

“A topical tracing”

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Vignette

A middle-aged homeless man is found unconscious and brought to the emergency department. No medical history is available. He smells strongly of alcohol and there are no signs of head injury. His ECG is shown in Figure 1.

Questions

1. Describe the ECG abnormalities.
2. What is the diagnosis?

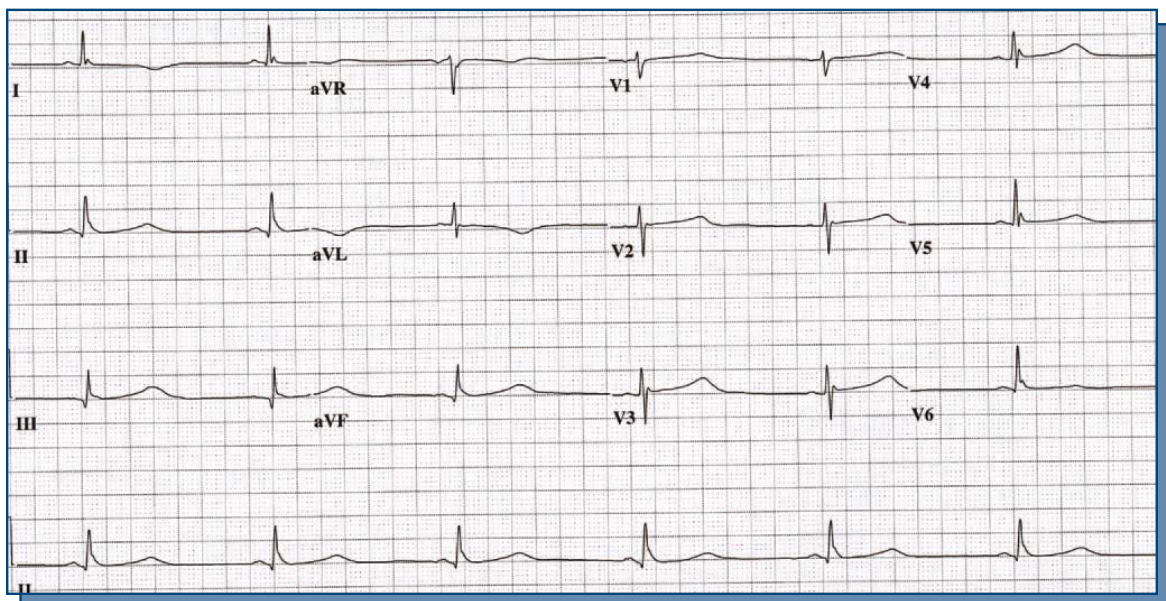


Figure 1.

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Answer

1. The ECG shows marked sinus bradycardia at 38 beats per minute. The P waves are of low amplitude and there is striking prolongation of the QT interval, which exceeds 700 milliseconds. There is an unusual late notch in the QRS complex, suggesting some kind of intraventricular conduction delay.
2. Bradycardia and QT interval prolongation are often seen in patients with metabolic disturbances or drug toxicity, and may also be a clue to the presence of intracranial disease. The clue to the diagnosis in this patient is the late notch in the QRS, seen best in leads I and V₃ to V₆, which is an Osborn or “J” wave. This is the classic ECG of severe hypothermia, although J waves are not pathognomonic of this condition and may be seen occasionally in hypercalcemia

and early repolarisation syndromes. The patient’s core temperature was 29 C, and following appropriate rewarming measures a repeat ECG (Figure 2) was normal.

Osborn waves are usually present in hypothermia with temperatures around 30 C and invariably seen at temperatures much below this; their magnitude is an indicator of the severity of the hypothermia. The mechanism appears to be an exaggeration of the “spike and dome” transmembrane action potential unique to epicardial cells. Cooling exaggerates the early transient outward current in these cells and this produces a positive deflection in the terminal portion of the QRS complex. Bradycardia and QT interval prolongation are also typically seen in hypothermia, and ventricular arrhythmias and heart block may occur in severe cases. **DX**

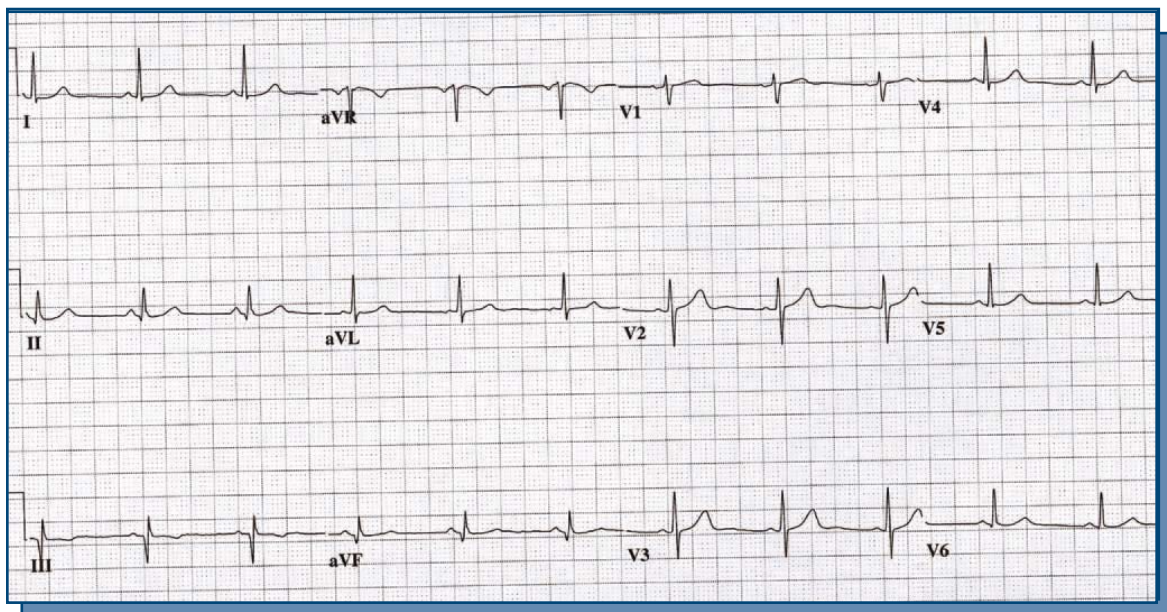


Figure 2.