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J Waves of Osborn Revisited

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In 1953, Joseph Osborn examined the physiologic effects of hypothermia and defined typical associated changes in the electrocardiogram (ECG), now known as J waves of Osborn. There is a subtlety, however: Osborn's J waves were absent in hypothermic animals whose pH was maintained via mechanical ventilation. Osborn wrote: "We regard this as evidence that the ECG changes ... may not be associated with the low temperature directly, but rather may be more closely associated with faulty elimination of CO₂ under hypothermic conditions" (1).

This principle is illustrated in a 64-year-old man who presented hypothermic to 92°F and profoundly acidemic (pH 7.03) after cardiac arrest. Striking J waves are evident on initial ECG (**A**). Controlled cooling was initiated; hypothermia was maintained to preserve brain function. Intubation and resuscitation restored bicarbonate, carbon dioxide concentrations, and pH. At pH 7.33, although body temperature was identical at 92°F, the J waves had resolved (**B**).

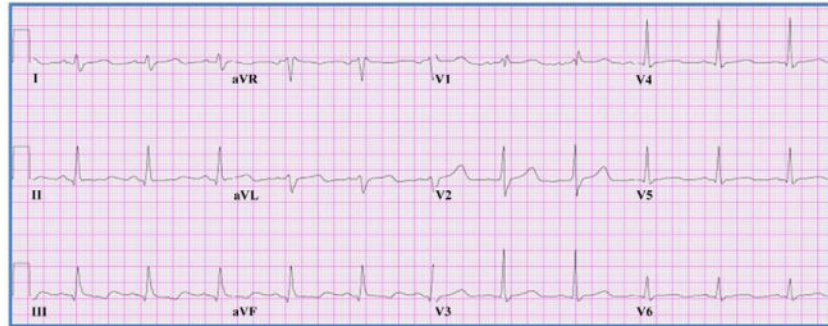
References

1. Osborn JJ. Experimental hypothermia: respiratory and blood pH changes in relation to cardiac function. *Am J Physiol.* 1953; 175:389–98. [PubMed: 13114420]

A Presentation (temperature 92°F, pH 7.03)



B Controlled cooling (temperature 92°F, pH 7.33)



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