even in the absence of visible external trauma. Any cardiac structure may be involved. Myocardial contusion may cause arrhythmias, BBB patterns, and changes resembling those of an acute MI. Impaired left ventricular function may be noted. Pericardial effusions may complicate serious trauma and can develop up to several weeks after the incident. Trauma to the heart can also result in rupture of valves, atrial or ventricular walls, and of major vessels.

3 Echocardiography is required as it may confirm myocardial contusion, any valve injury, ruptured vessels, or significant pericardial effusion including cardiac tamponade.

**Question 30**

A 59-year-old male had symptoms of palpitations and dizzy spells. Twenty-four hour Holter monitoring revealed evidence of sick sinus syndrome and paroxysmal AF. It also revealed sinus arrest with pauses of up to 3.2 seconds. He was on no medical treatment and required a permanent pacemaker.

- 1** What are the findings in ECG 30?
- 2** What nomenclature is used to describe methods of pacing?
- 3** What type of pacemaker has been used and how can it help in paroxysmal AF associated with sick sinus syndrome?



Answer 30

1 ECG 30 shows the presence of a dual chamber (DDD) pacemaker as evidenced by two pacing spikes. The first spike (circle) is followed by a P wave and the second spike (arrow) is followed by a broad QRS complex, confirming its ventricular origin.

2 A three letters code (*Table*, below) is used to describe methods of pacing. The majority of modern pacemakers are VVI or DDD. VVO pacemakers that pace ventricles at a fixed rate without sensing are not used any more, due to the risk of precipitating ventricular arrhythmias.

3 A dual chamber (DDD) pacemaker can help to re-establish and maintain sinus rhythm in sick sinus syndrome, by restoring the normal atrioventricular relationship by sequential pacing of the atria and ventricles. In sick sinus syndrome, AF is usually pause dependent. It arises from multiple atrial foci discharging simultaneously during periods of sinus arrest. Sinus rhythm can be maintained by maintaining atrioventricular synchrony.

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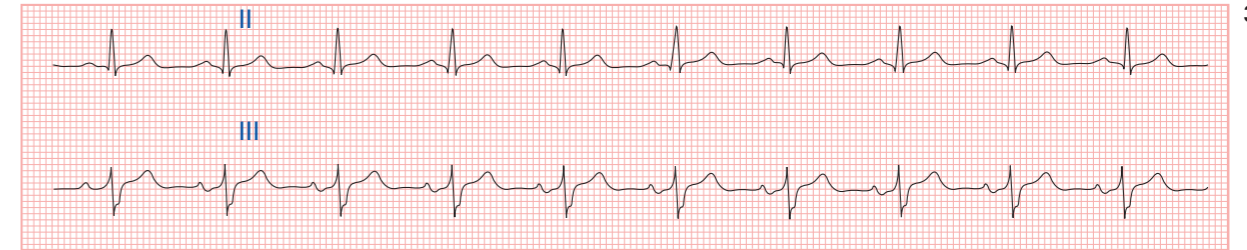
Pacemaker coding		
First letter	Second letter	Third letter
Chamber paced	Chamber sensed	Response to sensing
A atrial pacing	O no sensing	O no response
V ventricular pacing	A atrial sensing	I inhibited
D dual chamber pacing	V ventricular sensing	T triggered
	D dual chamber sensing	D pulse triggering and inhibition

Question 31

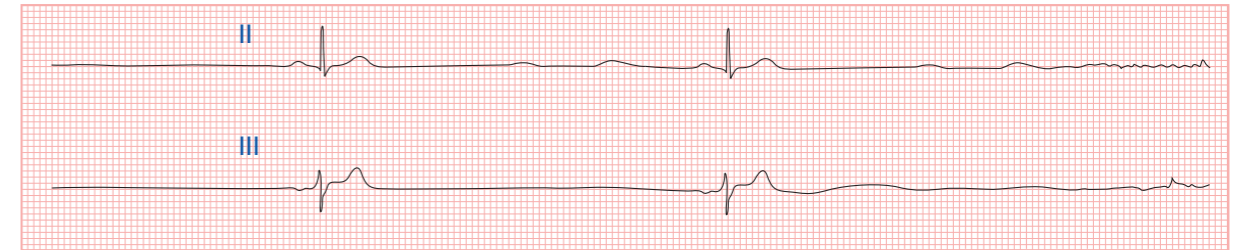
An 80-year-old female was having blackouts. During carotid sinus massage (CSM) she developed dizziness and light-headedness. ECG 31 was taken.

- 1 What is the diagnosis?
- 2 How should this condition be treated?

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Before carotid sinus massage



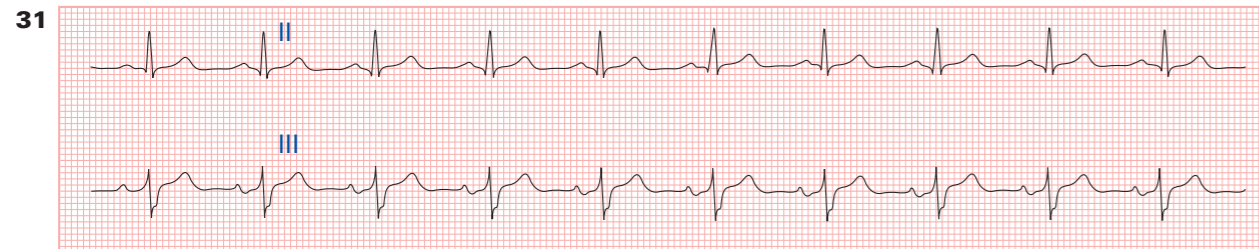
During carotid sinus massage

Answer 31

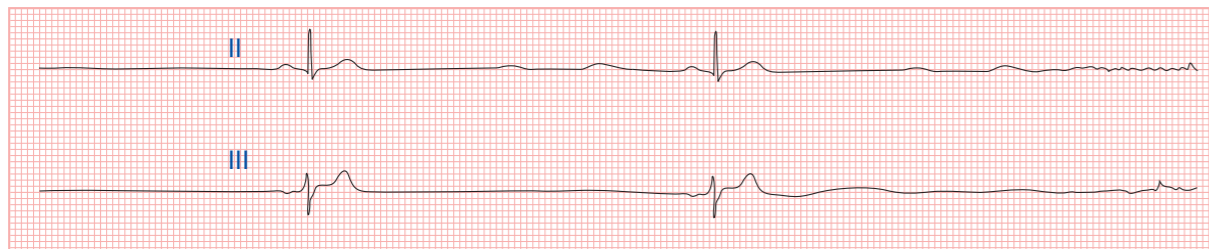
1 The history and ECG in this lady suggest the diagnosis of carotid sinus syndrome (CSS). ECG 31 shows a significant pause of >3 seconds on CSM. When such a pause is present in association with symptoms, the diagnosis is CSS. If the pause is present without any symptoms, the diagnosis is carotid sinus hypersensitivity (CSH). There are three subtypes of CSS: (1) cardioinhibitory, when CSM results in a pause of ≥ 3 seconds with symptoms; (2) vasodepressor, when CSM results in a drop in systolic blood pressure of ≥ 50 mmHg (6.7 kPa) with symptoms; and (3) mixed, when both the above criteria are present.

2 Drugs that depress the SA or AV node should be stopped. According to the ACC/AHA guidelines, recurrent syncope related to pauses of ≥ 3 seconds during CSM in the absence of drugs is an indication for a permanent pacemaker. The indication for a permanent pacemaker is not so clear when the bradycardia is not closely related to symptoms. A dual chamber pacemaker (DDD/DVI) is preferred in this situation.

The vasodepressor component of CSS is more difficult to treat. Vasodilator medication should be stopped. Selective serotonin re-uptake inhibitors or beta blockers have been used to try to improve the symptoms in patients with CSS.



Before carotid sinus massage

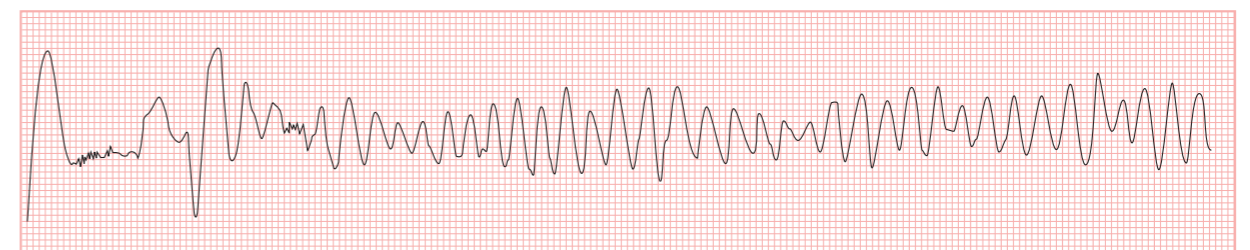
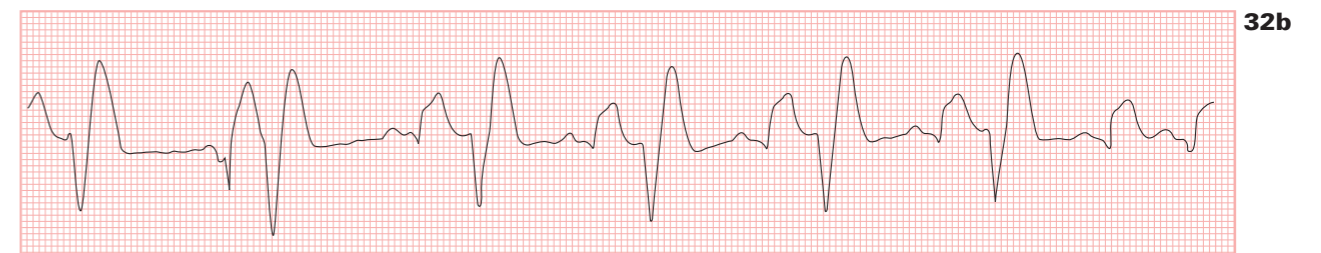
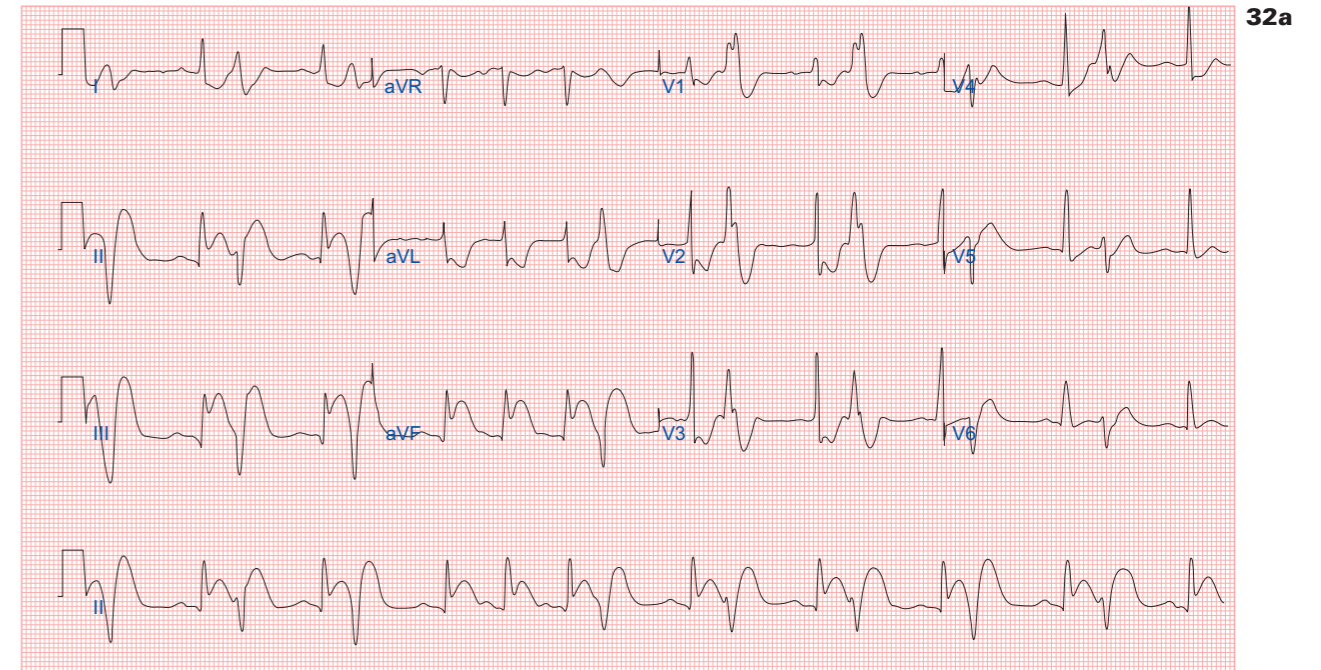


During carotid sinus massage

Question 32

A 58-year-old male presented in the accident and emergency department with chest pain.

- 1 What are the findings in ECG 32a?
- 2 What does ECG 32b show?
- 3 What is the differential diagnosis of a tall R wave in V1?

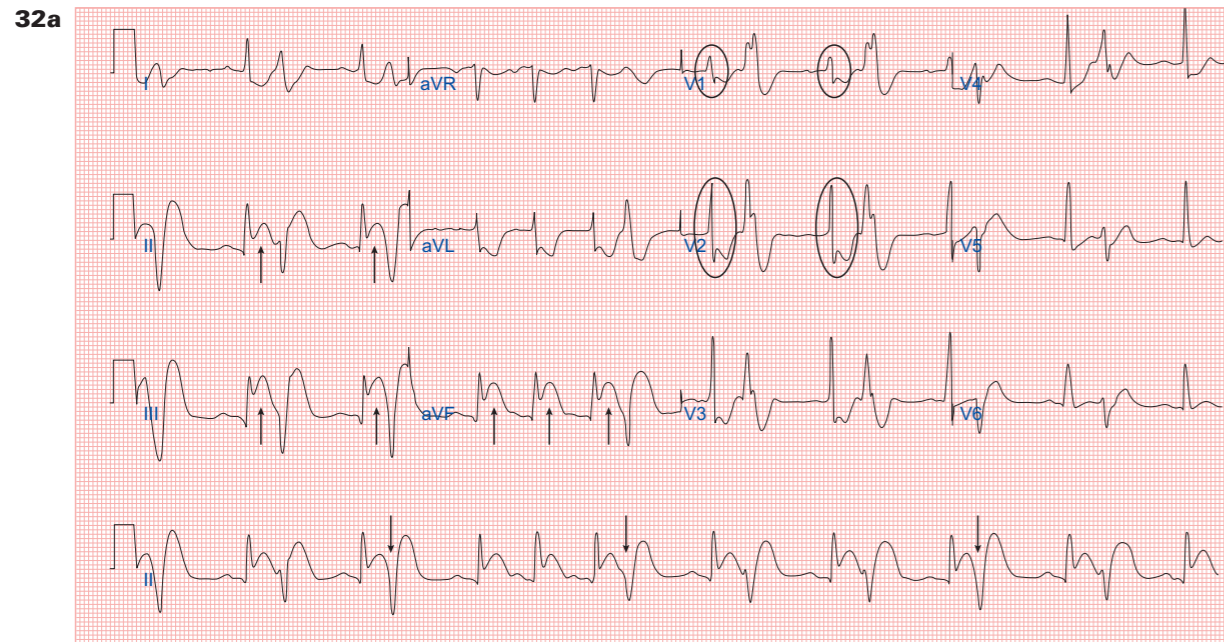


Answer 32

1 ECG 32a shows ST segment elevation in leads LII, LIII, and aVF consistent with acute inferior wall MI (arrows). There is a tall R wave in lead V1 and V2 (circles) indicating posterior wall extension. There are frequent ventricular ectopics some of which are falling on the T waves of the preceding QRS complexes (arrows in rhythm strip). This is known as 'R on T' phenomenon. This can lead to dangerous ventricular tachyarrhythmias.

2 ECG 32b is the rhythm strip from the same patient. There are frequent ventricular ectopics shown in this rhythm strip, one of which is an 'R on T' (arrow). In the second part of the rhythm strip there is ventricular fibrillation precipitated after such an event (circle).

3 ECG 32a shows an example of a tall R wave in V1. The differential diagnosis is posterior wall infarction, RBBB, acute pulmonary embolism, RVH, WPW type A, and a normal variant in the newborn.

**Question 33**

A 75-year-old female with a past history of ischaemic heart disease presented with chest pain of 45 minutes duration. She had an ECG performed in the accident and emergency department.

- 1 What are the findings in ECG 33?
- 2 Should this patient be thrombolysed?

