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**Citation:** Edelman, Elazer R., and Joynt, Karen. "J Waves of Osborn Revisited." *Journal of the American College of Cardiology* 55, 20 (May 2010): 2287 © 2010 American College of Cardiology Foundation

**As Published:** <http://dx.doi.org/10.1016/j.jacc.2009.06.071>

**Publisher:** Elsevier

**Persistent URL:** <http://hdl.handle.net/1721.1/112785>

**Version:** Author's final manuscript: final author's manuscript post peer review, without publisher's formatting or copy editing

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# HHS Public Access

Author manuscript

*J Am Coll Cardiol.* Author manuscript; available in PMC 2015 November 09.

Published in final edited form as:

*J Am Coll Cardiol.* 2010 May 18; 55(20): 2287. doi:10.1016/j.jacc.2009.06.071.

## 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 CO<sub>2</sub> 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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