

ECG DILEMMA-ANSWERMahaletwork Assefa¹, Sudarshan Balla²¹Department of Medicine, University of Missouri, Columbia, Missouri²Division of Cardiology, Department of Medicine, West Virginia University, Morgantown, WV.Corresponding author: Mahaletwork Assefa, DO. One Hospital Dr, Columbia, MO 65212
(assefam@health.missouri.edu)

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The ECG demonstrates findings of hypothermia. Such findings include: bradycardia, Osborn waves, and a prolonged QT interval. Patient's temperature was 33.6 °C on arrival in the emergency room.

DISCUSSION

Body's core temperature is tightly maintained between 36.5-37.5 °C (99.7-99.5 °F) regardless of environmental disparities. Hypothermia is defined as a body temperature below 35 °C. Mild hypothermia is defined as a temperature between 32.2 and 35 °C, moderate is between 28 and 32.1 °C, and severe is <28 °C¹. ECG changes associated with hypothermia include: Osborne waves or J waves, prolonged PR, QRS and QT intervals; bradyarrhythmia, shivering artifacts, VT, VF or asystole². The findings of hypothermia on this ECG are bradycardia, Osborn waves, and a prolonged QT interval.

The delay in impulse conduction through all cardiac tissue has been associated with prolongation of all the electrocardiogram intervals; PR, QRS, QT³. Osborne waves have been associated with hypothermia since their discovery in 1938. It's characterized as a small positive deflection (negative in aVR and V1) at the end of a QRS complex and an elevation of J

point⁴. They are more prominent in anterior and lateral precordial leads and lead II¹. Although Osborne waves are seen in 80% of patients with body temperature less than 35 °C¹, they are apparent with body temperature <32 °C (90 °F). The degree of hypothermia is inversely related to the magnitude of the QRS complex⁵. The exact mechanism of Osborne waves in hypothermia has not yet been established. An induction of increased activity of the cardiac transient outward potassium current, which is more prominent in epicardium than endocardium, has been suggested⁶. Multiple possible mechanisms have been described including acidosis, and delayed ventricular depolarization or early repolarization³. Similar ECG findings have been observed in patients with subarachnoid hemorrhage⁷, hypercalcemia⁸, early repolarization, and Brugada syndrome⁹.

In the correct clinical settings, Osborne waves, prolonged QT, and bradyarrhythmias relate to hypothermia.

Notes

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