Cold-hearted—the electrocardiogram in hypothermia

A 50-year-old woman was brought to the Emergency Department following prolonged hypothermia. Her core temperature on arrival was 32.3°C. Her electrocardiogram showed classic changes associated with hypothermia—baseline tremor, sinus bradycardia, a PR interval at the upper limit of normal (200 ms), a prolonged QTc (484 ms) and prominent Osborn waves (arrow).

Osborn waves, also known as ‘J waves’, were first described by Dr John Osborn in 1953 during experimental hypothermia. They result from a transmural voltage gradient mediated by the transient outward potassium current (Ito) in epicardium but not endocardium leading to accentuation of the spike-and-dome morphology of the action potential in M and epicardial cells. Osborn waves may also be seen in hypercalcaemia, Brugada syndrome and subarachnoid haemorrhage.

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